(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 014 485**
B1

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **30.03.83**

(51) Int. Cl.³: **E 01 B 7/24**, F 23 D 13/14

(21) Application number: **80200021.6**

(22) Date of filing: **09.01.80**

(54) **Burner for a railway points-heater.**

(30) Priority: **06.02.79 NL 7900937**
12.02.79 NL 7901084

(43) Date of publication of application:
20.08.80 Bulletin 80/17

(45) Publication of the grant of the patent:
30.03.83 Bulletin 83/13

(84) Designated Contracting States:
BE CH DE FR GB NL

(56) References cited:
DE - B - 1 111 661
FR - A - 1 439 978
FR - A - 2 292 928
US - A - 2 815 747
US - A - 3 304 985

(73) Proprietor: **Aben Apparaten- en Machinefabriek B.V.**
Odijkerweg 2b
NL-3972 NE Driebergen (NL)

(72) Inventor: **Reijerkerk, Cornelis Gerhardus**
v. Furstenburchstraat 11
Nijkerk (NL)
Inventor: **Waldmeier, Hans Robert**
3, Bachstrasse,
CH-4313 Möhlen (CH)

(74) Representative: **Konings, Lucien Marie Cornelis Joseph et al,**
OCTROOIBUREAU ARNOLD & SIEDSMA
Sweelinckplein 1
NL-2517 GK Den Haag (NL)

EP 0 014 485 B1

Courier Press, Leamington Spa, England

Burner for a railway points-heater.

The invention relates to a burner for a railway points-heater comprising a burner housing and at least one burner body arranged in said housing and having passages, in which the combustion of a gas-air mixture takes place.

Such a burner is known from DE—B 1,111,661. Herein the burner consists of a burner stone. In order to prevent extinction of the flame during a storm or during the passing of trains by a gust of wind, the combustion channels have such a width that the gas/air mixture passing through the the combustion channels already ignites in the combustion channels. This burner stone requires a long heating-up time until it reaches such a degree of heat that ignition can take place in the burner stone. During this heating-up time the flame may be extinguished by a gust of wind. The burner stone can be rendered suitable for all kinds of gas only with difficulty. The burner stone has, in particular, the disadvantage that it can be made only with difficulty and is likely to break down due to vibrations.

The invention provides a burner of the kind set forth in the preamble, in which the risk of extinction of the flame, even a short time after ignition, is avoided, and which as regards a flash-over of the flame to the gas-air mixture feed is absolutely safe, even in the event of appreciable variations in the gas-to-air ratio, in the chemical composition of the gas and/or the output of delivered heat, said burner being readily manufacturable and being capable of withstanding vibrations, since the burner body mainly consists of one extinction gauze and at least three and preferably more than three glowing gauze layers, said extinction gauze and said glowing gauze layers succeeding one another in the direction of flow, inside which the combustion takes place, said glowing gauze layers being arranged near one another and constituting together a glow body, comprising sufficiently heated material to keep the temperature of the burner body above the ignition temperature during some time after the flame has been blown out.

US—A—2 815 747 discloses a railroad switch-heater having an oil burner comprising wicks inserted in a U-shaped screen. The combustion takes place outside of the end of the wicks and thus outside of the U-shaped screen.

FR—A 2 292 928 discloses an infra-red burner having a burner body built up from a packet 15 of at least two adjoining gauze layers 15a and 15b and another gauze layer 23 positioned remote thereof. That gauze layer 15b of said at least two adjoining gauze layers 15a and 15b facing the gas inlet should be considered to constitute an extinction gauze layer 15b always remaining below the ignition temperature. This means that the other 15a of said at least two adjoining gauze layers 15a and 15b could be heated above the ignition temperature when the burner is in operation. However, also the temperature of this other gauze layer 15a remains relatively low, as the combustion takes place partly outside of this thin packet of gauze layers, although this FR—A—2 292 928 states, that the combustion occurs within the spaces between the gauze elements of this packet 15. It is believed that in reality the combustion occurs for a great deal in the free space between the packet 15 and the outer gauze layer 23. In order to catch the heat due to combustion in this free space, the outer layer 23 is required, which outer layer is called a backwards radiating grill, indicating its function, which would be superfluous in case the combustion would occur within the packet 15. This known burner is not proposed for use in a railway switch-heater and would not be useful at railroad switches, as the flame would already be definitively extinguished by little wind, due to the facts

that the wind flow resistance through the gauze layers is relatively low;

that the amount of heated material of the packet of glow gauzes is small;

and that the normal operation temperature of the packet of glow gauzes is relatively low. When such cooling air passes easily along little thin material of relatively low temperature, this material will almost immediately be cooled beneath the ignition temperature.

FR—A—1 439 978 discloses a burner with a radiating element, consisting of a metal plate, a grid, a ceramic plate or a combination of grids with ceramic plates. Page 1, column 2, line 7 describes that the combustion takes place at the surface of the radiating element.

US—A—3 304 985 describes a burner comprising ceramic balls.

The burner body preferably comprises a gauze holder having a U-shaped profile. This is a unit, which can easily be replaced. This burner body can easily be fabricated when the holder retains a plurality of gauze plates retained by meant of bent-over tags of the holder. Tests have shown that a very well operating burner is achieved with a burner body comprising at least one gauze of expanded material. This gauze has a considerable heating surface and forms a considerable flow resistance reducing the wind velocity, when the wind flows through the burner. So the required number of gauze layers is smaller when using expanded material. Further this material has the additional advantage of the use of an element which can be produced at extremely low cost.

The preferred embodiment of the burner according to the invention comprises a plurality of gauze plates having rhombic meshes, the directions of length of which are alternately

transverse of one another. This again increases the wind flow resistance and improves the heating of the material of the burner body.

The invention will be described more fully hereinafter with reference to a drawing.

The drawing shows schematically in

Fig. 1 a plan view of railway points having a points-heater provided with burners in accordance with the invention,

Fig. 2 an enlarged, perspective view, partly broken away, of a detail of a points-heater having burners as shown in Fig. 1,

Fig. 3 an enlarged perspective and exploded view, partly broken away of a burner of the points-heater shown in Fig. 1,

Figs. 4 and 5 an enlarged sectional view of a burner in operation with a rail taken on the line IV—IV and V—V respectively in Fig. 2,

Figs. 6 and 7 a front and side view respectively of details VI of Fig. 3,

Figs. 8 and 9 a front and side view respectively of detail VIII of Fig. 3,

Figs. 10 and 11 a front and side view respectively of detail X of Fig. 3,

Figs. 12 and 13 a front and side view respectively of detail XII of Fig. 3,

Fig. 14 on an enlarged scale detail XIV of Fig. 4,

Figs. 15 and 16 each a variant of detail XIV,

Fig. 17 an enlarged sectional view XVII—XVII of Fig. 2,

Fig. 18 detail XVIII of Fig. 1 and

Fig. 19 a perspective view, partly broken away, of a different burner according to the invention.

The railway points-heater 60 comprises a gas/air mixing apparatus 1 having a gas manifold 17 connected with a gas pipe 16 and an air suction hood 18. The air is sucked in with the aid of the gas fed in under pressure. The gas/air mixture flows through a common burner pipe 2 connected with the mixing apparatus 1 towards a plurality of burners 3. The burners 3 each comprise a burner housing 61 and a burner body 4 arranged therein and having passages. The passages establish a communication between a flame chamber 23 facing a rail 21 and a gas distribution chamber 62 extending in the direction of length of the burner 3. The gas distribution chamber 62 communicates through a slot 63, a cavity 64 and an opening 65 of the burner pipe 2 with said burner pipe 2.

Parallel to the burner pipe 2 is arranged a flash-over pipe 5, which communicates through an aperture 66 of the flash-over pipe 5, a channel 67 and through an aperture 68 in the holder 69 of the burner body 4 with the flame chamber 23. The flash-over pipe 5 is united with the burner pipe 2 to a profile. Midway between the burners 3 the flash-over pipe 5 communicates with the burner pipe 2 through gauze 14, which is fastened by a screw head 25 to a tie piece 6. This tie piece 6 is screwed into a nipple 32 arranged between the flash-over pipe 5 and the burner pipe 2 (see Fig. 18).

The burner according to the invention comprises an ignition device. For each rail this device comprises only one electric ignition member 15. The electrodes 8 and 38 of the ignition member 15 are located in the flash-over pipe 5 and are connected to a pulse producer 26 providing periodically a voltage pulse of 20 kV in periods of 20 to 15 seconds.

According to the invention the burner body 4 mainly consists of a gauze packet within which the combustion of the gas takes place, as a result of which the burner is not blown out by wind produced, for example, by a passing train. The burner body 4 comprises a gauze holder 69 of U-shaped profile. This gauze holder is formed by a perforated plate which distributes the gas at a flow resistance of 0.5 to 1 mm wc [5 to 10 Pa] in the direction of length of the burner 3. The circular perforations 70 may have a diameter of 1 mm and a relative distance of 2 mm.

Inside the holder 69 preferably at least three and most preferably more than three, for example, six gauze plates 71 preferably of expanded material are arranged in superposition, said plates having rhombic meshing 72 of a length *a* of 8 mm and a width *b* of 4 mm, the wire width being 0.7 mm. The directions of length 73 and 74 of these rhombic meshes of the gauze plates 71 are alternately transverse of one another. Beneath the gauze plates 71 adjacent the gas distributing body of the U-shaped holder 69, there is arranged a flame extinguishing gauze 75 of 40 to 80 mesh. The entire gauze packet consists of refractory gauze and has a flow resistance of 1 to 3 mmwc [10 to 30 Pa]. The gauzes 71 and 75 are retained in the holder 69 by bent-over tags 76 of the holder 69. Above the apertures 68 the holder 69 does not contain gauzes 71, 75, but at this area the limbs 77 of the U-shaped profile are bent over towards one another.

According to the invention, as described above and represented in the drawing, a simple infrared burner is provided, which runs at a temperature of 800 to 1000 degrees C. and which is wind-resistant with a low pressure drop, its length *t* being 9 cm and its width *s* 1.5 cm in the burner body 4 having a combustion capacity of about 60 g of propane/hour or 0.09 m^3/hour or normal natural gas, which corresponds to 600 to 750 kcal/hour. The gauzes 71 may, though not preferably, have meshes of twice said size or smaller meshes, for example, 20 mesh. The distance *f* of the burner 3 from the rail 21 may be 2 to 4 mm.

The railway points-heater 60 according to the invention operates as follows:

Before the winter begins, a closing member 48 is opened. As long as the rail temperature remains below 2 degrees C. the thermostat 50 controlled by a thermometer 59 is open and gas flows out of a reservoir 47 and is reduced at the

reducing valve 49 to a pressure of, for example, 0.3 ato and fed into the gas pipe 16. In the burner pipe 2 a gas/air mixture is formed, which flows through the connecting pipes 13 to all burners 3. In addition, the flash-over pipe 5 is filled with this mixture through the gauze 14, though at a lower pressure than that prevailing in the burner pipe 2. A spark produced at the electrodes 8 and 38 ignites the mixture in the flash-over pipe 5, the flame passing to the flame chambers 23 of the burners 3. The subsequent sparks of the ignition member only serve as monitoring sparks in the event all burners 3 would be extinguished. If the ignition member 15 does not periodically produce a spark, an extinguished burner 3 will nevertheless be ignited by the other burners 3. Since the gas/air mixture constantly flows through the gauzes 14 into the flash-over pipe 5, this pipe is each time filled with this mixture during periods of, for example, 10 seconds and from the flame chambers 23 of the burning burners 3 and/or by the ignition member 15 it is ignited. This flame may pass to the flame chamber 23 of an extinguished burner 3, which is thus ignited. The gauze 14 prevents the flame of the flash-over pipe 5 from passing into the burner pipe 2.

The gas conduit 16 may be connected with a natural or synthetic gas means instead of being connected with a gas reservoir.

Referring to Fig. 15 the extinction gauze 75 is arranged on the side of the holder 69 facing the gas distribution chamber 62.

Referring to Fig. 16 the gauze packet comprises apart from the holder 69 and a gas extinction gauze 75, a wound-up gauze 80 of expanded material corresponding to the gauze plates 71.

The burner 81 of Fig. 19 is longer than the burner 3 and has in a housing two cavities having two separated gas distribution chambers 62, but one uninterrupted burner body 4 and only one channel 67.

Claims

1. A burner (3) for use in a railway points-heater comprising a burner housing (61) and at least one burner body (4) arranged therein and having passages in which the combustion of a gas-air mixture takes place, characterized in that the burner body (4) mainly consists of a gauze packet of at least one extinction gauze (75) and at least three and preferably more than three glowing gauze layers (71), said extinction gauze and said glowing gauze layers succeeding one another in the direction of flow, inside which the combustion takes place, said glowing gauze layers being arranged near one another and constituting together a glow body, comprising sufficiently heated material to keep the temperature of the burner body (4) above the ignition temperature during some time after the flame has been blown out.

2. A burner as claimed in claim 1, characterized in that the burner body (4) comprises at least one gauze of expanded material (figs. 10—13).

3. A burner as claimed in any one of the preceding claims, characterized in that the burner comprises a plurality of gauze plates (71) having rhombic meshes (72), of which the directions of length are alternately transverse of one another (figs. 10—13).

4. A burner (3) as claimed in any one of the preceding claims, characterized in that the burner body (4) comprises a gauze holder (69) having a U-shaped profile.

5. A burner as claimed in claim 4, characterized in that the holder (69) retains a plurality of gauze plates (71) retained by means of bent-over tags (76) of the holder (69).

Revendications

1. Un brûleur (3) pour utilisation dans un réchauffeur d'aiguillage de voie ferrée comprenant un carter (61) de brûleur et au moins un corps (4) de brûleur disposé à l'intérieur de ce dernier qui comporte des passages dans lesquels s'effectue la combustion d'un mélange gaz/air, caractérisé en ce que le corps (4) de brûleur est essentiellement constitué par un ensemble de tamis comportant au moins un tamis (75) d'extinction et au moins trois et, de préférence, plus de trois, couches de tamis incandescentes (71), ledit tamis d'extinction et lesdites couches de tamis incandescentes se suivant l'un l'autre dans la direction de l'écoulement, et à l'intérieur desquelles se produit la combustion, lesdites couches de tamis incandescentes étant disposées proches les unes des autres et constituant ensemble un corps incandescent, comprenant suffisamment de matière chauffée pour maintenir la température du corps (4) de brûleur au-dessus de la température d'allumage pendant un certain temps après que la flamme a été soufflée.

2. Un brûleur suivant la revendication 1, caractérisé en ce que le corps (4) de brûleur comprend au moins un tamis de matière déployée (figures 10—13).

3. Un brûleur suivant l'une quelconque des revendications précédentes, caractérisés en ce que le brûleur comprend une série de plaques (71) de tamis ayant des mailles rhombiques (72) dont les directions de longueur sont alternativement transversales les unes aux autres (figures 10—13).

4. Un brûleur suivant l'une quelconque des revendications précédentes, caractérisé en ce que le corps (4) de brûleur comprend un support (69) de tamis ayant un profil en forme de U.

5. Un brûleur suivant la revendication 4, caractérisé en ce que le support (69) retient une série de plaques (71) de tamis retenues au moyen de pattes recourbées (76) du support (69).

Patentansprüche

1. Brenner (3) für einen Weichenheizer mit einem Brennergehäuse (61) und mindestens einem in diesem Gehäuse untergebrachten, Durchgänge aufweisenden Brennerkörper (4) dadurch gekennzeichnet, dass der Brennerkörper (4) im wesentlichen aus einem Gazepaket mindestens einer Flammlöschgaze (75) und mindestens dreier, vorzugsweise mehr als drei Glühgazen besteht, innerhalb deren die Verbrennung stattfindet, welche Flammlöschgaze und welche Glühgazen in der Strömungsrichtung in Reihenfolge angeordnet sind und welche Glühgazen naheeinander angebracht sind und gemeinsam einen Glühkörper bilden, der ausreichend erhitztes Material enthält, um die Temperatur des Brennerkörpers (4) während einer bestimmten Zeit nach dem Löschen der Flamme über die Zündtemperatur aufrechtzuerhalten.

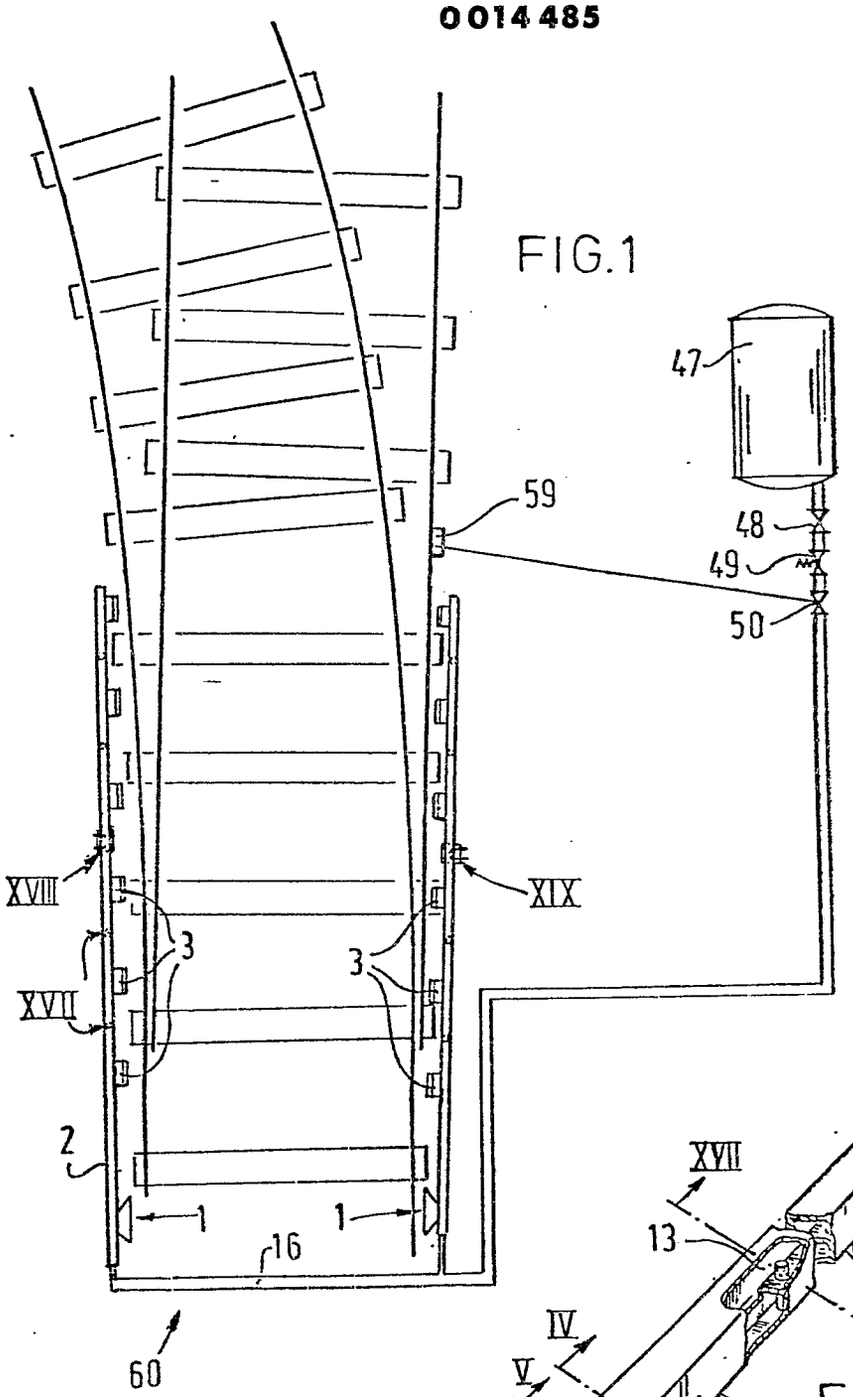
2. Brenner nach Anspruch 1, dadurch gekennzeichnet, dass der Brennerkörper (4) mindestens eine Gaze aus Streckmaterial enthält (Fig. 10 bis 13).

3. Brenner nach einer der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass der Brenner eine Anzahl von Gazen (71) mit rautenförmigen Maschen (72) enthält, die abwechselnd mit der Längsrichtung der Maschen quer aufeinander liegen (Fig. 10 bis 13).

4. Brenner (3) nach einem der vorhergehenden Ansprüche dadurch gekennzeichnet, dass der Brennerkörper (4) einen Halter (69) aus Gaze mit U-förmigem Profil enthält.

5. Brenner nach Anspruch 4, dadurch gekennzeichnet, dass die Anzahl von Gazen (61) mittels abgebogener Zungen (76) des Halters (69) im Halter (69) eingesperrt ist.

FIG.1


47
59
48
49
50
XVIII
XIX
3
3
XVII
2
1
1
16
60

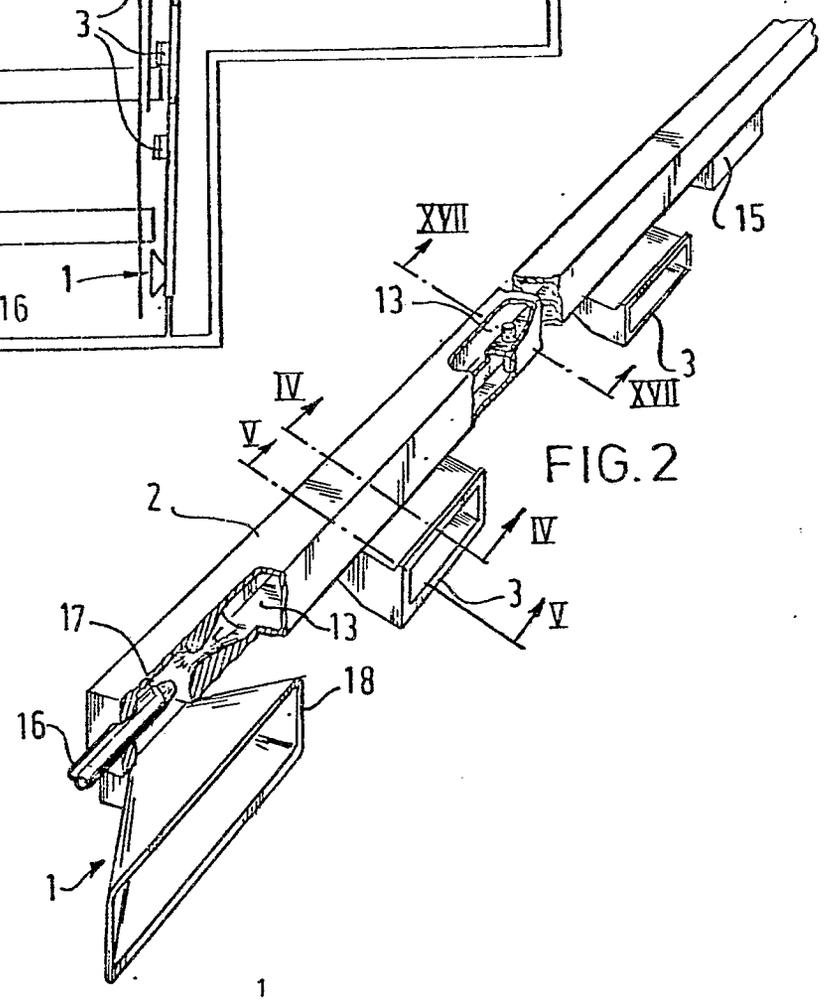

XVII
15
13
3
XVII
IV
V
2
IV
3
V
17
13
18
16
1

FIG.2

FIG. 3

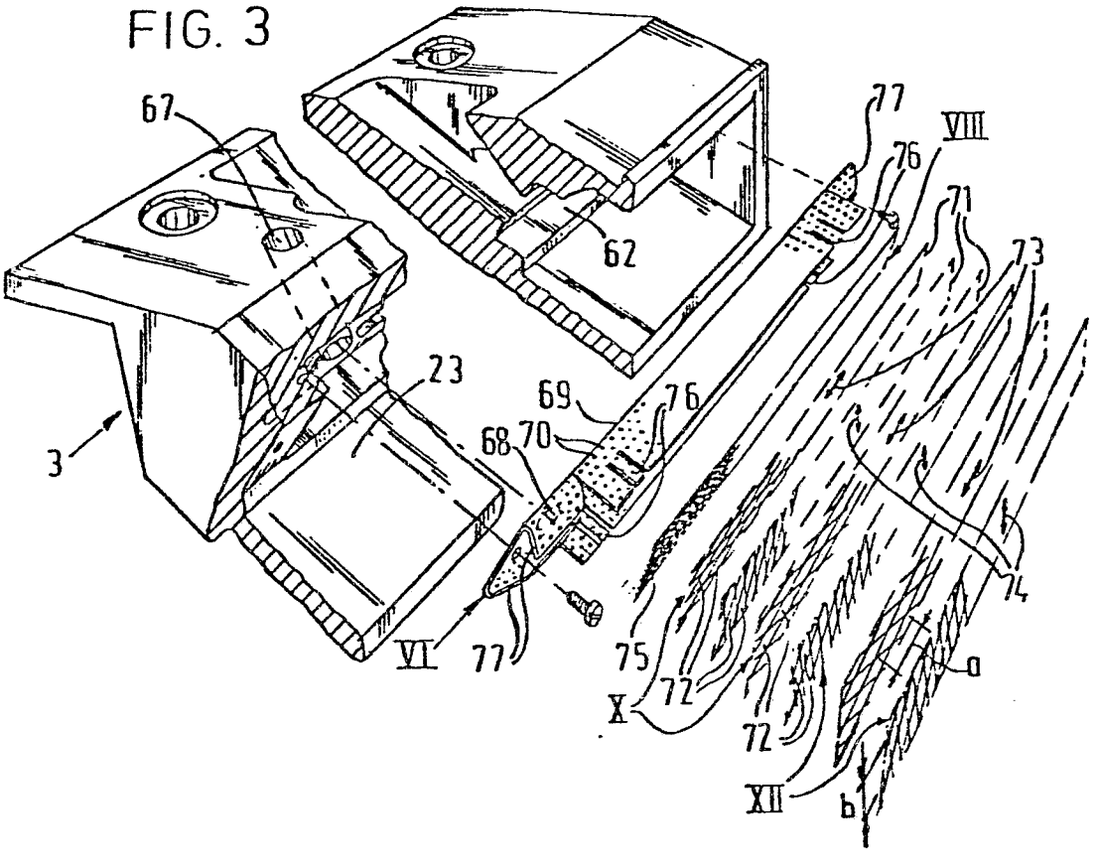


FIG. 4

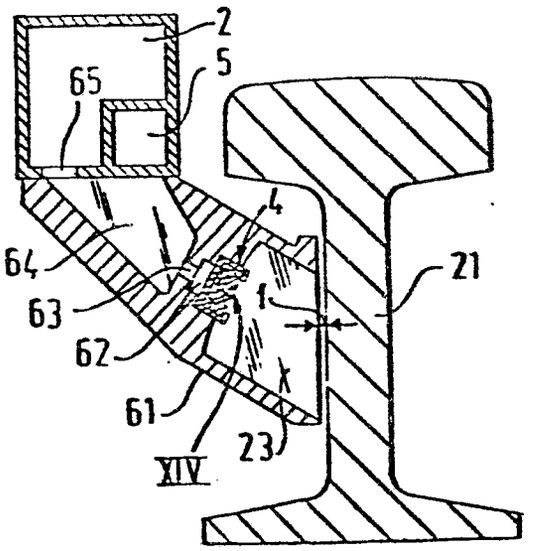
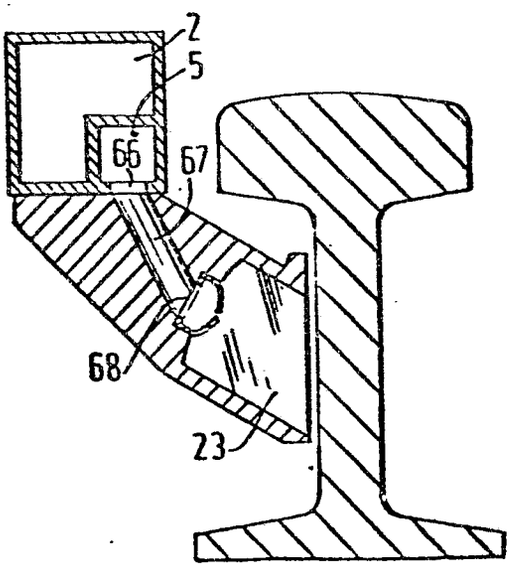


FIG. 5



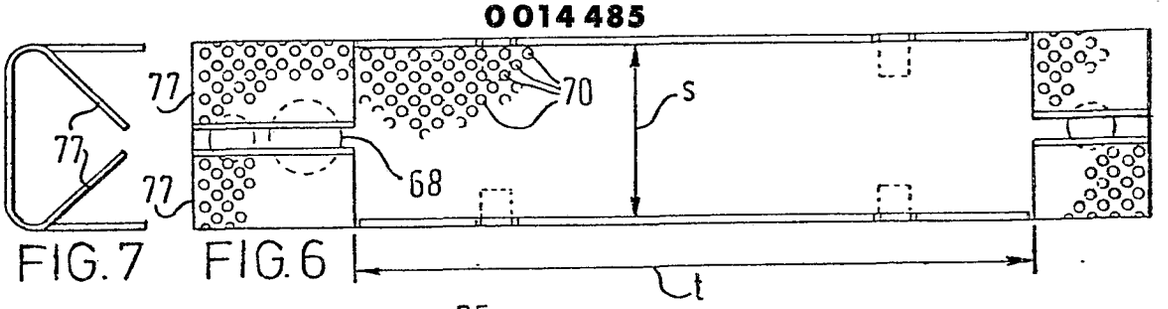


FIG. 7 FIG. 6

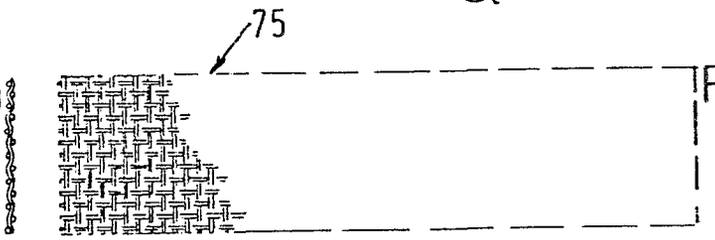


FIG. 9 FIG. 8

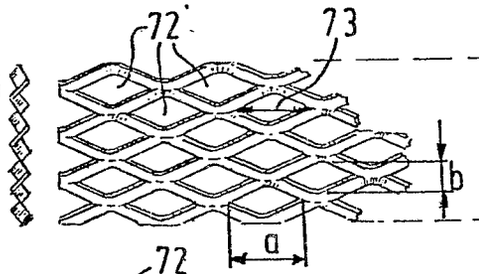


FIG. 11 FIG. 10

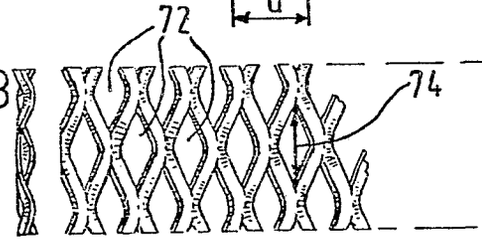


FIG. 13 FIG. 12

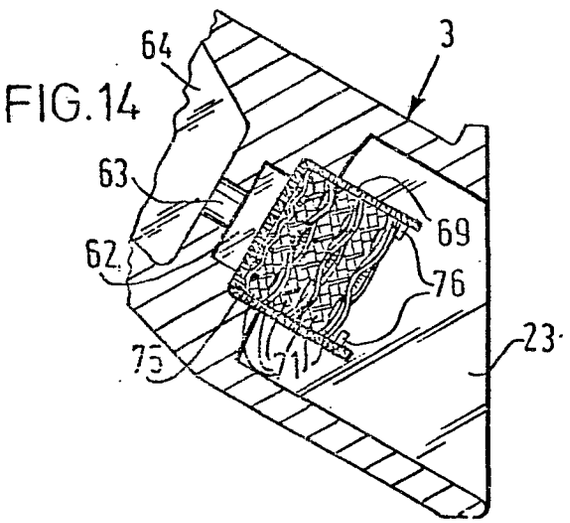


FIG. 14

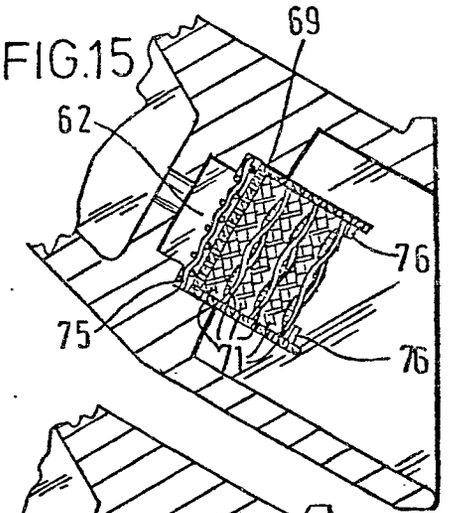


FIG. 15

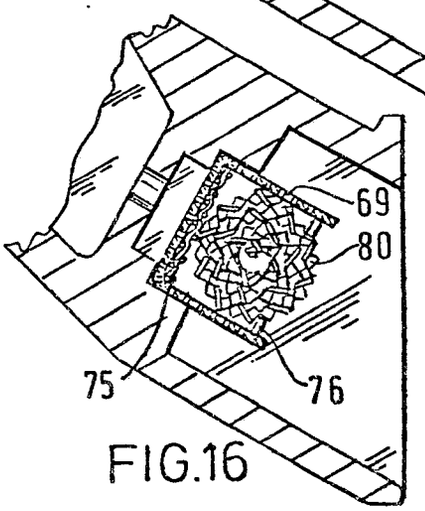


FIG. 16

FIG. 17

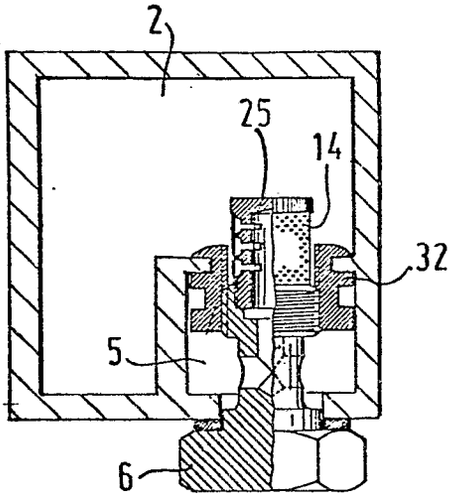


FIG. 18

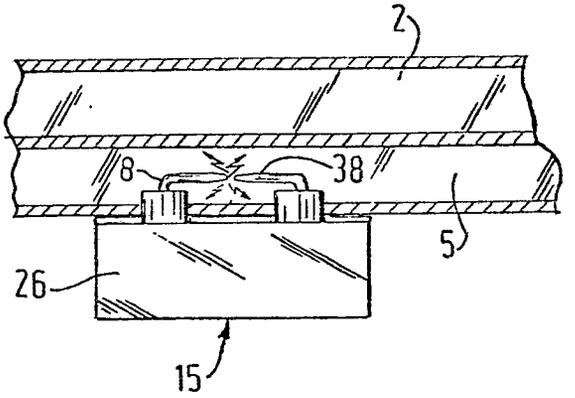


FIG. 19