

EUROPEAN PATENT SPECIFICATION

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⑧ **Improvements in steam generators for use with electrodomestic appliances such as a steam iron.**

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Description

Combination of steam iron and steam generator are per se known such as, for example, of the type in which a reciprocating membrane pump pumps water from a water container and to a steam generator from which steam is supplied to a steam iron under the control of a push button provided in the iron handle. The reciprocating membrane pump is connected to an inlet pipe and an outlet pipe, each provided of a non-return valve.

A first drawback of the known combination resides in the calcareous deposits that render the steam iron inefficient after a very short period of time.

A second drawback of such known very expensive and not operative combination is that it is not a compact construction.

A third drawback of such known combination resides in the fact that the operator must press the control push button with a high frequency since the steam generator has no thermic inertia.

A fourth drawback of such known combination is that the combination is necessarily limited to steam irons. US—A—2 606 272 discloses a vapor generator in which a pump feeds water from a water reservoir to a heating unit; the heating unit comprises a metallic block heated by electric resistors. This vapor generator is not suitable for domestic use and no provisions are made to prevent calcium deposits. Cleaning operations and general maintenance must be performed by specialists and would be expensive and time consuming.

FR—A—2 306 400 discloses a vaporization chamber with front and rear opening of expensive construction, which does not solve adequately the cleaning and decalcification problems.

The task of this invention is to provide a reliable, efficient, durable steam generator which is suitable also for domestic appliances and in which provisions are made to prevent calcium deposits and to facilitate cleaning operations and general maintenance.

This task is achieved by a steam generator as defined in claim 1.

The invention will be more clearly understood from the following detailed description of a preferred embodiment thereof, illustrated in the enclosed drawings, wherein:

Fig. 1 shows the steam iron and steam generator combination with the cover disconnected for representation consistency;

Fig. 2 is an electric diagram of the proposed combination;

Fig. 3 shows according to a sectional view the novel disposable device for decalcifying the water to be supplied to the water reservoir;

Fig. 4 shows partially according to a longitudinal sectional view the steam outlet embodying the steam outlet nipple permitting the cleaning of the steam generator chamber as well of the steam outlet nipple only;

Fig. 5 shows with some portions removed an horizontal sectional view of the steam generator;

Fig. 6 shows the different possible applications of the proposed combination.

The following specification will deal separately with:

- I: General construction
- II: Anticalciferous means
- III: Steam generator
- IV: Operation

I General Construction

With reference to the Figure 1 the invention provides a support frame *FR* made of metallic sheet or of plastics material supporting a steam generator *SB*, an electrical vibration piston pump *PU*, and a water reservoir *CO*. A cover or closure *KO* is provided having an opening *AP* to provide access to the water inlet opening *IA* of the water reservoir *CO*. The cover *KO* may be fixed to the support frame *FR* with screws and the frame has an up-standing side flange *PR* with a carrying handle *MA*.

The cover has an aperture which receives a switch *SW* associated with a warning lamp *WL*.

The piston pump *PU* is supported by two spaced rubber flanges *FL*¹-*FL*² which absorb the pump vibrations.

II Anticalciferous means

Reference is made to the Figures 3, 4, and 5.

A container *CN* is partially charged with known resin *RS* and has an upper aperture *UA* and a lower aperture *LA*, the latter cooperating with the inlet opening *IA* of the water reservoir.

UA and *LA* are designed respectively to receive stoppers *SR*¹-*ST*² and the exchange resin container is of the disposable kind. The resin layer *RS* is confined between two spongy layers *SR*¹-*ST*², leaving an upper cavity *CV* so that the resin container *CN* operates as illustrated as a funnel. When the resin container is removed from the water reservoir *CO* a rubber stopper *SR* closes the water inlet as shown in dotted lines in Figure 3.

When the resin is exhausted the resin coloration changes, alerting the operator that a fresh container should be substituted.

With reference now to the Figure 4 novel means are illustrated for the removal of calciferous deposits in the event that a resin container is not used.

The steam generator *SB* has a steam chamber *CA* and comprises a metallic body *BL* incorporating an electric heating resistor *RE* associated with a thermostat *TH*. A threaded bushing *TB* is fixed to the outlet of the cylindrical steam chamber having an internal threaded portion which receives an outlet steam nipple *ON*. The latter is hollow and machined with a set of holes and presents an inside threaded portion *TR* cooperating with a screw *SC* that presents a longitudinal hole *HL*.

To a cylindrical portion *CY* of nipple a steam hose *SH* may be secured with a band *BN* in known manner.

If it is required to clean only the nipple *ON* it is sufficient to unscrew the screw *SC*. If it is required to clean the whole steam chamber, the nipple *ON*

may be unscrewed and removed to give access to steam chamber *CA* for cleaning with a brush (non represented).

A "teflon" insulating sleeve is provided for the protection of the steam hose *SH*.

III Steam Generator

The steam generator *SB* comprises a metallic block *BL* embodying a heating resistor *RE*. The inlet water duct has been shown at *IW* and is close to the water outlet *OU* from the pump to which it is connected by a teflon duct *TD* as shown. An insulating layer *LY* covers the metallic block *BL*, and the layer *LY* and the block *BL* are surrounded by metallic housing *HO* as shown. In this way the invention provides a steam generator that has a very high thermal inertia.

IV Operation

From the foregoing and particularly from the Fig. 2 the operation of the proposed novel combination is apparent.

If the switch *SW* is operated to connect the electrical supply (compare Fig. 2) the heating resistor *RE* produces steam from the water injected into the steam chamber if the pump is energized. This is rendered possible by activating the switch push button *PP* provided in the iron handle *HA*. The warning lamp is not energized. If the temperature in the steam generator chamber is too high the thermostat disconnects the heating resistor from the electrical supply and the warning lamp is energized. Namely the lamp is energized as soon as the thermostat opens.

For preventing calciferous deposits the resin container operating as funnel may be used, as already stated (see II).

If the resin container is not used the calciferous deposits may be removed from the steam outlet nipple e.g. *ON* or from the steam generator chamber *CA* as stated (see II).

As will be apparent the steam iron rests on the cover *KO*, when ironing is not required.

FU shows a fuse and *RY* the electrical resistor of the steam iron combination.

With reference now to the Figures 1, 2 and 6 it results apparently that the electrodomestic appliance such as a steam iron may be disconnected and the steam generator may be used alternatively for a steam floor washing apparatus *SA*, a coffee machine *CM* or an electric steam brush *VB* and so like. This is permitted thanks to the provision of a quadripolar plug *QP* and a quadripolar socket *AT* which latter is fixed to the flanged portion *PR*.

Since the steam hose and the electric quadripole cable may be disconnected the whole Fig. 1 steam generator may be alternatively used for the Fig. 6 uses.

The objects and advantages of the invention well result from the foregoing.

Claims

1. A steam generator (*SB*) for use with electro-

domestic appliances such as a steam iron, comprising a metallic block (*BL*) made of a material with high thermal inertia embodying heating resistors (*RE*) and a vaporization chamber (*CA*), thermostat means (*TH*), cooperating with a warning lamp (*WL*), being connected in series to said heating resistors (*RE*), said steam generator being connected to a water reservoir (*CO*), by means of a vibration electric pump (*PU*), for feeding water to said chamber, and to an appliance such as a steam iron (*IR*), said steam generator further comprising a threaded steam outlet to which a nozzle (*ON*) is applied, said nozzle being removably associated with said vaporization chamber and adapted for permitting access to said chamber for cleaning purposes, characterized in that said nozzle (*ON*) comprises a hollow part connected at one side to said chamber by means of a set of radially arranged holes (*FX*) and at the opposite side connected to a hose (*SH*), said hollow part of said nozzle protruding into said chamber (*CA*), said nozzle having also an internal threading (*TR*) engaging a screw (*SC*) fitted with a calibrated hole (*LH*) for delivery steam at suitable high pressure, said screw being removable for permitting cleaning of said nozzle, said hollow part of said nozzle having, on its side adjacent to said chamber, a closed flat end defining, together with the internal walls of said chamber, an annular laminating passage adapted for reducing calcium deposits.

2. A steam generator, according to claim 1, wherein said vaporization chamber (*CA*) is connected to said vibration electric pump (*PU*) by means of a nipple (*IW*) of relatively large internal diameter located on the side of said chamber opposite to said nozzle.

3. A steam generator, according to claim 1, wherein said vibration electric pump (*PU*) is activated by a switch (*PP*) associated to said appliance.

4. A steam generator, according to claims 1 and 3, wherein said steam generator, water reservoir and vibration pump are associated to a base element (*FR*) and a cover element (*KO*), said cover element being adapted to operate as a support member for an appliance such as a steam iron.

5. A steam generator, according to claim 1, wherein said heating resistors (*RE*) are embodied into said metallic block (*BL*) during the moulding stage.

Patentansprüche

1. Dampferzeuger zum Gebrauch bei elektrischen Haushaltsgeräten, wie ein Dampfbügeleisen, bestehend aus einem metallischen Block (*BL*), hergestellt aus einem Material mit eingelagerten, thermisch hochträgen Heizwiderständen (*RE*) und einer Verdampfungskammer (*CA*), einem mit einer Warnlampe (*WA*) zusammenwirkenden Thermostaten (*TH*), welche Lampe mit den Heizwiderständen (*RE*) in Reihe geschaltet ist und wobei der Dampferzeuger mit einem Wassereservoir (*CO*) verbunden ist durch eine elektri-

sche Vibrationspumpe (PU) für die Zuförderung von Wasser zur Verdampfungskammer und zu einem Gerät wie einem Dampfbügeleisen und ferner bestehend aus einem eingeschraubten Dampfauslaß mit einer Düse (NO), die zwecks Reinigungszuganges zur Verdampfungskammer dieser lösbar zugeordnet ist, dadurch gekennzeichnet, daß die Düse (NO) ein Hohlteil aufweist, das auf der einen Seite mit der Kammer durch mehrere, radial angeordnete Löcher (FX) und auf der anderen, gegenüberliegenden Seite mit einem Schlauch (SH) verbunden ist, daß sich das Hohlteil der Düse in die Kammer (CA) erstreckt, wobei die Düse auch ein Innengewinde (TR) aufweist, das eine Schraube (SC) mit einer kalibrierten Bohrung (LH) für den Dampfauslaß bei geeigneter hohem Druck und lösbar zum Zweck der Düsenreinigung aufnimmt und daß das Hohlteil kammerseitig ein geschlossenes, flaches Ende aufweist, das zusammen mit der inneren Wand eine kreisförmig laminierte Passage für die Reduktion von Kalzium-Ablagerungen definiert.

2. Dampferzeuger nach Anspruch 1, worin die Verdampfungskammer (CA) durch ein mit relativ großem Innendurchmesser versehenes Nippel (IW) mit der elektrischen Vibrationspumpe (PU) verbunden ist, und zwar an der Seite der Kammer, die der Düse gegenüberliegt.

3. Dampferzeuger nach Anspruch 1, worin die elektrische Vibrationspumpe (PU) mit einem dem Gerät angeordnetem Schlatter (PP) einschaltbar ist.

4. Dampferzeuger nach Anspruch 1 und 3, worin der Dampferzeuger, das Wasserrezeiv und die Vibrationspumpe einem Basiselement (FR) und einer Abdeckung (KO) zugeordnet sind, wobei die Abdeckung derart ausgebildet ist, daß sie als Träger für ein Gerät, wie ein Dampfbügeleisen, dient.

5. Dampferzeuger nach Anspruch 1, worin die Heizwiderstände (RE) während der Ausformung des metallischen Blockes (BL) in diesen eingebracht sind.

Revendications

1. Générateur de vapeur (SB) utilisable dans des appareils électro-ménagers, tels qu'un fer à repasser à vapeur, comprenant un bloc métallique (BL) en un matériau ayant une inertie thermique élevée, comportant des résistances de chauffage (RE) et une chambre de vaporisation (CA),

des moyens formant thermostat (TH), coopérant avec une lampe d'alarme (WL), étant reliés en série auxdites résistances de chauffage (RE), ledit générateur de vapeur étant relié à un réservoir d'eau (CO), au moyen d'une pompe électrique à vibrations (PU), pour fournir de l'eau à ladite chambre, et à un appareil tel qu'un fer à vapeur (IR), ledit générateur de vapeur comprenant de plus une sortie de vapeur filetée à laquelle est appliquée une buse (ON), ladite buse étant associée, de façon amovible, à ladite chambre de vaporisation et adaptée pour permettre l'accès à ladite chambre dans un but de nettoyage, caractérisé en ce que ladite buse (ON) comprend une partie creuse reliée d'un côté à ladite chambre au moyen d'un jeu de trous agencés radialement (FX) et du côté opposé reliée à un tuyau (SH), ladite partie creuse de ladite buse faisant saillie dans ladite chambre (CA), ladite buse ayant également un filetage interne (TR) engageant une vis (SC) munie d'un trou calibré (LH) pour délivrer de la vapeur à une pression élevée appropriée, ladite vis étant retirable pour permettre le nettoyage de ladite buse, ladite partie creuse de ladite buse ayant, sur son côté adjacent à ladite chambre, une extrémité plate fermée définissant, en même temps que les parois internes de ladite chambre, un passage de laminage annulaire adapté pour réduire les dépôts de calcium.

2. Générateur de vapeur selon la revendication 1, dans lequel ladite chambre de vaporisation (CA) est reliée à ladite pompe électrique à vibrations (PU) au moyen d'un raccord (IW) ayant un diamètre interne relativement grand, situé sur le côté de ladite chambre opposé à ladite buse.

3. Générateur de vapeur selon la revendication 1, dans lequel ladite pompe électrique à vibration (PU) est activée par un commutateur (PP) associé audit appareil.

4. Générateur de vapeur selon les revendications 1 et 3, dans lequel ledit générateur de vapeur, ledit réservoir d'eau et ladite pompe à vibration sont associés à un élément de base (FR) et à un élément formant couvercle (KO), ledit élément formant couvercle étant adapté pour jouer le rôle d'un organe de support pour un appareil, tel qu'un fer à repasser à vapeur.

5. Générateur de vapeur selon la revendication 1, dans lequel lesdites résistances de chauffage (RE) sont agencées dans ledit bloc métallique (BL) pendant l'étape de moulage.

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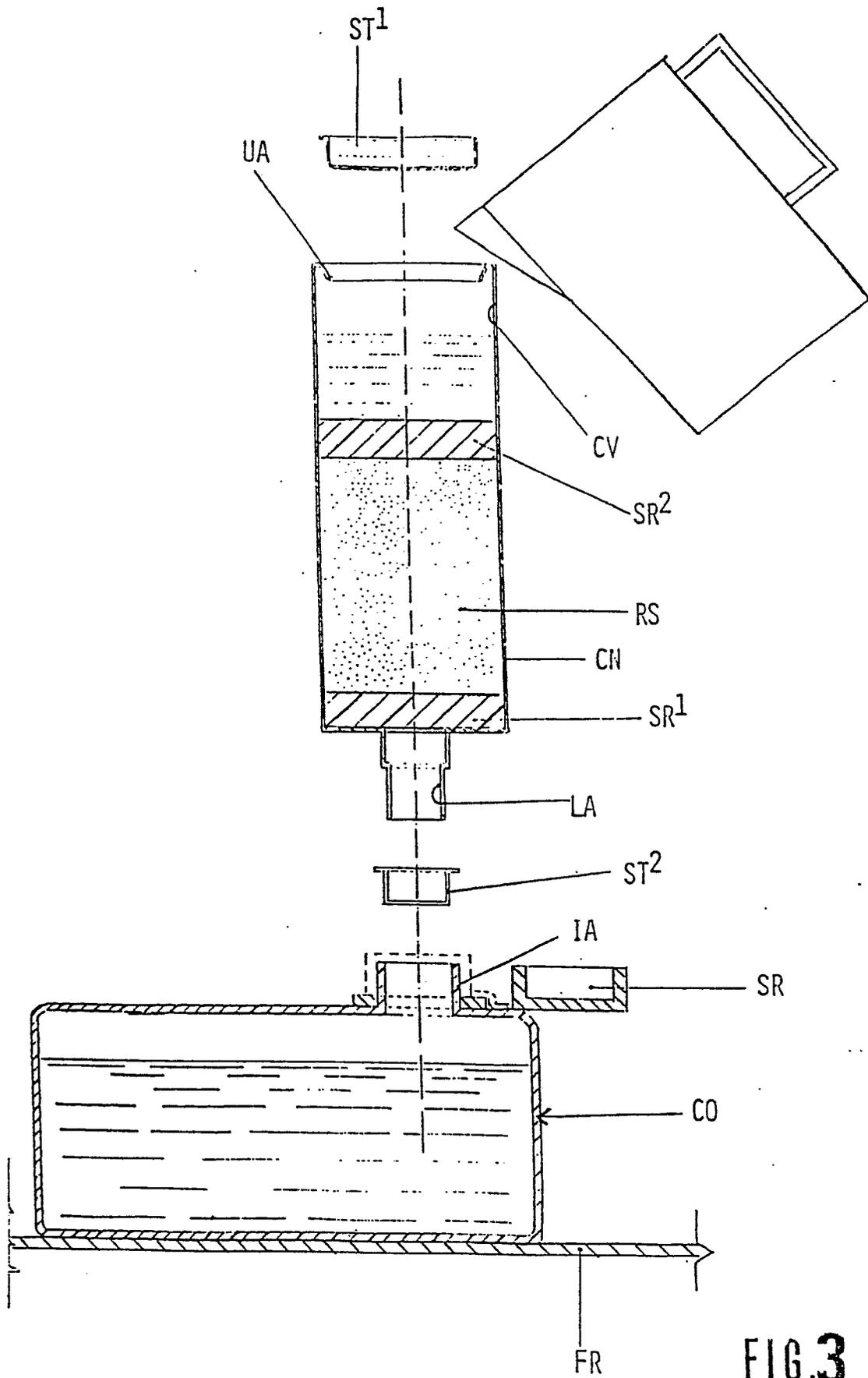
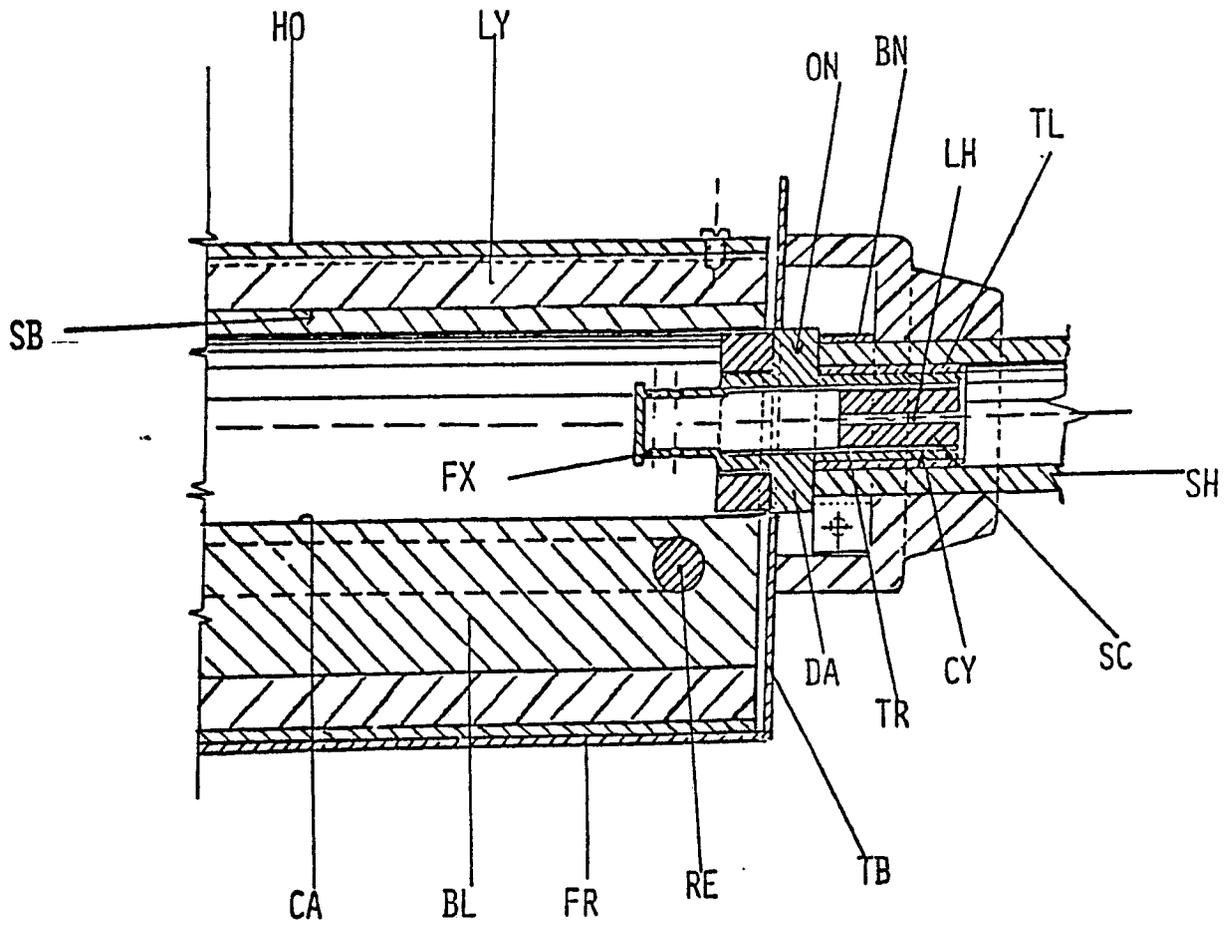


FIG.3



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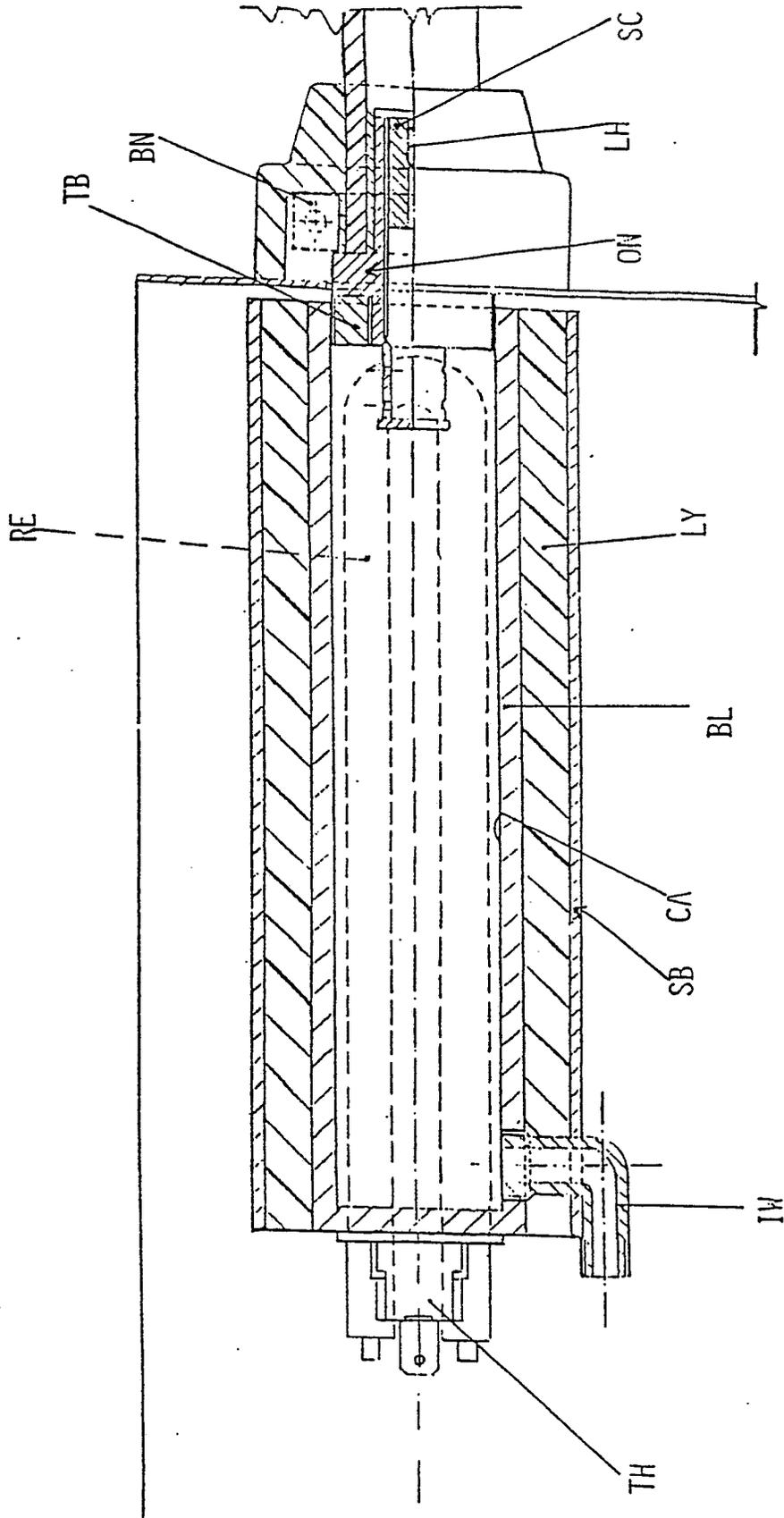


FIG. 5

