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⑤④ **Device in a waste water installation in a building.**

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FR-A- 2 240 322
GB-A- 2 145 129

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Description

The invention relates to a device in a waste water installation in a building, comprising a connection box with a flow connection having circular cross section, at one end of the connection box, which is connected to a receiving conduit, said connection box including a bowl-or trough-shaped lower portion, the lowermost location of the flow connection being substantially in alignment with the lowermost location of the lower portion, and a flat upper portion.

SE-B-7410763-2 describes a sewer branch comprising a box construction having a trough-shaped lower portion and a flat upper portion, inlet openings for waste water from sanitary devices being provided in the flat upper portion which is raised in relation to a connection socket at one end of the box construction for connection of the sewer branch to a sewage riser. The prior art sewer branch has been proposed in order to provide a sewer branch which will be effectively flushed by the sewage and thus will be kept clean so that it will not easily be clogged or blocked by sludge.

The present invention is proposed in order to solve a completely different problem than the prior art sewer branch. In conventional sewer installations having decentralized and at the sides of a riser by means of branches connected joining conduits from sanitary devices there is the problem that a negative pressure will be obtained in the joining and receiving conduits of the sewer system, e.g. when flushing a closet bowl connected to these conduits, or when waste water is poured more or less suddenly into the sewer system from another type of sanitary device, if specific air inlets at atmospheric pressure are not provided in the sewer system. Due to the negative pressure the closing water depth in existing water seals of connected sanitary devices will be reduced such that the water seals do not function and nasty-smelling gases from the sewer net as a consequence thereof can penetrate into existing spaces. This means a sanitary inconvenience which cannot be accepted, and it is therefore necessary and also laid down in existing building standards that there should be provided in sewer installations a number of air inlets via specific so-called aeration conduits or vacuum valves as is necessary in order to maintain in existing water seals the closing depth thereof, which means, of course, that the sewer installation will be more expensive and also more complicated. Even if sewer branches of the type disclosed in said SE-B-7410763-2 are provided, this problem will not be overcome.

The present invention solves the problem by the device of the kind mentioned above having obtained the characteristics appearing from claim 1.

In order to explain the invention reference is made to the accompanying drawings in which

FIG. 1 is a plan view of a connection box of the invention,

FIG. 2 is a side view of the connection box in FIG. 1,

FIG. 3 is an enlarged cross-sectional view of the connection box,

FIG. 4 is an enlarged side view of a bow for coupling a joining conduit to the connection box,

FIG. 5 is a plan view from below of the connection bow in FIG. 4,

FIGS. 6A to 6E are diagrammatic side views of the device of the invention illustrating different arrangements,

FIGS. 7 and 8 are a plan view and a side view, respectively, of a modified embodiment of the connection box of the invention,

FIGS. 9 and 10 are side views of connection boxes in series,

FIGS. 11 to 13 are a longitudinal sectional view, a plan view, and a cross-sectional view, respectively, of a connection box of the invention having an enlarged air hood,

FIGS. 14 and 15 are a longitudinal sectional view and a plan view of another embodiment of a connection box having an air hood, and

FIGS. 16 and 17 are a longitudinal sectional view and a plan view of a further embodiment of the connection box having an enlarged air hood.

The connection box shown in FIGS. 1 to 3 in the drawings preferably is made in its entirety of thermosetting resin, and this is true also for the connection bow shown in FIGS. 4 and 5. The connection box has elongated shape and comprises a trough-shaped bottom portion 10 circularly curved in cross section, and a flat top portion 11 as well as a flow connection 12 having circular cross-sectional shape, at each end of the connection box, the lowermost location of each flow connection being substantially aligned with the lowermost location of the circularly curved bottom portion. The top portion of the connection box is countersunk in relation to the flow connections. The countersunk portion of the connection box has a cross-sectional area which is at least equal to the cross-sectional area of one of the flow connections. The width of the connection box is enlarged in relation to the flow connections, and between the flow connections and the countersunk portion of the connection box transitions 13 are provided which are partly flat and partly conical and as seen in direction from the flow connection to the countersunk portion have a cross-sectional area which is initially reduced and then enlarged.

The flat top portion 11 of the connection box has a number of circular connection apertures 14, FIG. 3, which in this case are provided with connection bows 15 for the connection of connecting conduits from existing sanitary devices, but in the most simple embodiment of the connection box this box can be provided with only so-called air hoods, i.e. sockets which are closed to the surroundings and communicate with the interior of the connection box through the apertures 14.

The bows can be of the construction shown in more detail in FIGS. 4 and 5 and can include an angle in the vertical plane ranging from 50° to 90°. They are attached by snap lock to the top portion 11 by the bow forming a radially slotted external flange 16, which can snap into an annular groove 17 in the

bounding wall of the circular aperture 14 in the top portion for the reception of the connection bow. In the top portion, also an O ring 18 is provided to seal between the connection bend and the connection box. The connection bend can be rotated over 360° so as to be adjusted to different horizontal angles determined by the position of the sanitary devices in relation to the connection box. Instead of bows, other connection means can be provided such as straight or S-shaped connection means.

The flat top portion 11 of the connection box has a central longitudinal air collecting depression 19, FIG. 1, in the lower side thereof, said apertures 14 opening into this depression.

In FIGS. 6A to 6D, several embodiments of the connection box are shown as well as the manner of connecting the several embodiments in a sewer system. According to FIG. 6A, the connection box has air hoods 20 only on the flat top portion and is positioned substantially horizontally. One flow connection 12 thereof (inlet connection) joins the connecting conduit 21 from a closet bowl while the other one (outlet connection) joins a horizontal receiving conduit 22. A corresponding installation but with the connection box arranged vertically and with a receiving conduit also extending vertically, is shown in FIG. 6B. A combination of these two embodiments is shown in FIG. 6C.

FIG. 6D discloses an installation corresponding to that of FIG. 6A but with connection bends 15 arranged as in FIGS. 1 to 3, which shall join different connecting conduits from different sanitary devices such as sinks, washbasins, floor outlets and bath tubs.

The embodiment of FIG. 6E is similar to that of FIG. 6D but in this case one transition 12 forms a so-called overangle (225°).

In the embodiment of FIGS. 7 and 8, the countersunk portion of the connection box is circular comprising a circular bowl-shaped lower portion 10 and a flat top portion 11 which has also in this case a central longitudinal air-collecting depression 19 in the lower side thereof. However, the apertures for the connection bends 14 or, alternatively, the air hoods 20 in this case are located at each side of the depression 19. In a modification of this embodiment the countersunk portion can be octagonal.

Several connection boxes can be arranged in series as shown in FIGS. 9 and 10, the boxes being connected or attached to each other or being made integral with each other.

In the connection box, the flow characteristic of the flush water flow entering therein from the closet bowl will be changed partly by initial retardation and thus damming-up of the flow in the upstream transition 13, and partly by following distribution and pressure equalization of the water flow in the countersunk portion of the connection box so that the flow will change from a low velocity and a heavily turbulent flow course to a more laminary flow course at reduced velocity. The air at the countersunk top of the connection box as a consequence thereof will be pressed into the connecting conduits via the connection bends or other connection means or into the hoods, respectively. Thus, the differential pres-

sure between the inlet side of the water seal adjacent the closet bowl and the outlet side of the water seal connecting to the conduit network, will be reduced, and this effect gives such a reduction of the arising negative pressure at the passage of the closet water through the connection box that the water seals of the sanitary devices connected to the installation will maintain the closing depth thereof. The risk of a reduction of the closing depth of the water seals thus will be eliminated, which makes air supply means for air at atmospheric pressure superfluous in connection with the water seals.

As far as the installation is concerned it is of interest that the water seal of a closet bowl which separately joins the connection box in a horizontal non-aerated conduit system up to an aerated vertical receiving conduit, will be intact also when large amounts of water are suddenly poured into the conduit system. An embodiment of the connection box having an enlarged air hood then may be used. FIGS. 11 to 13 disclose such a connection box. In the depression formed by the countersunk portion on the upper side of the connection box, a closed container 23 is arranged. A socket 24 preferably provided with a sieve 25, is provided on the upper portion 11 and communicates with the interior of the connection box, and this socket projects upwards over a distance into the interior of the container 23. FIGS. 14 and 15 disclose a similar embodiment having two sockets 24, however, which communicate each with one container 23A and 23B but, in an alternative embodiment, can communicate with a common container.

When the leading amount of flush water enters the connection box a certain part of the air contained therein will be pressed through the socket or the sockets, respectively, into the enlarged air space in the container or the containers, respectively, wherein the air for some seconds will be compressed to a slight overpressure which then will be transmitted immediately through the socket or the sockets, respectively, to the flush water in the connection box, where the overpressure to some extent has a retarding and reducing effect on the negative pressure when the trailing amount of the flush water passes through the water seal and the risk of the seal being emptied is at maximum.

In the embodiments of FIGS. 11 to 13 and FIGS. 14 and 15, respectively, a minor amount of water will be present in the container 23 or the containers 23A and 23B, respectively. This can be avoided by the embodiment of the connection box shown in FIGS. 16 and 17 wherein the sockets 24 connect to the bottom of the container 23.

In order to attenuate the noise level at flushing the connection box can be coated with rubber internally and externally or it can also be coated externally with foamed rubber or plastic material.

Claims

1. Device in a waste water installation in a building, comprising a connection box (10, 11) with a flow connection (12) having circular cross section, at one end of the connection box, which is connected

to a receiving conduit (22), said connection box including a bowl- or trough-shaped lower portion (10), the lowermost location of the flow connection being substantially in alignment with the lowermost location of the lower portion, and a flat upper portion (11), **characterized** in that the connecting conduit (21) from a sanitary device having a large instant water discharge, e.g. a closet bowl, is connected with a corresponding flow connection (12) at the other end of the connection box, and that the connection box is widened in relation to the flow connections, the flat upper portion being countersunk in relation to the flow connections and having one or more connections for connecting conduits and/or air hoods, and has a transition (13) from each flow connection to the widened and countersunk portion of the connection box, said transition having reduced and then again enlarged cross-sectional area for initial damming-up of the flow and following speed reduction of the flow at water discharge from the sanitary device, the flow characteristic at the same time being changed from turbulent to more laminary flow course for reduction of the air escape from the connection box.

2. Device as in claim 1, **characterized** in that the connections on the flat countersunk upper portion (11) are provided with rotatable bends (15) for the connection of connecting conduits.

3. Device as in claim 1 or 2, **characterized** in that one or more air hoods are connected to the flat upper portion.

4. Device as in claim 1, **characterized** in that several connection boxes are interconnected or built together in series to form a unit.

5. Device as in claim 4, **characterized** in that the connection boxes have different lengths.

6. Device as in claim 1, **characterized** in that the flat upper portion (11) has an air-collecting depression (19) in the lower side thereof.

Patentansprüche

1. Vorrichtung in einer Abwasseranlage in einem Gebäude, die einen Verbindungskasten (10, 11) mit einem Durchflußanschluß (12) vom kreisförmigen Querschnitt an einem Ende des Verbindungskastens umfaßt, der an ein Abflussrohr (22) angeschlossen ist, wobei der Verbindungskasten ein schüssel- oder trogförmiges Unterteil (10), mit dessen tiefster Stelle die tiefste Stelle des Durchflußanschlusses im wesentlichen fluchtet, sowie ein flaches Oberteil (11) umfaßt, dadurch gekennzeichnet, daß das Verbindungsrohr (21) von einem sanitären Gerät mit einem hohen, plötzlichen Wasserausstoß, z.B. von einer Klosettschüssel, mit einem entsprechenden Durchflußanschluß (12) am anderen Ende des Verbindungskastens verbunden ist, und daß der Verbindungskasten relativ zu den Durchflußanschlüssen erweitert ist, wobei das flache Oberteil relativ zu den Durchflußanschlüssen abgesenkt ist und einen oder mehrere Anschlüsse für Verbindungsrohre und/oder Lufthauben hat, sowie einen Übergang (13) von jedem Durchflußanschluß zu dem erweiterten und abgesenkten Teil des Verbindungskastens aufweist, welcher Übergang eine reduzier-

te und dann wieder vergrößerte Querschnittsfläche für ein anfängliches Aufstauen der Strömung und eine anschließende Verringerung der Geschwindigkeit der Strömung bei einem Wasserausstoß von dem sanitären Gerät hat, wobei gleichzeitig die Strömungscharakteristik von einem turbulenten in einen mehr laminaren Strömungsverlauf geändert wird, um den Luftaustritt aus dem Verbindungskasten zu reduzieren.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Anschlüsse an dem flachen, abgesenkten Oberteil (11) mit drehbaren Bogenstücken (15) für den Anschluß von Verbindungsrohren versehen sind.

3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß eine oder mehrere Lufthauben an dem flachen Oberteil angeschlossen sind.

4. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß mehrere Verbindungskästen zur Bildung einer Einheit in Serien miteinander verbunden oder zusammengebaut sind.

5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die Verbindungskästen unterschiedliche Längen haben.

6. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das flache Oberteil (11) eine Luftammel-Vertiefung (19) an ihre Unterseite aufweist.

Revendications

1. Dispositif dans une installation d'eau usée dans un bâtiment comportant une boîte de connexion (10, 11) avec une connexion d'écoulement (12) ayant, à une extrémité de la boîte de connexion qui est connectée à un conduit de réception (22) une section transversale circulaire, ladite boîte de connexion comportant une partie inférieure (10) ayant une forme de cuvette ou auge, l'endroit le plus inférieur de la connexion d'écoulement étant essentiellement aligné avec l'endroit le plus inférieur de la partie inférieure, et une partie supérieure plate (11), caractérisé en ce que le conduit de connexion (21) d'un dispositif sanitaire ayant un débit d'eau instantané élevé, par exemple une cuvette de toilette, est connecté avec une connexion d'écoulement correspondante (12) à l'autre extrémité de la boîte de connexion et en ce que la boîte de connexion est élargie par rapport aux connexions d'écoulement, la partie supérieure plate étant contre-baissée par rapport aux connexions d'écoulement et ayant une ou plusieurs connexions pour des conduits de connexion et/ou des capuchons d'air, et comporte une transition (13) à partir de chaque connexion d'écoulement vers la partie élargie et contre-baissée de la boîte de connexion, ladite transition comportant une surface de coupe transversale réduite et ensuite élargie pour une rétention initiale de l'écoulement et ensuite une réduction de la vitesse d'écoulement lors d'un débit d'eau venant du dispositif sanitaire, la caractéristique de l'écoulement étant changée en même temps d'un écoulement turbulent en un écoulement plus laminaire pour la réduction de l'échappement d'air de la boîte de connexion.

2. Dispositif selon la revendication 1, caractérisé en ce que les connexions sur la partie supérieure plate contre-baissée (11) sont munies de coudes rotatifs (15) pour la connexion des conduits de connexion.

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3. Dispositif selon la revendication 1 ou 2 caractérisé en ce que un ou plusieurs capuchons d'air sont connectés à la partie supérieure plate.

4. Dispositif selon la revendication 1 caractérisé en ce que plusieurs boîtes de connexion sont interconnectées ou assemblées en série pour former une unité.

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5. Dispositif selon la revendication 4 caractérisé en ce que les boîtes de connexion ont des longueurs différentes.

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6. Dispositif selon la revendication 1 caractérisé en ce que la partie supérieure plate (11) comporte une dépression pour capter de l'air (19) dans son côté inférieur.

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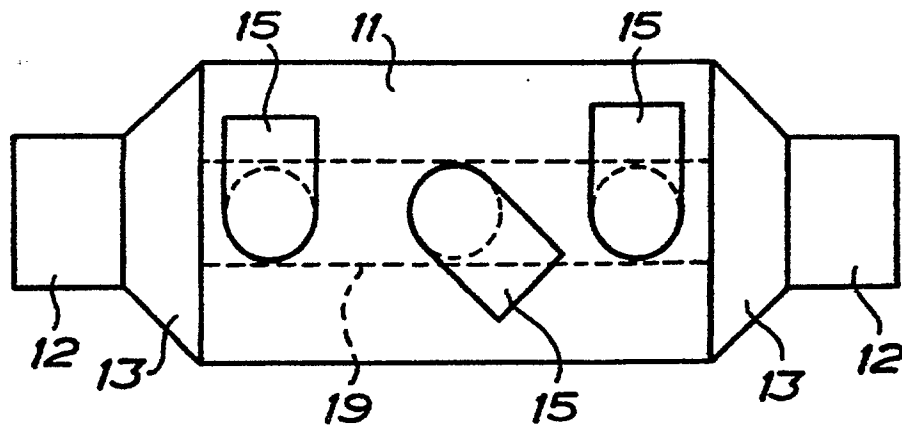


FIG. 1

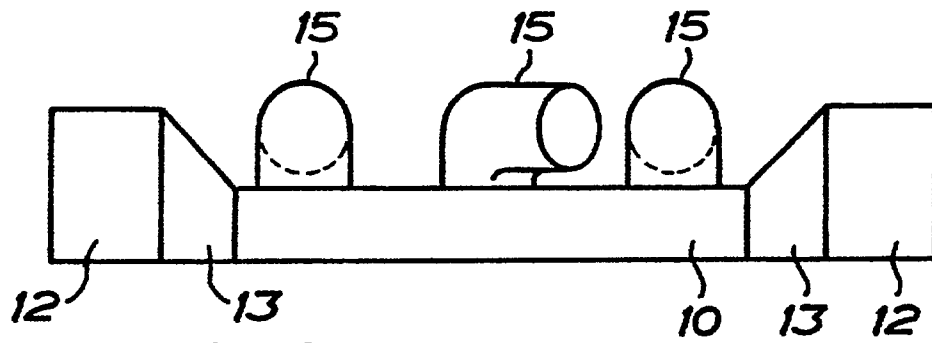


FIG. 2

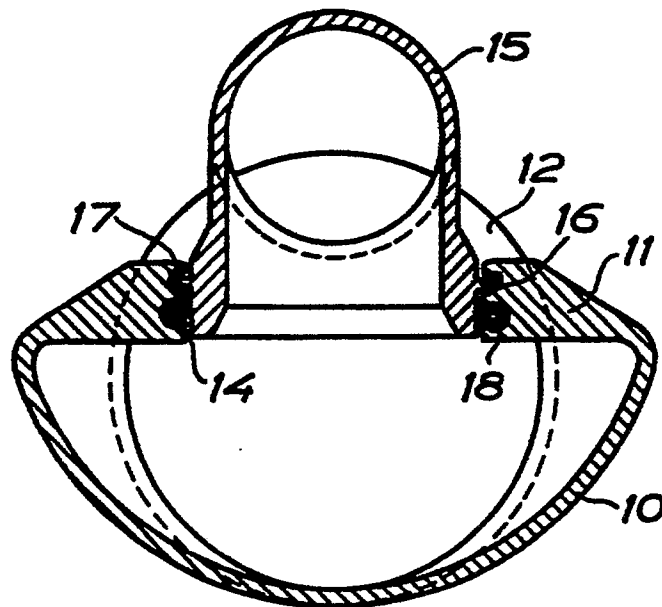


FIG. 3

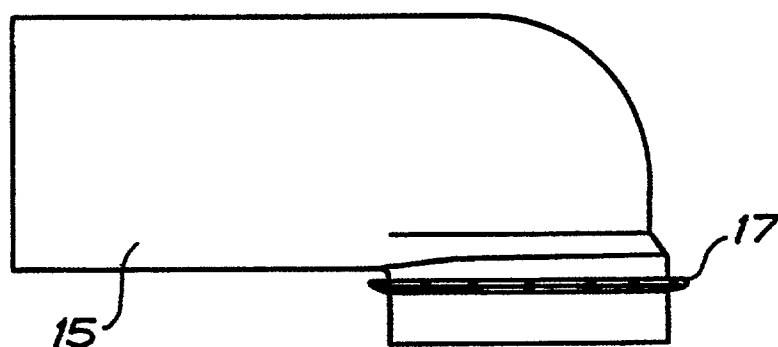


FIG. 4

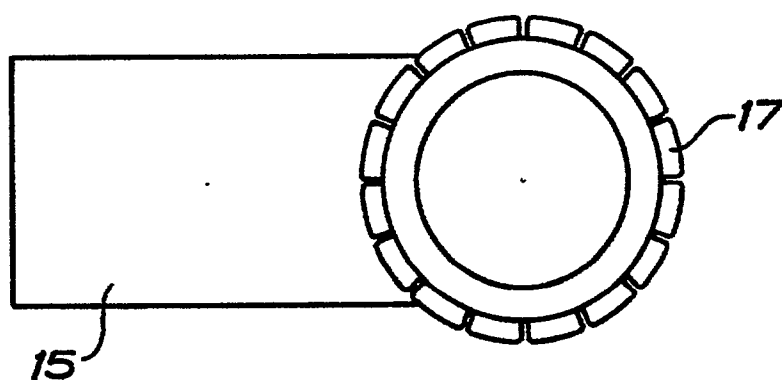


FIG. 5

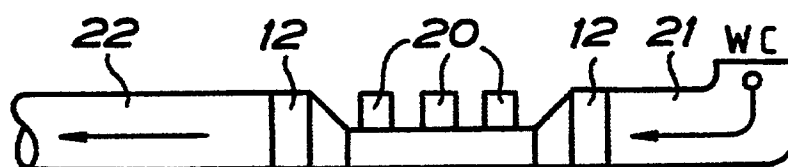


FIG. 6A

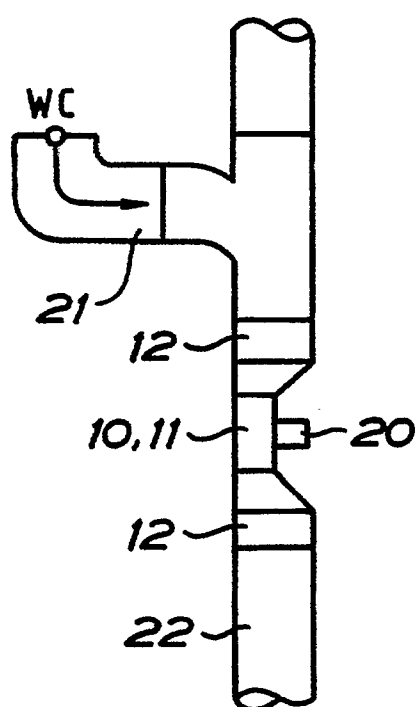


FIG. 6B

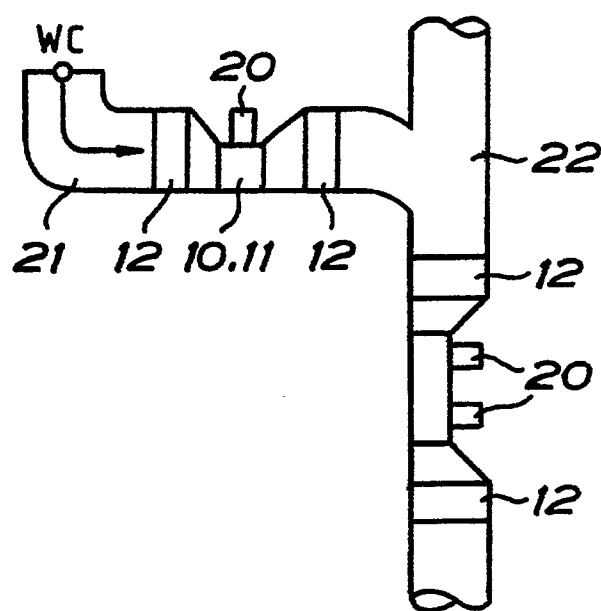


FIG. 6C

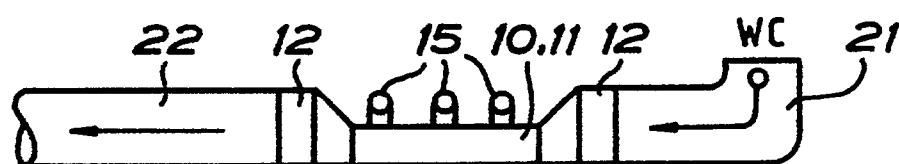


FIG. 6D

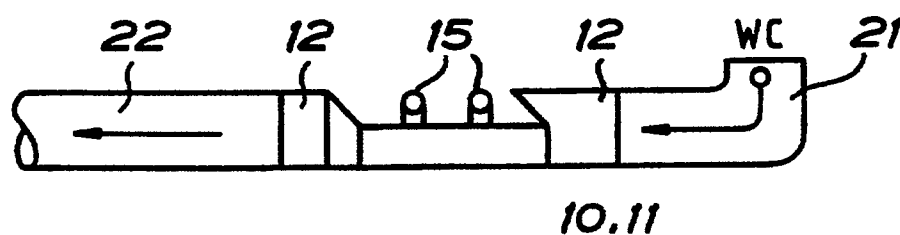


FIG. 6E

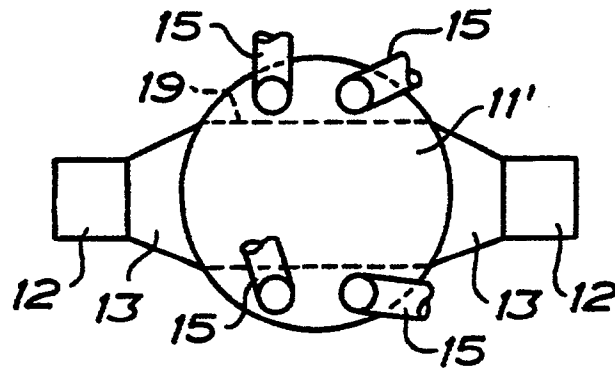


FIG. 7

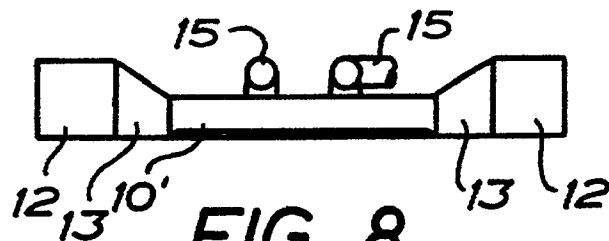


FIG. 8

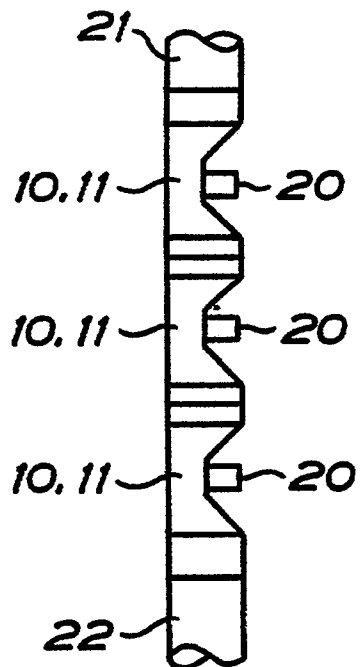


FIG. 9

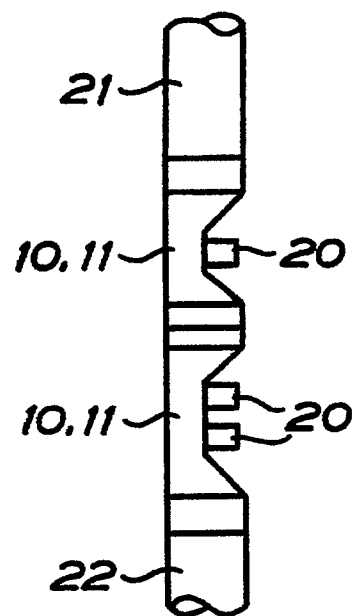


FIG. 10

