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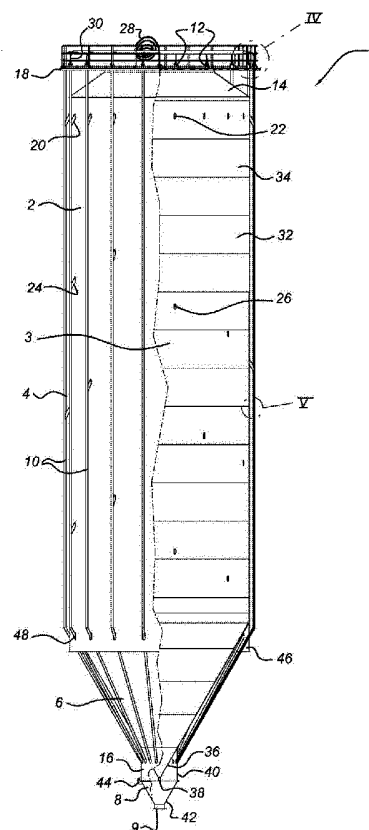
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(74) Gemachtigde:

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(54) **Blender for particulate materials.**

(57) A gravity blender for receiving particulate material comprises a silo having a cylindrical upper portion and a hollow interior and a mixing chamber. A plurality of blending conduits is provided externally of the cylindrical upper portion and extend downwards from the upper portion of the silo to communicate with the mixing chamber. A plurality of passageways each extend from a respective upper outlet from the hollow interior into a respective blending conduit such that the particulate material can flow from the hollow interior to the mixing chamber via the blending conduits. The blending conduits also extend upwards, beyond the respective upper outlet to a respective access location allowing access to the blending conduit for cleaning purposes.



NL C 2011126

Dit octrooi is verleend ongeacht het bijgevoegde resultaat van het onderzoek naar de stand van de techniek en schriftelijke opinie. Het octrooischrift komt overeen met de oorspronkelijk ingediende stukken.

BLENDER FOR PARTICULATE MATERIALS

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The invention relates to a gravity blender of the type used for the storage and subsequent delivery of particulate materials.

2. Description of the Related Art

 Particulate materials, such as polymer granules, can be stored in bulk in a silo.
10 Silos are large storage facilities in which many tonnes of particulate material may be stored. During production of polymer material, the material properties, such as physical and mechanical properties, are desired to be constant. This is important for subsequent processing of the polymer material.

 Before polymers were used at a large scale in applications such as continuous
15 film or filament production, the need for precision blending of bulk solids products were met with mechanical tumbler, ribbon or screw blenders. Capacities of these units ranged from less than one cubic meter to over 100 cubic meters.

 As the demand for polymers has grown, much larger blender volumes have become necessary to allow continuous production lines in polymers producing plants to
20 operate without frequent shutdowns caused either by variations in material properties or by contamination inherent in the production process. This has led to a demand for tumble blenders in the range of 700 cubic meter capacity.

 The high cost of large tumble blender installations induced industry-wide efforts to develop a blending capability in storage silos to comply with the product uniformity
25 requirements of the polymer industry. This was the start of the development of, amongst others, gravity blenders with capacities of up to 3000 cubic meter.

 Gravity blenders generally use internal tubes having openings to allow solids in the silo to flow to a separate mixing chamber below the silo. The tube openings in the main body of the silo are located so that material drained into the mixing chamber
30 represents a typical composition of the material in the main silo body.

 Such a gravity blender is described in European patent EP0538445. The described gravity blender comprises a bin to receive and store particulate material, the bin having an upper portion and a downwardly converging lower portion. Blending

conduits are provided within the bin, the blending conduits extending along an inside of the bin downward from the top of the bin and terminating in apertures in a baffle provided between the upper portion and lower portion of the bin. The blending conduits have a number of apertures through which particulate material can enter the blending conduits and be conveyed by the blending conduits to the lower portion of the bin. The principle of operation is well-known and often referred to as the moving top-hole principle.

Use of such gravity blenders results in more constant material properties of the produced polymer material by blending of material from several levels in the silo before processing of the polymer material.

However, a disadvantage of these gravity blenders is that residual particulate material can remain in the blending conduits and/or the silo. If a change of product is required, complete removal of all traces of the previous material may be required. For a number of applications, such as for very thin polymer foil, it is highly desired to have material properties within a very narrow range to facilitate further processing of the polymer material.

It would be desirable to provide a gravity blender that would result in a decrease in residual material in the silo and blending conduits to improve the resulting material properties of the produced polymer material.

BRIEF SUMMARY OF THE INVENTION

The invention relates to a gravity blender operable to receive and store a mass of particulate material, the gravity blender comprising: a silo having a cylindrical upper portion and a hollow interior; a mixing chamber; a plurality of blending conduits provided externally of the cylindrical upper portion and extending downward from the upper portion of the silo to communicate with the mixing chamber; and a plurality of passageways each extending from a respective upper outlet from the hollow interior into a respective blending conduit, such that the particulate material can flow from the hollow interior to the mixing chamber via the blending conduits, wherein the blending conduits extend upwards beyond the respective upper outlet to a respective access location.

By providing the blending conduits at the exterior of the silo, interior structures within the silo are avoided. Interior structures can cause collection or hang-up of

particulate material, which can contaminate subsequent material to be stored in the silo. In the event that a different material is to be filled into the silo, it is essential that all of the previous material is removed. Although existing designs may attempt to minimize such internal structures, even the minutest of flanges or welds can collect residue. In the present design, the blending conduits may be provided exclusively and only at the exterior of the silo, at least in the upper portion of the silo where the particulate material is received. In other words, it may be excluded that the blending conduits pass through a portion of the silo where particulate material is stored.

According to an important aspect of the invention, by extending the blending conduits upwards beyond the respective upper outlet to a respective access location, improved access to the blending conduits can be provided for the purpose of cleaning and inspection. In this manner, the interior of the blending conduits is accessible and may be cleaned out to remove residue. To further reduce or prevent contamination of the produced polymer material, the blending conduits should be free of residual particulate material before storing a next load of material in the silo. In this context, access to the interior of the respective blending conduit is intended to refer to the fact that an opening can be provided directly into the blending conduit. Furthermore, in this context the upper outlet denotes the uppermost outlet into a respective blending conduit from the hollow interior.

According to a preferred embodiment of the invention, the access locations for each blending conduit are located at the same height with respect to the silo. This allows construction of a gantry at a single location e.g. above the level of the upper portion whereby access by personnel may be provided to the access locations. It will nevertheless be understood that a gantry around the upper portion could also provide access to the access locations.

In a still further preferred embodiment, there may be provided a silo cleaning system for cleaning the hollow interior of the silo. The silo cleaning system may be provided at the top of the upper portion of the silo, in particular at a central location. The silo cleaning system may be otherwise conventional and provides a water film for flushing down the internal walls of the silo. As a result of the absence of blending conduits within the hollow interior, the silo cleaning system may better perform its function and may be able to reach all parts of the circumferential wall.

According to a still further aspect of the invention, the gravity blender may further comprise a conduit cleaning system communicating with the access locations for cleaning the interior of the blending conduits. The conduit cleaning system may comprise multiple supplies in star formation or a single ring-main connected to the
5 blending conduits at or adjacent to the access locations. The conduit cleaning system may comprise individual spray heads for each access location, each of which may be otherwise conventional. Flushing of the blending conduits is thus facilitated.

According to the invention it will be understood that the hollow interior is completely free of blending conduits i.e. there may be no blending conduit passing
10 through or extending into the hollow interior. According to a still further aspect of the invention, the hollow interior may be free of all internal structures on which retention of particulate material could occur. As it will be understood, defining the absence of internal structures may be considered a matter of scale, nevertheless, in the context of the particulate material to be stored, the hollow interior should be free of structures on
15 which particles of this size could be retained. The interior may therefore be free of welds, flanges, bolts, pipes, horizontal surfaces and the like and otherwise smooth within the order of magnitude of the particles to be stored.

Most preferably, the hollow interior of the upper portion of the silo will be free of all obstructions having a horizontal extent of more than 5 mm. Most preferably it will
20 not have obstructions having a horizontal extent of more than 2 mm and still more preferably, any obstruction or surface should have a horizontal extent of less than 1 mm. Preferably, the same will apply to the interior of the blending conduits.

Furthermore, according to the invention, the blending conduits and passageways may each have a barrier-free inner surface such that retention of particulate material is
25 prevented. Usually the blending conduit is made up of several parts that are connected together. By providing the blending conduits external to the hollow interior of the silo, external flanges and welds may be used in their construction. As a result, the blending conduits may have perfectly smooth inner surfaces having a similar smoothness to that discussed above in the context of the hollow interior.

30 In order to further enhance the ability to clean and inspect the interior of the blending conduits, these preferably extend downwardly parallel to the outside of the silo and are straight from the access location over at least the length of the upper

portion. In this manner, visual inspection may be achieved from the access location and any intervention may take place in a line of sight.

Each blending conduit may connect to a single outlet from the hollow interior. Nevertheless, in a preferred embodiment, each blending conduit has a plurality of
5 further passageways extending from further outlets located at different heights with respect to the silo. This allows each conduit to operate according to the moving top-hole principle, which is otherwise well-known from the above-mentioned reference. More preferably, the respective upper outlets are located at different heights with respect to the silo. Furthermore, the blending conduits are preferably evenly distributed
10 around the exterior of the silo. It will of course be understood that the passageways and further passageways slope downwards from the respective outlets.

The further outlets may be provided both in the upper portion and the mid-portion. The outlets may be restricted to the upper portion only, although this is generally less preferred.

15 According to another preferred embodiment, the silo comprises a downwardly-directed, conically-shaped baffle serving as a divider between an interior of the mid-portion of the silo and the mixing chamber. The baffle preferably has a central passage at its lowest point, communicating with the mixing chamber and allowing for emptying of the silo into or through the mixing chamber. The central passage may be provided
20 with an appropriate valve arrangement, if required.

The mixing chamber will generally be provided directly connected to the mid-portion although it is not excluded that it could be separate therefrom. Preferably, the mixing chamber comprises a first portion connected to the mid-portion of the silo and a second portion moveably connected to the first portion to allow opening of the mixing
25 chamber. This further facilitates cleaning of the gravity blender and can allow better access to the lower ends of the blending conduits.

According to a further embodiment, the blending conduits extend downwardly parallel to the outside of the silo, converging towards the mixing chamber along an outside of the converging mid-portion of the silo. Each blending conduit may have a
30 single bend or angle at the transition between the mid-portion and the upper portion. The blending conduit may thus be fully accessible partly from the top, via the access location and from the bottom via the mixing chamber.

According to another embodiment, the upper portion is provided with a skirt, which may support the silo in use. The skirt may extend downwardly over at least part of the mid-portion along at least part of a circumference of the outside of the silo.

Due to the external blending conduits, a skirt allows support of the silo in use.

5 Preferably, the skirt is arranged around the blending conduits to allow passage of the blending conduits. For instance the skirt can be provided with a recess extending from a free end of the skirt towards the silo at the position of a blending conduit. Alternatively, the blending conduits can extend through the skirt at openings positioned at a section of the skirt and the blending conduits.

10

BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the invention will be appreciated upon reference to the following drawings of a number of exemplary embodiments, in which:

Figure 1 shows a partially sectioned side view of a gravity blender according an
15 embodiment of the invention;

Figure 2 shows a lower portion of the gravity blender of Fig. 1 in more detail;

Figure 3 shows a perspective view from the top of the gravity blender of Fig. 1;

Figure 4 shows an enlarged view of detail IV of Fig. 1;

Figure 5a shows an enlarged view of a joint according to detail VI of Fig. 1; and

20 Figure 5b shows an alternative embodiment of the joint of Fig. 5a.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Figure 1 shows a gravity blender 1 according to a preferred embodiment of the invention in partially sectioned side view. The gravity blender 1 comprises an upright
25 silo body 2 having a hollow interior 3. The silo 2 has a generally cylindrical upper portion 4 and a funnel shaped mid-portion 6 extending to a mixing chamber 8 at the base 16 of the silo 2. The mixing chamber has a delivery port 9 at its lower extremity. Around the exterior of the silo 2 are located blending conduits 10. The blending conduits 10 each extend from the mixing chamber 8 to an access location 12 at the top
30 14 of the silo 2. A gantry platform 18 is provided over the top 14 of the silo 2 allowing access to the access locations 12.

Each blending conduit 10 connects via an upper passageway 20 to an upper outlet 22 from the silo 2. A number of further passageways 24 are provided at lower levels

connecting from further outlets 26 from the silo 2 to the blending conduits 10. Also visible in Figure 1 is a silo cleaning system 28 and a conduit cleaning system 30 located on the gantry platform 18.

The silo 2 is constructed in a conventional manner using flanged panels 32, which are welded or bolted together to ensure a smooth internal surface 34. The skilled person will recognise that alternative constructions including butt welding could also be employed. At the base 16 of the silo 2, a conically-shaped baffle 36 is provided, separating the mid-portion 6 from the mixing chamber 8. The baffle 36 is provided with a central passageway 38 communicating with the mixing chamber 8. This may be provided with appropriate valving means (not shown) as required. The mixing chamber 8 is also formed in two parts with a first portion 40 connected to the mid-portion 6 and a second portion 42 connected to the first portion by a hinge 44 to allow opening of the mixing chamber 8.

The upper portion 4 of the silo 2 terminates at its lower side in a downwardly extending skirt 46 which partially surrounds the mid-portion 6. The skirt 46 is provided with openings 48 by which the blending conduits 10 can traverse the skirt 46. The skilled person will understand that further elements may be present in the construction of the gravity blender 1 that have here been omitted for clarity. In particular, the skirt 46 provides a support by which the silo 2 can be supported.

Figure 2 shows an enlarged view of the lower part of the gravity blender 1 of Figure 1, with the mixing chamber 8 opened. In this view, it can be more clearly seen how the blending conduits 10 traverse the skirt 46 via the openings 48. It may also be noted that at this location, the blending conduits 10 have a single bend or angle 11. The blending conduits 10 are otherwise straight over their upper sections from the angle 11 to the access locations 12 and over their lower sections, from the mixing chamber 8 to the angle 11.

Figure 3 shows a perspective view from above the gravity blender 1 of Fig. 1, in which the gantry platform 18 is better visible. Also visible is the conduit cleaning system 30 and the silo cleaning system 28. The conduit cleaning system 30 comprises a number of spray heads 56 each connected by a connection piece 58 to a ring main 60. The connection for the silo cleaning system 28 is not shown, but it will be understood that this can also be connected to the ring main 60 or otherwise.

Figure 4 shows a detailed cross-section of view IV in Figure 1 showing the conduit cleaning system 30 in greater detail. As can be seen, the blending conduit 10 extends upwards through the gantry platform 18 to the access location 12. Each access location 12 is provided with a closure 54 which can be selectively opened as required to provide access into the interior of the blending conduit 10. The spray heads 56 extend through the closure 54 and are connected by the connection piece 58 to the ring main 60. The silo cleaning system 28 is substantially similar to the conduit cleaning system 30 and is not further described.

Figure 5a shows an enlarged view of detail V of Figure 1 illustrating a welded joint construction used in manufacture of the blending conduits 10. The blending conduits 10 are formed from individual tube segments 10a, 10b, joined at a weld 62. The weld 62 is formed from the outside surface of the blending conduit and each tube segment 10a, 10b has a chamfered end 64 to ensure that the inner surface of the blending conduit 10 at the weld 62 is smooth and free of obstructions.

Figure 5b shows an alternative embodiment of a flanged joint to be used in the blending conduit. In this embodiment, blending conduit 110 is formed from individual tube segments 110a, 110b, joined by flanges 162. Because the blending conduit 110 is located outside of the silo 2, the flanges 162 can be formed extending from the outside surface of the blending conduit 110 without risk that they will serve as a location for hang-up of particulate material. The flanges 162 are held together by bolts 164 as is otherwise conventional, leaving the inner surface of the blending conduit smooth and free of obstructions.

Use of the gravity blender 1 of the present invention will briefly be described with reference to Figures 1 to 4. In use, the silo 2 is filled with particulate material from the top 14 via an appropriate port (not shown). The particulate material filled in to the silo 2 may vary slightly in composition and particle size throughout the hollow interior 3. It is therefore important that on withdrawing material from the silo 2, this takes place from a number of locations simultaneously in order to provide a relatively constant aggregate flow to the mixing chamber and from the delivery port 9. The location of the upper outlets 22 and further outlets 26 ensure that material is withdrawn simultaneously from different levels. As the level of the material within the silo 2 drops, additional further outlets become active according to the moving top-hole principle.

If it is desired to proceed with a different batch of material e.g. of a different composition, the silo 2 is emptied completely and subsequently cleaned using the silo cleaning system 28 and the blending conduits are cleaned using the conduit cleaning system 30. To this end, water or other appropriate cleaning liquid is sprayed from the silo cleaning system 28 into the interior of the silo 2 and forms a liquid film running down the internal surface of the silo 2. This flushes out residual material and also serves to remove static charge from the surface. Owing to the complete absence of obstructions within the silo 2, the liquid film can form evenly around the full periphery of the hollow interior 3. Furthermore, because there are no locations where material can collect, an enhanced degree of cleaning is achievable. The conduit cleaning system 30 is also operated in a similar way, with all the spray heads 56 being supplied with cleaning liquid from the ring main 60 via the connection pieces 58. The cleaning liquid is flushed through the length of the blending conduits 10 to the mixing chamber 8. On completion of the cleaning process, the closures 54 may be opened and a visual inspection of the blending conduits can be performed. Because of the manner in which the blending conduits 10 are manufactured using welds 62, the interior is smooth and the presence of any residual material can be readily perceived.

The invention has thus been described by reference to certain embodiments as discussed above. It will be recognized that these embodiments are susceptible to various modifications and alternative forms well known to those of skill in the art. In particular, it will be understood that other methods of use and cleaning of the gravity blender may be applicable. Other modifications in addition to those described above may be made to the structures and techniques described herein without departing from the spirit and scope of the invention. Accordingly, although specific embodiments have been described, these are examples only and are not limiting upon the scope of the invention as defined by the claims.

CONCLUSIES

1. Zwaartekrachtmenger (1) bruikbaar voor het ontvangen en opslaan van een massa deeltjesmateriaal, waarbij de zwaartekrachtmenger omvat:
 - 5 een silo (2) met een cilindrisch bovendee (4) en een holle binnenzijde (3);
een mengkamer (8);
een meervoud van mengleidingen (10) voorzien aan een buitenzijde van het cilindrische bovendee en zich neerwaarts uitstrekkend vanaf het cilindrische bovendee van de silo om in verbinding te staan met de mengkamer; en
 - 10 een meervoud van doorgangen (20) die zich elk vanaf een respectieve bovenste uitlaat (22) van de holle binnenzijde (3) uitstrekken in een respectieve mengleiding, zodat het deeltjesmateriaal kan stromen van de holle binnenzijde naar de mengkamer via de mengleidingen, waarbij de mengleidingen zich opwaarts uitstrekken naar een respectieve inlaatpositie (12) voorbij de respectieve bovenste uitlaat.
 - 15
2. Zwaartekrachtmenger volgens conclusie 1, waarbij de inlaatposities afsluiters omvatten, welke voorzien in selectieve toegang tot een binnenzijde van de respectieve mengleiding.
- 20 3. Zwaartekrachtmenger volgens conclusie 1 of 2, waarbij de inlaatposities voor elke mengleiding zijn gepositioneerd op dezelfde hoogte ten opzichte van de silo.
4. Zwaartekrachtmenger volgens een der voorgaande conclusies, verder omvattende een siloreinigingssysteem (28) voor het reinigen van de holle binnenzijde van de silo,
 - 25 waarbij het siloreinigingssysteem is voorzien aan de bovenzijde van het bovendee van de silo.
5. Zwaartekrachtmenger volgens een der voorgaande conclusies, verder omvattende een leidingreinigingssysteem (30) in verbinding staand met de inlaatposities voor het
 - 30 reinigen van de binnenzijde van de mengleidingen.

6. Zwaartekracht menger volgens een der voorgaande conclusies, waarbij de holle binnenzijde vrij is van interne structuren, zodat het vasthouden van deeltjesmateriaal is voorkomen.
- 5 7. Zwaartekracht menger volgens een der voorgaande conclusies, waarbij de mengleidingen en doorgangen elk een barrièrevrij binnenoppervlak hebben, zodat het vasthouden van deeltjesmateriaal is voorkomen.
8. Zwaartekracht menger volgens een der voorgaande conclusies, waarbij de
10 mengleidingen zich neerwaarts uitstrekken, parallel aan de buitenzijde van de silo en vanaf de inlaatpositie recht zijn over de lengte van het bovendee.
9. Zwaartekracht menger volgens een der voorgaande conclusies, waarbij elke mengleiding een meervoud van verdere doorgangen heeft, welke doorgangen zich
15 uitstrekken vanaf verdere uitlaten gepositioneerd op verschillende hoogten ten opzichte van de silo.
10. Zwaartekracht menger volgens een der voorgaande conclusies, waarbij de respectieve bovenuitlaten zijn gepositioneerd op verschillende hoogten ten opzichte van
20 de silo.
11. Zwaartekracht menger volgens een der voorgaande conclusies, waarbij de mengleidingen gelijk zijn verdeeld rondom de buitenzijde van de silo.
- 25 12. Zwaartekracht menger volgens een der voorgaande conclusies, waarbij de silo een trechtervormig middendeel omvat, welke zich uitstrekt van het bovendee naar de mengkamer.
13. Zwaartekracht menger volgens conclusie 12, waarbij de verdere uitlaten zijn
30 voorzien in zowel het bovendee als het middendeel van de silo.

14. Zwaartekracht menger volgens conclusie 12 of 13, verder omvattende een neerwaarts gerichte kegelvormige schotplaat (6), dienend als een verdeler tussen een binnenzijde van het middendeel van de silo en de mengkamer.
- 5 15. Zwaartekracht menger volgens conclusie 14, waarbij de schotplaat op zijn laagste punt een centrale doorgang heeft, welke in verbinding staat met de mengkamer.
16. Zwaartekracht menger volgens een der conclusies 13-15, waarbij de mengkamer een met het middendeel van de silo verbonden eerste deel en een beweegbaar met het eerste deel verbonden tweede deel voor het laten openen van de mengkamer, omvat.
- 10
17. Zwaartekracht menger volgens een der conclusies 13-16, waarbij de mengleidingen convergeren naar de mengkamer langs een buitenzijde van het middendeel van de silo.
- 15
18. Zwaartekracht menger volgens een der conclusies 13-17, verder omvattende een omranding (46), waarbij de omranding zich neerwaarts uitstrekt over ten minste een deel van het middendeel langs ten minste een deel van een omtrek van de buitenzijde van de silo.
- 20
19. Zwaartekracht menger volgens conclusie 18, waarbij de mengleidingen door de omranding steken.

Fig. 1

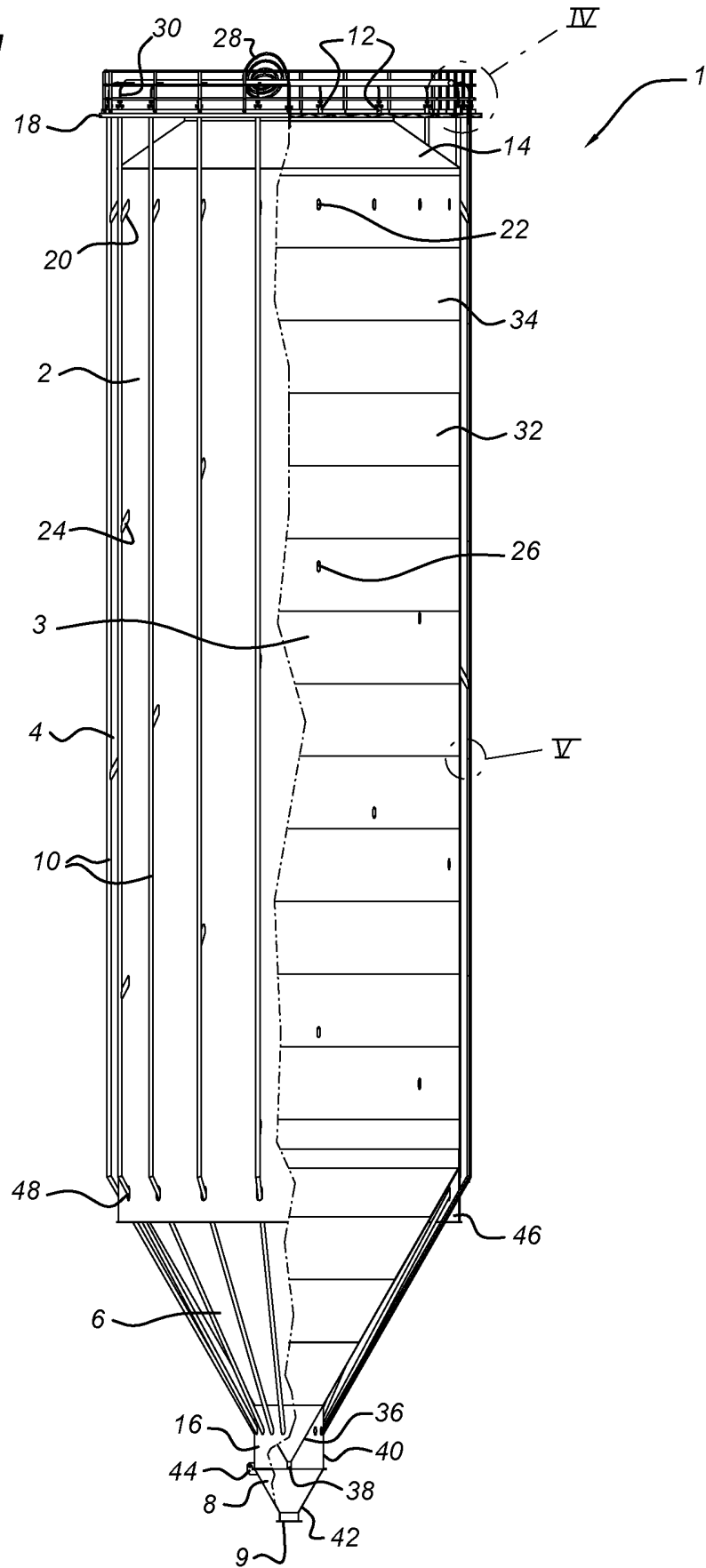


Fig. 2

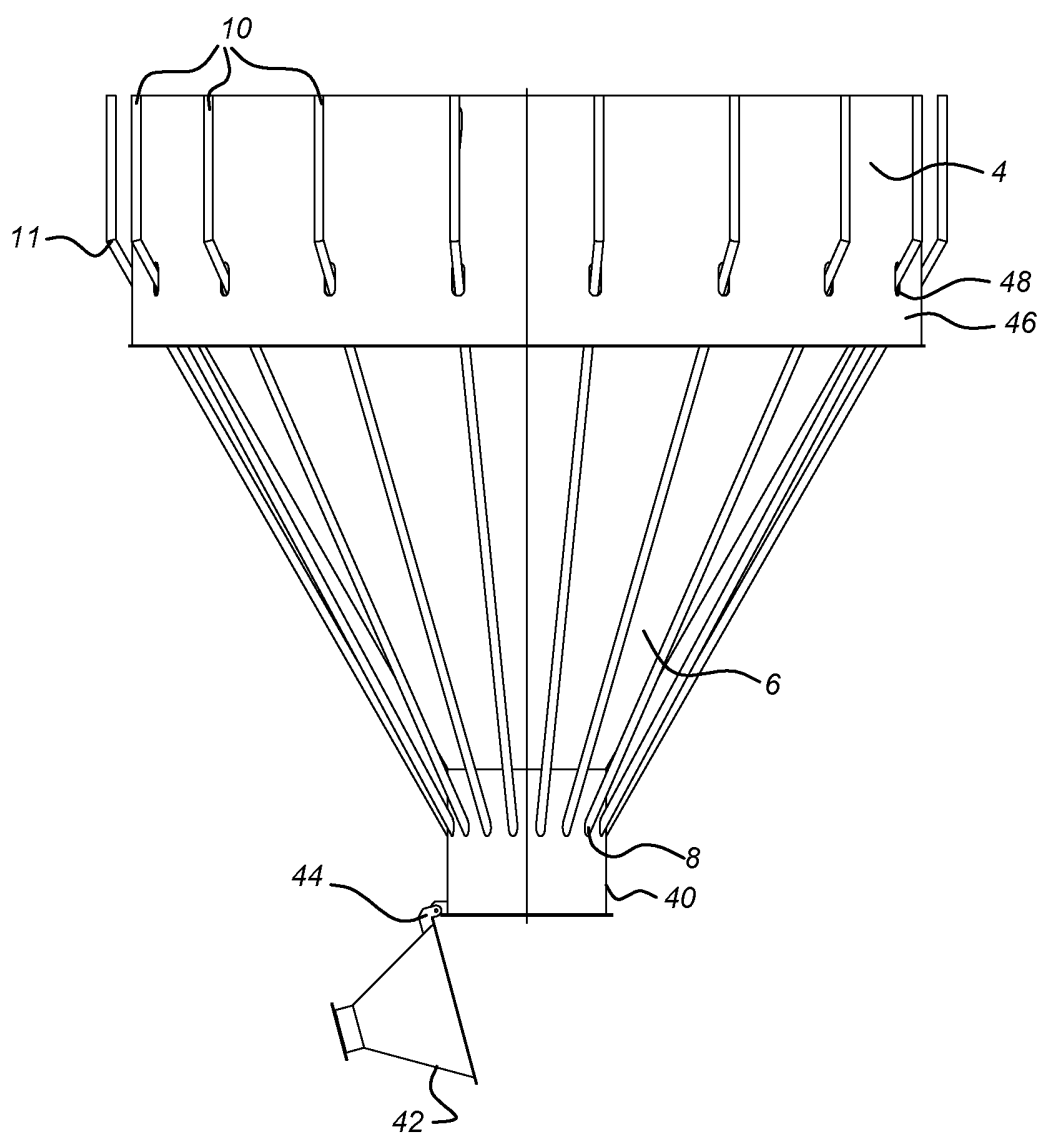


Fig. 3

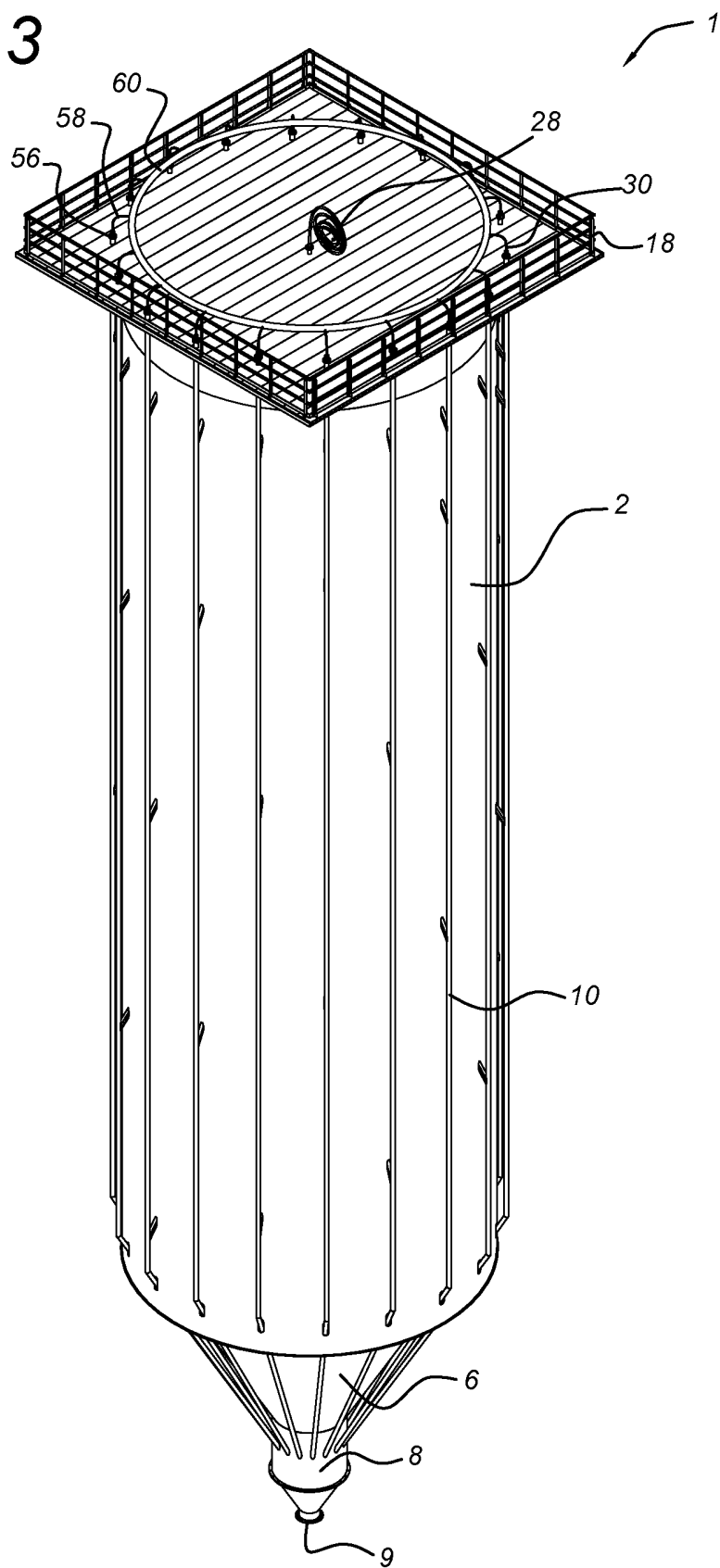


Fig. 4

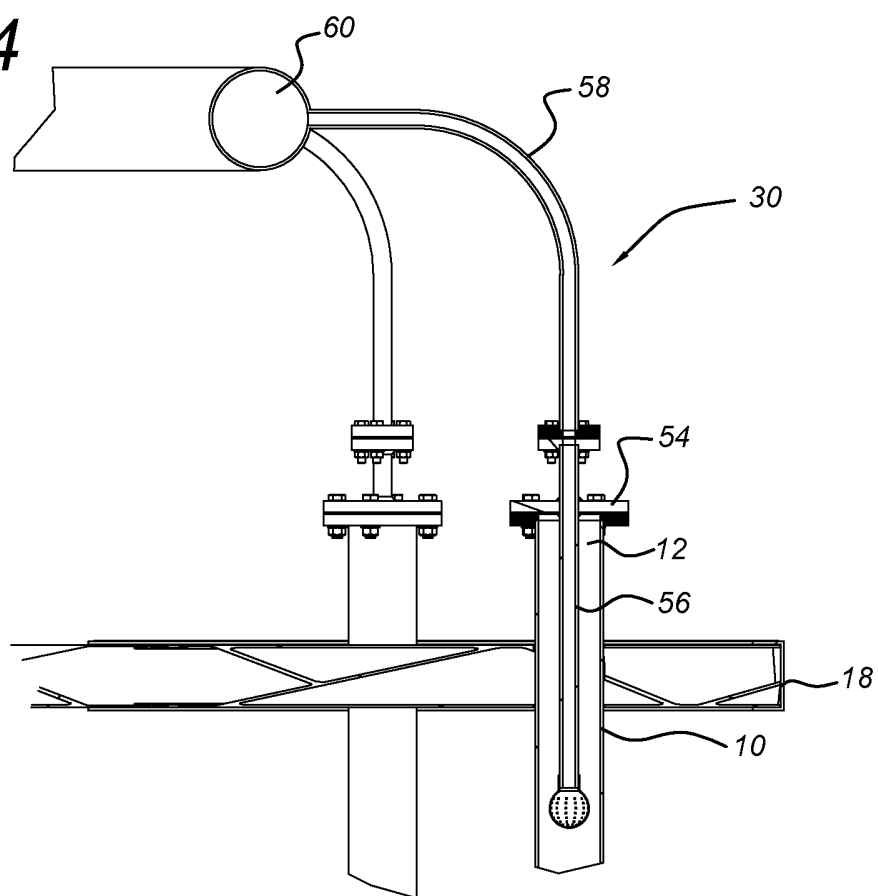


Fig. 5a

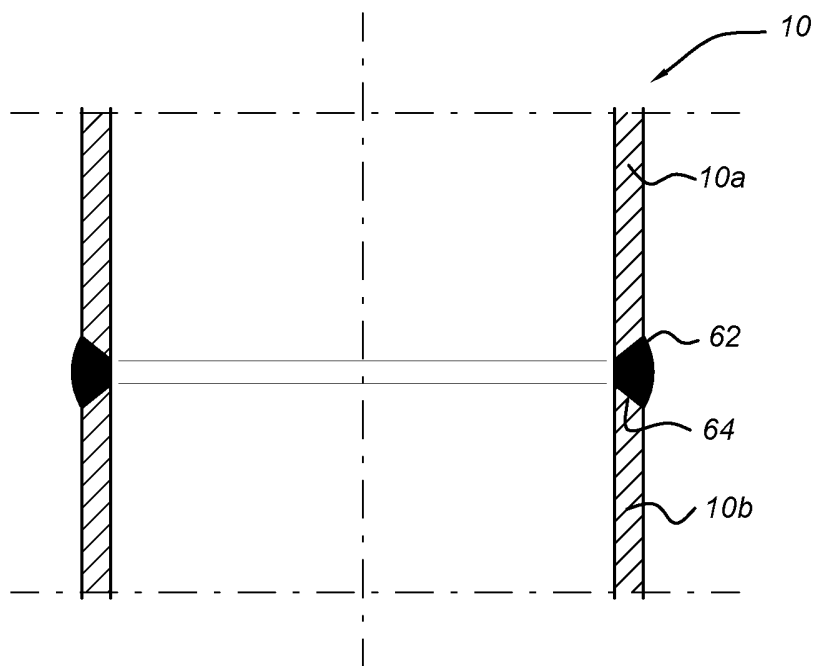
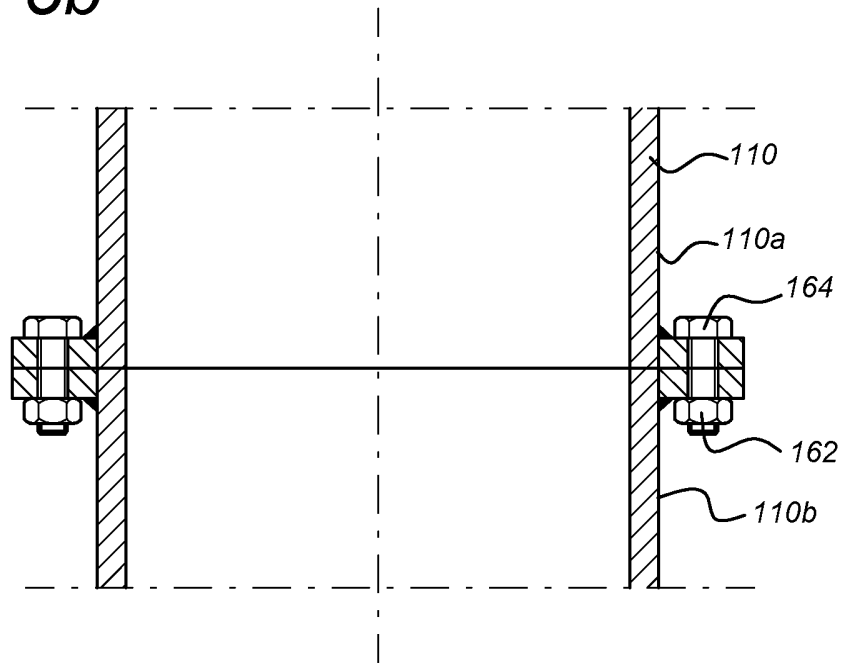


Fig. 5b



SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE		KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE	
		P6045592NL	
Nederlands aanvraag nr.		Indieningsdatum	
2011126		09-07-2013	
		Ingeroepen voorrangsdatum	
Aanvrager (Naam)			
J&D Beheer B.V.			
Datum van het verzoek voor een onderzoek van internationaal type		Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.	
28-09-2013		SN 60765	
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)			
Volgens de internationale classificatie (IPC)			
B01F5/24 B01F15/00 B08B9/032			
II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK			
Onderzochte minimumdocumentatie			
Classificatiesysteem		Classificatiesymbolen	
IPC	B01F	B08B	
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen			
III.	☐	GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES (opmerkingen op aanvullingsblad)	
IV.	☐	GEBREK AAN EENHEID VAN UITVINDING (opmerkingen op aanvullingsblad)	

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek
NL 2011126

A. CLASSIFICATIE VAN HET ONDERWERP
INV. B01F5/24 B01F15/00 B08B9/032
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)
B01F B08B

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)
EPO-Internal

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
Y	US 4 632 565 A (MAHONEY JR WILLIAM J [US]) 30 december 1986 (1986-12-30) * figuren 1-4 * * kolom 2, regel 25 - kolom 4, regel 13 * -----	1-19
Y	US 3 351 326 A (ALBERTS JAMES A ET AL) 7 november 1967 (1967-11-07) * figuren 1,2 * * kolom 2, regel 52 - regel 56 * -----	1-19
Y	US 3 138 369 A (BENNETT RICHARD J ET AL) 23 juni 1964 (1964-06-23) * kolom 2, regel 54 - regel 58 * * figuur 1 * ----- -/--	1-19

☒ Verdere documenten worden vermeld in het vervolg van vak C.

☒ Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

° Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvraag vermeld

"E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"&" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid

18 maart 2014

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

Naam en adres van de instantie

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De bevoegde ambtenaar

Krasenbrink, B

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2011126

C.(Vervolg). VAN BELANG GEACHTTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A	US 5 240 328 A (KRAMBROCK WOLFGANG [DE]) 31 augustus 1993 (1993-08-31) * figuren 1,2 * * kolom 3, regel 13 - kolom 5, regel 63 * -----	1-19
Y	EP 2 497 565 A1 (BAYER MATERIALSCIENCE AG [DE]) 12 september 2012 (2012-09-12) * figuren 3,4 * * alinea [0034] * -----	4,5

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2011126

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
US 4632565	A	30-12-1986	GEEN
US 3351326	A	07-11-1967	GB 1127452 A 18-09-1968 US 3351326 A 07-11-1967
US 3138369	A	23-06-1964	GEEN
US 5240328	A	31-08-1993	GEEN
EP 2497565	A1	12-09-2012	CN 102671562 A 19-09-2012 EP 2497565 A1 12-09-2012 RU 2012108926 A 20-09-2013 US 2012230146 A1 13-09-2012

WRITTEN OPINION

File No. SN60765	Filing date (<i>day/month/year</i>) 09.07.2013	Priority date (<i>day/month/year</i>)	Application No. NL2011126
International Patent Classification (IPC) INV. B01F5/24 B01F15/00 B08B9/032			
Applicant J&D Beheer B.V.			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

	Examiner Krasenbrink, B
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WRITTEN OPINION

Application number
NL2011126

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	1-19
	No: Claims	
Inventive step	Yes: Claims	
	No: Claims	1-19
Industrial applicability	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Application number
NL2011126

Box No. VII Certain defects in the application

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

- D1 US 4 632 565 A (MAHONEY JR WILLIAM J [US]) 30 december 1986 (1986-12-30)
- D2 US 3 351 326 A (ALBERTS JAMES A ET AL) 7 november 1967 (1967-11-07)
- D3 US 3 138 369 A (BENNETT RICHARD J ET AL) 23 juni 1964 (1964-06-23)
- D4 US 5 240 328 A (KRAMBROCK WOLFGANG [DE]) 31 augustus 1993 (1993-08-31)
- D5 EP 2 497 565 A1 (BAYER MATERIALSCIENCE AG [DE]) 12 september 2012 (2012-09-12)

2 The present application does not meet the criteria of patentability, because the subject-matter of claim 1 does not involve an inventive step.

2.1 D1 is regarded as being the prior art closest to the subject-matter of claim 1, and discloses (cf. figures 1-4; column 2, line 25 - column 4, line 13; the references in parentheses applying to this document) a *zwaartekrachtsmenger (10) bruikbaar voor het ontvangen en opslaan van een massa deeltjesmateriaal, waarbij de zwaartekrachtsmenger omvat: een silo met een cilindrisch bovendeel (12) en een holle binnenzijde; een mengkamer (26); een meervoud van mengleidingen (30) voorzien aan een buitenzijde van het cilindrische bovendeel (12) en zich neerwaarts uitstrekkend vanaf het cilindrische bovendeel van de silo om in verbinding te staan met de mengkamer (26); en een meervoud van doorgangen (32, 48, 49) die zich elk vanaf een respectieve bovenste uitlaat (32) van de holle binnenzijde uitstrekken in een respectieve mengleiding (30), zodat het deeltjesmateriaal kan stromen van de holle*

binnenrij de naar de mengkamer (26) via de mengleidingen (30), waarbij de mengleidingen (30) zich opwaarts uitstrekken naar een respectieve inlaatpositie (36) voorbij de respectieve bovenste uitlaat (32) (cf. figure 2).

- 2.1.1 The subject-matter of claim 1 therefore differs from this known *zwaartekrachtsmenger* in that the *positie* is an *inlaatpositie*.
- 2.1.2 The problem to be solved by the present invention may therefore be regarded as cleaning the *mengleidingen*.
- 2.1.3 The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step:
- The differentiating feature of an inlet at the upper end of the blending conduit has already been employed for solving the same problem in similar *zwaartekrachtsmengers* (cf. D2: figures 1, 2 and column 2, lines 52-56: "closures 16 which are preferably removable to facilitate cleaning"; or cf. D3: figure 1 and column 2, lines 54-58: "conduits 15 are ... provided with removable caps 19 for inspection and cleaning"). Therefore, it would be obvious to the person skilled in the art to apply this feature with corresponding effect to a *zwaartekrachtsmenger* according to D1, thereby arriving at a *zwaartekrachtsmenger* according to claim 1.
- 2.2 The subject-matter of claim 1 does also not involve an inventive step over a combination of document D4 with any of documents D2 or D3, cf. relevant passages in the Search Report.
- 3 Dependent claims 2-19 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of inventive step, the reasons being as follows:
- 3.1 The additional features of claims 2, 3 are already disclosed in any of documents D2, D3 (cf. relevant passages cited in the Search Report).
- 3.2 The additional features of claims 4, 5 are already disclosed in document D5 (cf. relevant passages cited in the Search Report).
- 3.3 The additional features of claims 6-19 are already disclosed in document D1 (cf. relevant passages cited in the Search Report).
- 3.3.1 Regarding claim 16, D1 discloses in figure 4 a *mengkamer* comprising a lower part and an upper part which parts are screwed together, which is considered as *beweegbaar verbonden*.

- 3.3.2 Regarding claims 18 and 19, D1 discloses in figure 1 four support legs 16 which are considered as constituting *een omranding, waarbij de omranding zich neerwaarts uitstrekt over ten minste een deel van het middendeel langs ten minste een deel van een omtrek van de buitenzijde van de silo, waarbij de mangleidingen door de omranding steken.*

Re Item VII

Certain defects in the application

- 1 The relevant background art disclosed in documents D1-D4 is not mentioned in the description, nor are these documents identified therein.