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(71) Applicant: **Ballast-Nedam Groep N.V.**
Laan van Kronenburg 2
NL-1180 BE Amstelveen(NL)

(71) Applicant: **Waco Beton B.V.**
IJsseldijk 169
NL-2922 BJ Krimpen a/d IJssel(NL)

(72) Inventor: **Van Heummen, Petrus Hendrikus**
Heemraadhof 19
NL-2922 CK Krimpen a/d Yssel(NL)

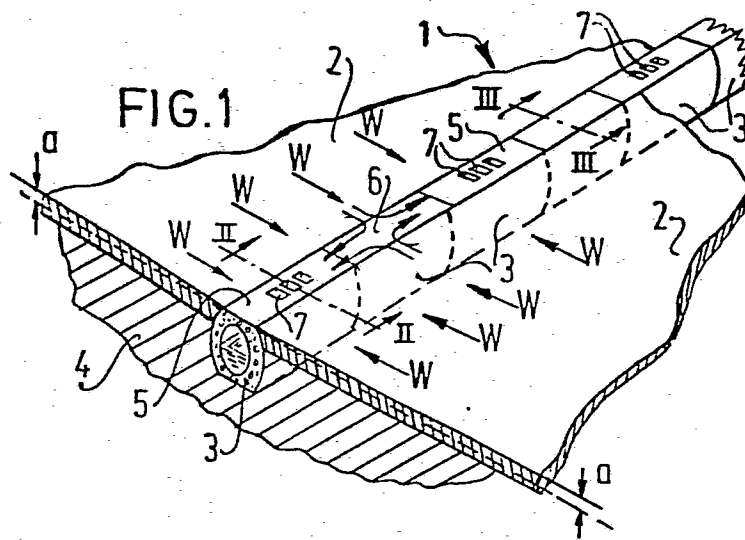
(74) Representative: **Konings, Lucien Marie Cornelis**
Joseph et al,
OCTROOIBUREAU ARNOLD & SIEDSMA Sweelinckplein
1
NL-2517 GK Den Haag(NL)

(54) Gutter for draining off water or the like from a hardened path.

(57) The gutter elements (3) of a gutter (1) situated along a hardened path (2) are constructed in a simple, but at the same time solid manner, as they are made from non-reinforced concrete, and have a closed profile along the larger part of their length.

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Gutter for draining off water or the like from a hardened path

The invention relates to a gutter for draining off the water or the like from a hardened path, for example, a road surface, platform, parking space or the like, said gutter comprising a series of concrete gutter elements joining one another in a substantially watertight manner, at least one gutter element, the top side of which is level with the road profile, being provided with at least one inlet for admitting the water to be conducted away from the road into the transport channel of the gutter.

Such a gutter is known from U.S. Patent Specification 2,436,593. With this known gutter each gutter element has a substantially U-shaped cross-section along the larger part of its length and on the top side it is mainly open. The open top side is closed by loose plates, which may be closed or be provided with inlets. In order to obtain a sufficiently strong construction of these gutter elements they are made from reinforced concrete.

The invention provides a gutter of the kind set forth, the gutter elements of which can be manufactured more

easily and hence at a lower cost price, since the concrete gutter elements are each made from non-reinforced concrete and have a closed profile at least for the larger part of their length. The absence of reinforcement means saving of
5 steel and reinforcement fabric. Moreover, a gutter element of non-reinforced concrete can be more readily manufactured by means of a tube drawing machine.

A preferred embodiment of the gutter according to the invention provides an improved affluence of the water
10 towards the inlets and comprises itself, in addition, a collecting space for capturing incoming water for the short time of affluence towards the inlets in order to minimize the amount of water remaining on the road. In this preferred embodiment of the gutter according to the invention the top
15 side of the gutter element has a hollow depression forming a collecting space draining off towards the inlet.

It should be noted that, for example, the Dutch Patent Application laid up for public inspection 7307715 discloses a gutter, in which the walls of the gutter elements
20 slope down towards the middle, where a gap is provided throughout the length of elements for conducting the water towards the transport channel. The transport channel of this known gutter is relatively small, whilst the gap extending over the whole length has the drawback, when the gutter is
25 used along traffic roads, that wheels are likely to get into the gap.

A further preferred embodiment of the gutter according to the invention is characterized in that each gutter element is provided at the top with a water conducting, up-
30 right rim forming, for example, a curb.

Reference is made in this regard to French Patent Specification 956,822, in which a collecting gutter arranged along the side of the road joins an elevated rim of, for example, a pavement or the like. This rim does, however, not
35 form a monolithic unit with the gutter elements as with the gutter in accordance with the present invention.

In order to be able to store a standard rain shower per unit time, in which case, for example, half a cubic metre



of water per meter of gutter length must be held for a short time along the road provided with the gutter, the transport channel has a substantially circular passage of a size sufficient for accommodating a standard amount of rain water collected per unit time. This has the advantage that a pump of lower standard capacity can pump away sufficient amounts for a longer period of time to conduct away the rain water, since the transport channel itself serves as a storing reservoir. Therefore, the water draining system does not require expensive, additional means.

If the gutter comprises pocket wells situated at equal distances from one another between two series and joining each a well element in a watertight manner, for example, by a roller ring junction for collecting impurities such as sludge or sand, dragged along by the water, this further development of the gutter according to the invention may be satisfactorily employed along tree-lined roads, since the leaves are collected in the pockets. These impurities can be occasionally removed via a cover provided on the top side of the well.

In a further preferred embodiment according to the invention the profile of the top side of the well element is like that of the gutter elements. This is particularly important when the road sides are also used by traffic, for example, cyclists.

In order to satisfactorily conducting away the water, the gutter according to the invention is characterized in that at least one pocket well is provided with an additional outlet for conducting away the water collected in the storing space at a lower level than the gutter elements. This water can be conducted away to a collecting sewer, from where it can be passed, for example, to a sewerage purifying system or to a collecting basin, if admission of water heavily contaminated, for example, by brine to the collecting sewer cannot be allowed, or to the surface water, if it can be assumed that the rain water flowing in a fairly pure state from the road can be conducted away, for example, to a ditch or a

lake. With regard to environmental requirements and to the problems of the excessive amounts of salt in biological purification of waste water this drain system readily permits of constructing a second rain water draining system, whilst if
5 the water is strongly contaminated, temporary storage, for example, in a salt water basin may be carried out, and after drastical dilution, for example, by successive, normal rain showers the water containing less salt may yet be supplied to the purification sytem or may be pumped away to the sea.

10 For the interconnection of two relatively spaced drains it is advantageous to use an additional outlet of a pocket well for low-level communication, for example, at a given depth beneath the road, between a pocket well of a first gutter with a pocket well of a second gutter situated
15 at a distance from the first.

The above mentioned and further features of the invention will be described more fully with reference to a few embodiments shown in the drawing.

The drawing shows in

20 Fig. 1 a perspective view of a gutter in accordance with the invention arranged, for example, in a parking place, platform or airfield,

Fig. 2 an enlarged sectional view taken on the line II-II in Fig. 1,

25 Fig. 3 an enlarged sectional view taken on the line III-III in Fig. 1

Fig. 4 a perspective view of a further gutter in accordance with the invention comprising a curb,

30 Fig. 5 an enlarged cross-sectional view taken on the line V-V in Fig. 4,

Fig. 6 a perspective view of a variant of the embodiment shown in Fig. 4, the top side of the gutter having a collecting space.

35 Fig. 7 an enlarged sectional view taken on the line VII-VII in Fig. 6,

Fig. 8 an enlarged sectional view taken on the line VIII-VIII in Fig. 6,



Fig. 9 a longitudinal sectional view of a variant of the gutter shown in Fig. 6,

Fig. 10 a perspective view of a preferred embodiment of the gutter in accordance with the invention, provided
5 with a pocket well and

Fig. 11 a cross-sectional view taken on the line XI-XI in Fig. 10.

A gutter 1 according to the invention is arranged in a platform, taxi park or parking place 2 slightly sloping
10 towards the area where a series of substantially watertight series of joined gutter elements 3 of the gutter 1 is dug into the ground 4. The gutter elements 3 are monolites of non-reinforced concrete made on a tube-drawing machine. Along the larger part of their length they have a closed profile.
15 They comprise top walls 5 or 6 level with the pavement 2 provided with inlets 7 or completely closed respectively. The inlets 7 are recessed in the concrete in the form of slots, which can admit the water flowing from the road 2 in the direction of of the arrows W and being conducted by the profiles of the top walls of the gutter elements 3 into the
20 transport channel 9 formed by the gutter elements 3. Above the closed top walls 6 a thin layer of water 8 is formed. Owing to sufficient inclination (angle α) all water can flow towards the inlets 7 of the neighbouring gutter elements 3.

25 Through the inlets 7 the water enters the transport channel 9 having a circular passage, which has adequate storing capacity for completely collecting a standard rain shower without the occurrence of clogging in the drain system.

30 In the embodiment of the gutter 40 shown in Fig. 4 the water flows from a road surface 10 against the upright rims 11 of the gutter elements 12. These gutter elements 12 again have top walls 13 or 14, the top walls 13 having inlets 7 for the water and the top walls 14 being closed. The water
35 is dammed up against the borders 11 and can readily reach the inlets 7 through which it attains a transport channel 9.

Figs. 6 to 8 illustrate an embodiment of the gutter

41 according to the invention, which is in engagement with a road surface 27: the profile of the top side of the gutter 41 itself functions like a kind of first collecting space 15, from where the inlets 7 receive the water flowing in the direction of the arrows W. In this embodiment water nuisance in the case of a normal rain shower is minimized because the water released by a standard rain shower can be collected substantially completely inside the collecting space 15 intentionally proportioned for this purpose and in the transport channel 9.

Fig. 9 illustrates a series of gutter elements 42 and 43, in which inlet gratings 17 rather than inlets 7 as shown in Fig. 6 are used in the top wall 44 of the gutter elements 43. These inlet gratings 17 allow, for example, cyclists to pass readily. The successive gutter elements 42 and 43 are joined in a watertight manner through a junction 18, 19 including a roller ring 20, which junctions permit a displacement of the gutter elements relative to one another in the direction of length as well as in an angular direction, whilst the watertight seal is maintained, when the road is slightly settling.

Referring to Fig. 10, two series 46 and 47 of gutter elements 16 are arranged in line with one another with the interposition of a pocket well 21, which is shown in a cross-sectional view in Fig. 11 and which comprises a well element 22 connected with the gutter elements 16 and co-operating through a watertight junction with a prefabricated concrete element 24 provided with an additional outlet 23 and supporting on the collecting element 25 of the pocket well 21 also formed by a prefabricated concrete element, in which are collected solid substances such as leaves 28 passed along by the water: by removing a cover 26 with the aid of a suitable mechanism said substances 28 can be removed.

The gutter construction according to the invention readily permits of mounting a pocket element, as the case may be, with one or more additional outlets 23 for conducting the water towards a storage space (not shown) for contaminated water, towards a collecting sewer or directly towards the

surface water and/or additional draining systems in which a gutter on one side of a road surface may be connected through a transverse tie tubing with a gutter on the other side of said road surface.

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CLAIMS

1. A gutter for draining off the water or the like from a hardened path, for example, a road surface, platform, parking space or the like, said gutter comprising a series of concrete gutter elements joining one another in a substantially watertight manner, at least one gutter element, the top side of which is level with the road profile, being provided with at least one inlet for admitting the water to be conducted away from the road into the transport channel of the gutter, characterized in that the concrete gutter elements are each made from the non-reinforced concrete and have a closed profile substantially along the larger part of this length.

2. A gutter as claimed in Claim 1 characterized in that the top side of the gutter element has a hollow depression which constitutes a collecting space communicating with at least one inlet.

3. A gutter as claimed in Claim 1 or 2 characterized in that each gutter element is provided on the top side with a water conducting raised border forming, for

example, a curb.

4. A gutter as claimed in anyone of the preceding Claims characterized in that the transport channel has a substantially circular passage of sufficient size to store a
5 standard amount of rain water supplied per unit time.

5. A gutter as claimed in anyone of the preceding Claims characterized in that the gutter comprises pocket wells situated at equal distances from one another between two series in a watertight manner by means of, for example, a
10 roller ring junction and joining each a well element, said wells collecting the impurities such as sludge or sand carried along by the water, whilst via a cover provided on the top side of the well element said impurities can be occasionally removed.

15 6. A gutter as claimed in Claim 5 characterized in that the profile of the top side of the well element is identical to that of the gutter elements.

7. A gutter as claimed in Claim 5 or 6 characterized in that at least one well pocket is provided with an
20 additional outlet for the water stored in the storage space at a lower level than the gutter elements.

8. A gutter as claimed in Claims 5, 6 or 7 characterized in that an additional outlet is provided at a pocket well for a low-level communication, for example, at a given
25 depth beneath a road, between a pocket well of a first gutter and a pocket well of a second gutter located at a distance from the first.

amended claims

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C L A I M S

1. A gutter (1) for draining off the water or the
like from a surface (2) of a hardened path like a road,
platform or the like, said gutter (1) being laid with its
top-side flush with said surface (2) and said gutter (1),
5 comprising a series of concrete gutter elements (3, 12, 16,
42, 43) joining one another, at least one gutter element
being provided with at least one inlet (7, 17) for admitting
the water to be conducted away into the transport channel (9)
of the gutter (1), whereby said inlets (7, 17) of said gutter
10 elements (3, 12, 16, 42, 43) are situated in the top walls
of the gutter elements (3, 12, 16, 42, 43) only, said gutter
elements (3, 12, 16, 42, 43) having a closed profile sub-
stantially along the larger part of their length, characterized
in that each pair of adjoining gutter elements (3, 12, 16,
15 42, 43) is provided at its ends with edges (18, 19), the

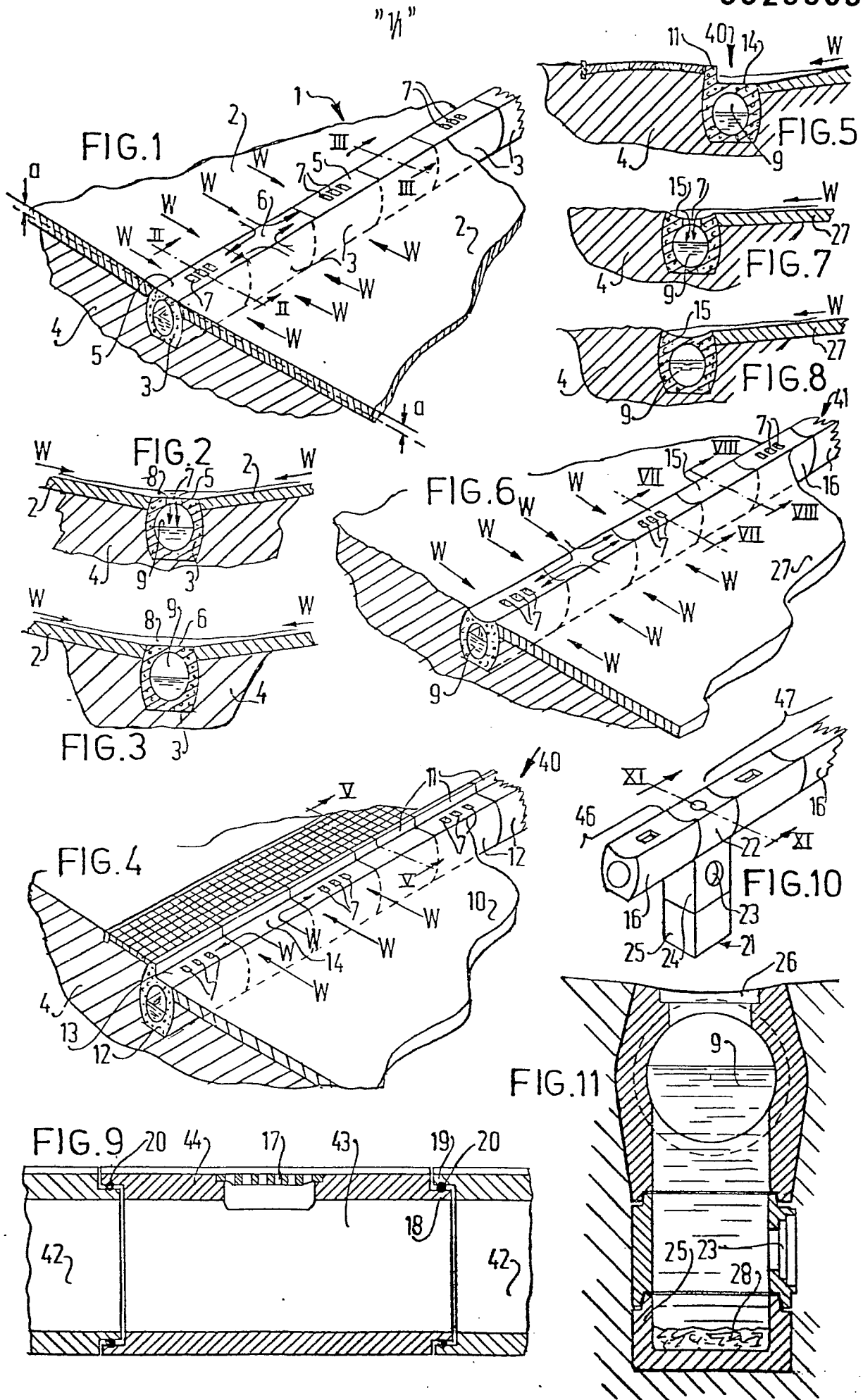
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edge (18) of the one gutter element (43) of said pair
extending axially within the edge (19) of the other gutter
element (42) of said pair, said two edges (18, 19)
engaging a roller ring (20) positioned between said edges
5 (18, 19) for permitting a displacement of the gutter ele-
ments (3, 12, 16, 42, 43) relatively to one another whilst
maintaining a watertight seal, said gutter elements (3, 12,
16, 42, 43) being made from non-reinforced concrete on a tube-
drawing machine and having a transport channel of a suffi-
10 cient size to store a standard amount of rainwater with the
order of magnitude of 0.5 m^3 par m element length or more.

2. A gutter as claimed in claim 1, characterized
in that the top side of each gutter element (3, 12, 16, 42,
43) has a hollow depression, which constitutes a collecting
15 space (15) communicating with at least one inlet (7, 17).

3. A gutter as claimed in claim 1 or 2, characterized
in that each gutter element (12) is provided on its top side
with a water conducting raised border (11) like a curb,
forming a water collecting space communicating with at least
20 one inlet (fig. 4).

4. A gutter as claimed in any one of the preceding
claims, characterized in that in a gutter (1), pocket wells
(21) are installed at equal distances from one another,
an additional outlet (23) being provided at said pocket well
25 (21) for a low-level communication, for example, at a given
depth beneath a road, between a pocket well (21) of a first
gutter (1) and a pocket well (23) of a second gutter (1)
located at a distance from the first.





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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	DE - A - 2 242 736 (EVERCRETE LTD.) * whole document * --	1,2,4	E 01 C 11/22
	DE - A - 1 658 522 (PFUHLER, BETONRÖH- REN GMBH & CO.) * whole document * --	1-4	
	DE - U - 7 330 840 (ACO SEVERIN AHL- MANN) * whole document * --	1,4-7	
	DE - U1 - 7 831 677 (H. HARGENS) * whole document * --	1,2,4	TECHNICAL FIELDS SEARCHED (Int. Cl.)
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A	DE - A1 - 2 632 660 (PATENTA ENTWICK- LUNGS- UND VERWERTUNGS-GMBH) * fig. 1 to 10 * --		CATEGORY OF CITED DOCUMENTS
A	FR - A - 458 052 (STE CHARRETTON ET GRUAZ) * fig. * -----		X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
☒ The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search Berlin		Date of completion of the search 02-05-1980	Examiner PAETZEL