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(54) TRUCK-MOUNTED CONCRETE MIXER, MIXING DRUM AND MIXING DRUM BLADE STRUCTURE OF THE SAME

AUF EINEM LASTENFAHRZEUG MONTIERTER BETONMISCHER, MISCHTROMMEL UND MISCHTROMMELSCHAUFELSTRUKTUR DAFÜR

BÉTONNIÈRE SUR CAMION, ET TAMBOUR MÉLANGEUR ET STRUCTURE DE PALES DE TAMBOUR MÉLANGEUR DESTINÉS À CETTE BÉTONNIÈRE

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Description

TECHNICAL FIELD

[0001] The present invention relates to the field of concrete mixing, in particular to a truck-mounted concrete mixer, and a mixing drum and a mixing drum blade structure of the truck-mounted concrete mixer.

BACKGROUND ART

[0002] Concrete is one of the most important civil engineering materials of the time, and belongs to an artificial masonry material produced by mixing cementing material, aggregate, and water at appropriate mix ratios, agitating and vibration-forming, and curing under certain conditions. Due to its advantages, such as wide source, low price, and simple process of production, etc., the consumption of concrete is growing faster. In addition, concrete also has merits such as high compression strength, high durability, and wide range of stress rating, etc. Owing to these advantages and merits, concrete is widely used, and is an important material not only in civil engineering but also in ship building, mechanical industry, ocean exploitation, and terrestrial heat engineering, etc.

[0003] As concrete production and application techniques are developed rapidly, centralized concrete mixing and commercialized supply means are employed gradually, which is to say, concrete is supplied from specialized concrete batching plants, and transported by truck-mounted concrete mixers to construction sites.

[0004] A truck-mounted concrete mixer comprises an automobile chassis and a special mechanism for mixing and transporting concrete. The special mechanism mainly comprises a power takeoff unit, front and rear supports of mixing drum, a speed reducer, a hydraulic system, a mixing drum, a control unit, and a cleaning system. The working principle of a truck-mounted concrete mixer is: the mechanical power is obtained from the automobile chassis by the power takeoff unit, and is used to drive a variable displacement pump in the hydraulic system to convert the mechanical energy into hydraulic energy and transfer the hydraulic energy to a constant displacement motor, the constant displacement motor drives the speed reducer, and the speed reducer drives an agitation unit to agitate the concrete. Wherein, the mixing drum plays a crucial role in the concrete mixing quality.

[0005] The mixing drum is a concrete container, which is usually made of high-quality wear-resistant steel sheets, and comprises a drum body with helical blades welded to the inner wall thereof to facilitate automatic loading/unloading concrete. The concrete moves along the helical direction of the blades while the mixing drum rotates, and is mixed and agitated in a continuous lifting and rollover process. The mixing drum rotates in the normal direction and the concrete moves inwards along the blades in the charging and transport process; the mixing drum rotates in the reversed direction and the concrete flows outwards along the blades in the discharging process. The mixing drum rotates under the driving power of the hydraulic driving unit. A truck-mounted concrete mixer with 3-6m^3 load capacity usually utilizes the automobile engine to drive the hydraulic pump via the PTO shaft and drive the hydraulic motor with high pressure oil so as to drive the mixing drum; a truck-mounted concrete mixer with 9-12m^3 load capacity usually utilizes an onboard auxiliary diesel engine to drive the hydraulic pump so as to drive the hydraulic motor.

[0006] The mixing blades are an important component of the mixing drum; and if the mixing blades are damaged or worn severely, the concrete will not be mixed homogeneously, and segregation phenomenon may occur.

[0007] As shown in Figure 1, in the prior art, the blades 2 are distributed helically and assembled on the inner wall of the drum body 1 of the mixing drum. As shown in Figure 2, the cross section of blade 2 is at an inclined angle to the inner wall of the drum body 1. Such assembled blades have poor performance for ensuring concrete homogeneity and have poor adaptability to concrete. Therefore, the blades can't provide satisfactory mixing effect and the discharging speed is low; in addition, the blades don't have enough strength and may be worn down easily.

[0008] US 4,187,028 discloses a mixing blade for concrete mixer comprising a first part substantially perpendicular to the inner wall of the drum and a second part angled with respect to the first part. Along the first part of the blade a through hole is provided, which is coupled to a deflector blade. The through hole allows the passage of the concrete from one side of the blade to another in response to rotation of the drum, so as to establish the turbulence in the flow of wet concrete.

[0009] JP 59 140811 U discloses a mixing drum blade structure of a truck-mounted concrete mixer in accordance with the preamble of claim 1 and DE 40 10 539 A1 discloses other solutions of blades of concrete mixers formed by two parts angled to each other.

SUMMARY OF INVENTION

[0010] The object of the present invention is to provide a truck-mounted concrete mixer, and a mixing drum and a mixing drum blade structure of the truck-mounted concrete mixer, so as to overcome the drawbacks in the prior art, such as inhomogeneous concrete mixing and poor mixing effect, etc.

[0011] To attain the object described above, in one aspect, the present invention provides a mixing drum blade structure of truck-mounted concrete mixer, comprising a first blade part connected to the inner wall of the mixing drum and a second blade part intersect-connected to the first blade part in accordance with claim 1.

[0012] Preferably, there is an angle α between the first blade part and the second blade part.

[0013] Preferably, the angle α is 45°-90°.

[0014] Preferably, the ratio of the width of the second

blade part to the height of the first blade part is 0.05-0.6.

[0015] The first blade part extends inwardly from the inner wall of the drum body, forming a first side and a second side that are opposite to each other, wherein, the first side is connected to the inner wall of the mixing drum, and the second blade part is arranged on the second side or arranged between the first side and the second side.

[0016] Preferably, the second blade part is arranged in an equally divided manner in relation to the first blade part.

[0017] Preferably, the second blade part is arranged in a deflected manner toward one side of the first blade part.

[0018] Preferably, the ratio of the distance from the connection point of the second blade part and the first blade part to one end of the second blade part to the width of the second blade part is 0.15-0.8.

[0019] Preferably, both the first side and the second side extend in a helical structure along the inner wall of drum body of the mixing drum, and the second blade part is arranged continuously or intermittently along the helical structure.

[0020] Preferably, the first blade part and the second blade part are connected in a removable manner, or connected by welding, or formed integrally.

[0021] A plurality of first flow-through holes are arranged on the first blade part.

[0022] Preferably, the first flow-through holes are round holes, and ratio of the diameter of the first flow-through holes to the height of the first blade part is 0.1-0.5.

[0023] Preferably, the ratio of the distance from the center of the first flow-through hole to the connection point of the second blade part and the first blade part to the height of the first blade part is 0.3-0.75.

[0024] A plurality of second flow-through holes are arranged on the second blade part.

[0025] The ratio of the distance from the center of the second flow-through hole to the connection point of the second blade part and the first blade part to the width of the second blade part is 0.25-0.4.

[0026] In another aspect, the present invention further provides a mixing drum of truck-mounted concrete mixer, comprising a drum body with a drum opening and a drum bottom respectively provided at the two ends of the drum body, wherein, the mixing drum further comprises the mixing drum blade structure described above on the inner wall of the drum body.

[0027] Preferably, along the axial direction, the mixing drum comprises a drum opening part close to the drum opening, a drum bottom part close to the drum bottom, and a middle part between the drum opening part and the drum bottom part, and the mixing drum blade structures provided on the drum opening part, middle part, and drum bottom part are different from each other.

[0028] Preferably, the second blade part of the mixing drum blade structure arranged at the drum opening part is arranged on the first blade part in a deflected manner towards the drum opening; the second blade part of the mixing drum blade structure arranged at the middle part is arranged on the first blade part in an equally divided manner in relation to the first blade part; the second blade part of the mixing drum blade structure arranged at the drum bottom part is arranged on the first blade part in a deflected manner towards the drum bottom.

[0029] In another aspect, the present invention further provides a truck-mounted concrete mixer, which has the mixing drum of truck-mounted concrete mixer described above.

[0030] Since the mixing drum blade structure of truck-mounted concrete mixer provided in the present invention employs a first blade part and a second blade part that is intersect-connected to the first blade part, the strength of the entire mixing drum blade structure is increased, and therefore the mixing drum blade structure is more adaptable in the concrete mixing work; in addition, the mixing effect is optimized and the mixture is more homogeneous; therefore, the segregation phenomenon can be prevented in the mixing process.

[0031] With the mixing drum blade structure described above, the mixing drum of truck-mounted concrete mixer provided in the present invention has better wear-resistant performance and can achieve better diversion effect; as a result, the service life of the mixing drum is longer, the mixture is more homogeneous, and the charging speed and discharging speed are increased.

[0032] Moreover, the truck-mounted concrete mixer with the mixing drum described above in the present invention can maintain the concrete at high quality even during long-distance transportation.

DESCRIPTION OF ACCOMPANYING DRAWINGS

[0033] The accompanying drawings are provided to further illustrate the present invention and constitute a part of the patent application; the embodiments and associated description in the present invention are provided to interpret the present invention, and shall not be deemed as constituting any undue limitation to the present invention. Among the drawings:

Figure 1 is a schematic structural diagram of an existing mixing drum in the prior art;

Figure 2 is a schematic diagram of the cross-section structure of the existing mixing drum blade structure in the prior art;

Figure 3 is a schematic diagram of the first cross-section structure of the mixing drum blade structure in the present invention;

Figure 4 is a schematic diagram of the second cross-section structure of the mixing drum blade structure in the present invention;

Figure 4A and 4B are schematic diagrams of the first flow-through hole on the first blade part of the mixing drum blade structure in the present invention;

Figure 5 is a schematic diagram of the third cross-

section structure of the mixing drum blade structure in the present invention;

Figure 6 is a schematic diagram of the fourth cross-section structure of the mixing drum blade structure in the present invention;

Figure 7 is a schematic diagram of the fifth cross-section structure of the mixing drum blade structure in the present invention;

Figure 8 is a schematic diagram of the sixth cross-section structure of the mixing drum blade structure in the present invention;

Figure 9 is a schematic structural diagram of the mixing drum blade structure with flow-through holes in the present invention;

Figure 10 is a schematic structural diagram of the mixing drum in the present invention;

Figure 11 is a schematic structural diagram of the mixing drum blade structure mounted in the mixing drum in the present invention;

Figure 12 is a schematic diagram of the charging process of the mixing drum in the present invention; and

Figure 13 is a schematic diagram of the discharging process of the mixing drum in the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

[0034] It is noted that the embodiments and the features in the embodiments can be combined freely, provided that there is no confliction therebetween. Hereunder the present invention will be detailed in the embodiments, with reference to the accompanying figures.

[0035] In an embodiment, a mixing drum blade structure of truck-mounted concrete mixer is provided. As shown in Figure 3 and Figure 9 to 13, the mixing drum blade structure comprises a first blade part 10 connected to the inner wall of the drum body 40 of a mixing drum and a second blade part 30 intersect-connected to the first blade part 10.

[0036] With the second blade part 30 that is intersect-connected to the first blade part 10, the entire mixing drum blade structure is strengthened, and therefore the mixing drum blade structure is more endurable in the concrete mixing work; in addition, the mixing effect is optimized, the mixture is more homogeneous, and the segregation phenomenon can be prevented in the mixing process.

[0037] As shown in Figure 3, there is an angle α between the first blade part 10 and the second blade part 30. Specifically, as shown in Figure 3, the angle α is an acute angle or right angle formed between the cross section of the first blade part 10 and the cross section of the second blade part 30. For example, the angle α can be 45°-90°; preferably, the angle α is 90°. Preferably, as shown in Figure 3, the ratio of the width A of the second blade part 30 to the height B of the first blade part 10 is 0.05-0.6. In such an arrangement, the mixing drum blade structure will get better contact with concrete and it will be helpful in improving mixing efficacy, so as to obtain a better mixing effect.

[0038] Preferably, the first blade part 10 extends inwardly from the inner wall of the drum body 40, forming a first side and a second side that are opposite to each other, wherein, the first side is connected to the inner wall of the mixing drum, and the second blade part 30 can be arranged on the second side as shown in Figure 3-5, or arranged between the first side and the second side as shown in Figure 6-8.

[0039] As shown in Figure 3, the first blade part 10 has a first side surface 13 and a second side surface 15, and the second blade part 30 has a first deflected segment that extends towards the side of the first side 13 and a second deflected segment that extends towards the side of the second side 15; wherein, the length of the first deflected segment is b, which is equal to the distance from the connection point P of the second blade part 30 and the first blade part 10 to the one end of the second blade part 30; the length of the second deflected segment is a, which is equal to the distance from the connection point P to the other end the second blade part 30; the width of the second blade part 30 is A=a+b. Figure 3 and Figure 6 show the case of "a=b", i.e., the second blade part 30 is arranged in an equally divided manner in relation to the first blade part 10; alternatively, the second blade part 30 can be arranged on the second side or between the first side and the second side in a deflected manner towards one side of the first blade part 10, i.e., the case of "a>b" as shown in Figure 5 and Figure 7, and the case of "a<b" as shown in Figure 4 and Figure 8. In two embodiments that are not shown, the second blade part 30 can be arranged in a manner of "a=0, b>0" or "a>0, b=0". More preferably, as shown in Figure 4, the ratio of the distance from the connection point P of the second blade part 30 and the first blade part 10 to one end of the second blade part 30 (e.g., the length b of the first deflected segment) to the width A of the second blade part 30 is 0.15-0.8. Since the second blade part 30 is arranged in a deflected manner towards one side of the first blade part 10, the side where the deflected segment is longer will contact with concrete in a larger contact area, such that the concrete will roll over to and fro more violently, the mixing effect is improved, and the concrete will be mixed more homogeneously.

[0040] It can be seen from Figure 3: the second blade part 30 has a third side surface 31 and a fourth side surface 33, Generally speaking, the first side surface 13 and second side surface 15 of the first blade part 10 and the third side surface 31 and fourth side surface 33 of the second blade part 30 are flat surfaces in parallel to the directions of extension of the respective blade parts, and the cross sections of the first blade part 10 and second blade part 30 are of a linear shape, However, owing to machining tolerance, the first side surface 13, second side surface 15, third side surface 31, and fourth surface side 33 may not be parallel exactly to the directions of extension of the respective blade parts, and consequent-

ly the cross sections of the first blade part 10 and second blade part 30 may not be of a exact linear shape.

[0041] As shown in Figure 9 and 10, both the first side and the second side of the first blade part 10 extend helically along the inner wall of drum body 40 of the mixing drum, and the second blade part 30 can be arranged continuously or intermittently along the helical structure.

[0042] Preferably, the first blade part 10 and the second blade part 30 are connected in a removable manner (e.g., bolting, riveting, etc.), or connected by welding, or the first blade part 10 and the second blade part 30 can be formed integrally.

[0043] In addition, to facilitate the concrete to flow through the mixing drum more easily, as shown in Figure 4 and 9, a plurality of flow-through holes 11 can be arranged on the first blade part 10, wherein, the cross sectional shape of the first flow-through holes 11 can be round, elliptical, oblong, square, or other shape, so that the concrete can be mixed more intensively, and thereby the purpose of homogeneous mixing can be attained. The size and location of the first flow-through holes 11 can be arranged appropriately as required according to the actual condition. Preferably, as shown in Figure 4, the first flow-through holes 11 are of round shape, and the ratio of the diameter L1 of the first flow-through holes 11 to the height B of the first blade part 10 is 0.1-0.5. Preferably, the ratio of the distance K from the center of the first flow-through hole 11 to the connection point P of the second blade part 30 and the first blade part 10 to the height B of the first blade part 10 is 0.3-0.75, such that the concrete can be mixed more intensively and homogeneously.

[0044] As shown in Figure 4A and 4B, the first flow-through holes 11 can be of elliptical shape. In the embodiment shown in Figure 4A and 4B, the height of the first blade part 10 is about 440mm, a plurality of first flow-through holes 11 are arranged on the blade part 10, and the first flow-through holes 11 are of substantially elliptical shape, wherein, the major axis L2 of the ellipse is about 170mm, and the minor axis L3 of the ellipse is about 120mm. In the embodiment shown in Figure 4A, the distance K2 from the center of ellipse to the connection point P of the second blade part 30 and the first blade part 10 is about 300mm; whereas, in the embodiment shown in Figure 4B, the distance K3 from the center of ellipse to the connection point P of the second blade part 30 and the first blade part 10 is about 220mm.

[0045] As shown in Figure 5, a plurality of second flow-through holes 12 are arranged on the second blade part 30. The cross sectional shape of the second flow-through holes 12 can be of round, elliptical, square, or other shape, so that the concrete can be mixed more intensively and thereby the purpose of homogeneous mixing can be attained. The size and location of the second flow-through holes 12 can be arranged appropriately as required according to the actual condition. The ratio of the distance H from the center of the second flow-through hole 12 to the connection point P of the second blade part 30 and the first blade part 10 to the width A of the second blade part 30 is 0.25-0.4. With that arrangement, the concrete can be mixed more intensively and homogeneously. The mixing drum blade structure is arranged with both the first flow-through holes 11 and the second flow-through holes 12.

[0046] In another embodiment of the present invention, a mixing drum of truck-mounted concrete mixer with the mixing drum blade structure described above is provided. As shown in Figure 9 and 10, the mixing drum comprises a drum body 40, with a drum opening and a drum bottom respectively provided at the two ends of the drum body 40, wherein, the mixing drum blade structure is arranged on the inner wall of the drum body 40 in a helical manner; in addition, it can be seen from Figure 11 that there is an angle β between the first blade part 10 and the inner wall of the drum body 40, and the angle β can be any angle greater than 0° but smaller than 180°. The structure of mixing blades in the mixing drum can be any of the mixing drum blade structures described above, or any combination of the mixing drum blade structures described above.

[0047] The mixing drum will rotate around its central axis when it operates. As shown in Figures 12 and 13, along the axial direction of the central axis, the mixing drum comprises a drum opening part 50 close to the drum opening, a drum bottom part 90 close to the drum bottom, and a middle part 70 between the drum opening part 50 and the drum bottom part 90. Three types of mixing drum blade structures can be arranged in the mixing drum, and among the three parts, the mixing drum blade structure arranged at each part is different from the mixing drum blade structure arranged at any other two parts.

[0048] Preferably, the second blade part 30 of the mixing drum blade structure provided at the drum opening part 50 is arranged on the first blade part 10 in a deflected manner towards the drum opening (i.e., the length a of the second deflected segment of the second blade part 30 is smaller than the length b of the first deflected segment of the second blade part 30); the second blade part 30 of the mixing drum blade structure provided at the middle part 70 is arranged on the first blade part 10 in an equally divided manner in relation to the first blade part 10 (i.e., the length a of the second deflected segment of the second blade part 30 is equal to the length b of the first deflected segment of the second blade part 30); the second blade part 30 of the mixing drum blade structure provided at the drum bottom part 90 is arranged on the first blade part 10 in a deflected manner towards the drum bottom (i.e., the length a of the second deflected segment of the second blade part 30 is larger than the length b of the first deflected segment of the second blade part 30).

[0049] As shown in Figure 12, the movement direction of concrete is indicated by an arrow; in the charging process, the concrete is pushed towards the drum bottom along the two blade parts. The concrete gets a first agitation when it moves along the first blade part 10, and a part of the concrete climbs along the first blade part 10;

when the concrete encounters the second blade part 30, it rolls over forwards, and gets a second agitation. The second blade parts 30 at the drum opening part 50 and the middle part 70 of the mixing drum mainly provide agitation and diversion functions, and the second blade part 30 at the drum bottom part 90 mainly provides diversion and charging acceleration functions. The concrete will be mixed completely before it enters into the drum bottom part 90, therefore the mixing homogeneity is improved.

[0050] In the mixing process, since the mixing drum in this embodiment employs mixing drum blade structures composed of the first blade part 10 and the second blade part 30 and different mixing drum blade structures are arranged at different parts of the mixing drum, such that agitating walls in different directions are increased, and therefore the mixing effect will be optimized and the mixture will be more homogeneous.

[0051] As shown in Figure 13, the movement direction of concrete is indicated by an arrow; in the discharging process, the concrete is pushed towards the drum opening along the two blade parts. The concrete gets a first agitation when it moves along the first blade part 10, and a part of the concrete climbs along the first blade part 10; when the concrete encounters the second blade part 30, it rolls over forwards, and gets a second agitation. The second blade parts 30 at the drum bottom part 90 and the middle part 70 of the mixing drum mainly provide agitation and diversion functions, and the second blade part 30 at the drum opening part 50 mainly provides diversion and discharging acceleration functions.

[0052] With the mixing drum blade structure described above, the mixing drum of truck-mounted concrete mixer provided in this embodiment of the present invention has better wear-resistant performance and longer service life. In addition, since different mixing blade structures can be used in combination, the concrete mixing effect is improved, the concrete mixing is more homogenous, thus accelerating the charging speed and discharging speed.

[0053] In another embodiment of the present invention, a truck-mounted concrete mixer with the mixing drum described above is provided, and the truck-mounted concrete mixer can maintain the concrete at high quality even after long-distance transportation.

[0054] It can be seen from the above description that the embodiments of the present invention attain the following technical efficacies:

Since the mixing drum blade structure of truck-mounted concrete mixer provided in the embodiment provides a first blade part 10 and a second blade part 30 that is intersect-connected to the first blade part 10, the strength of the entire mixing drum blade structure is increased, and therefore the mixing drum blade structure is more adaptable in the concrete mixing work. In addition, the mixing effect is optimized and the mixture is more homogeneous. Therefore, the segregation phenomenon can be prevented in the mixing process. In addition, the arrangement of the flow-through holes 11 facilitates the through-flow of concrete and is advantageous for completely mixing concrete, so as to attain the purpose of homogeneous mixing.

[0055] In the embodiments of the present invention, a mixing drum of truck-mounted concrete mixer is further provided. With the mixing drum blade structure described above, the mixing drum has better wear-resistant performance and longer service life. In addition, since different mixing blade structures can be used in combination, the concrete mixing effect is improved, the concrete mixing is more homogenous, and the charging speed and discharging speed are accelerated.

[0056] Moreover, the truck-mounted concrete mixer with the mixing drum described provided in the embodiments of the present invention can maintain the concrete at high quality even after long-distance transportation.

Claims

1. A mixing drum blade structure of truck-mounted concrete mixer, comprising a first blade part (10) connected to the inner wall of the drum body (40) of a mixing drum, the mixing drum blade structure further comprising a second blade part (30) which is intersect-connected to the first blade part (10), wherein, a plurality of first flow-through holes (11) are arranged on the first blade part (10), wherein, a plurality of second flow-through holes (12) are arranged on the second blade part (30), and wherein the ratio of the distance (H) from the center of the second flow-through hole (12) to the connection point (P) of the second blade parts (30) and the first blade part (10) to the width (A) of the second blade part (30) is 0.25-0.4, wherein the first blade part (10) extends inwardly from the inner wall of the drum body (40), forming a first side and a second side that are opposite to each other, **characterised in that** the first side is connected to the inner wall of the mixing drum, and the second blade part (30) is arranged on the second side or arranged between the first side and the second side, and wherein both the first side and the second side extend in a helical structure along the inner wall of the drum body (40) of the mixing drum, and the second blade part (30) is arranged continuously or intermittently along the helical structure.

2. The mixing drum blade structure according to claim 1, wherein, there is an angle (α) between the first blade part (10) and the second blade part (30).

3. The mixing drum blade structure according to claim 2, wherein, the angle (α) is 45°-90°.

4. The mixing drum blade structure according to claim 1, wherein, the ratio of the width (A) of the second

blade part (30) to the height (B) of the first blade part (10) is 0.05-0.6.

5. The mixing drum blade structure according to claim 1, wherein, the second blade part (30) is arranged in an equally divided manner in relation to the first blade part (10).

6. The mixing drum blade structure according to claim 1, wherein, the second blade part (30) is arranged in a deflected manner towards one side of the first blade part (10).

7. The mixing drum blade structure according to claim 6, wherein, the ratio of the distance from the connection point (P) of the second blade part (30) and the first blade part (10) to one end of the second blade part (30) to the width (A) of the second blade part (30) is 0.15-0.8.

8. The mixing drum blade structure according to claim 1, wherein, the first flow-through holes (11) are of round shape, and the ratio of the diameter (L1) of the first flow-through holes (11) to the height (B) of the first blade part (10) is 0.1-0.5.

9. The mixing drum blade structure according to claim 8, wherein, the ratio of the distance (K) from the center of the first flow-through hole (11) to the connection point (P) of the second blade part (30) and the first blade part (10) to the height (B) of the first blade part (10) is 0.3-0.75.

10. A mixing drum of truck-mounted concrete mixer, comprising a drum body (40) with a drum opening and a drum bottom respectively provided at the two ends of the drum body (40), **characterized in that**, the mixing drum further comprises the mixing drum blade structure according to any of the claims 1-9 provided on the inner wall of the drum body (40).

11. The mixing drum according to claim 10, wherein, along the axial direction, the mixing drum comprises a drum opening part (50) close to the drum opening, a drum bottom part (90) close to the drum bottom, and a middle part (70) between the drum opening part (50) and the drum bottom part (90), and the mixing drum blade structures provided on the drum opening part (50), middle part (70), and drum bottom part (90) are different from each other.

12. The mixing drum according to claim 11, wherein, the second blade part (30) of the mixing drum blade structure arranged at the drum opening part (50) is arranged on the first blade part (10) in a deflected manner towards the drum opening; the second blade part (30) of the mixing drum blade structure arranged at the middle part (70) is arranged on the first blade part (10) in an equally divided manner in relation to the first blade part (10); the second blade part (30) of the mixing drum blade structure arranged at the drum bottom part (90) is arranged on the first blade part (10) in a deflected manner towards the drum bottom.

13. A truck-mounted concrete mixer, **characterized in that** the truck-mounted concrete mixer has a mixing drum of truck-mounted concrete mixer according to any of claims 10-12.

Patentansprüche

1. Mischtrommelschaufelstruktur eines auf einem Lkw montierten Betonmischers, umfassend einen ersten Schaufelteil (10), der mit der Innenwand des Trommelkörpers (40) einer Mischtrommel verbunden ist, wobei die Mischtrommelschaufelstruktur ferner einen zweiten Schaufelteil (30) umfasst, der mit dem ersten Schaufelteil (10) durch Durchschnitt verbunden ist, worin eine Vielzahl von ersten Durchflussöffnungen (11) am ersten Schaufelteil (10) angeordnet sind, worin eine Vielzahl von zweiten Durchflussöffnungen (12) am zweiten Schaufelteil (30) angeordnet sind, und worin das Verhältnis des Abstands (H) vom Mittelpunkt der zweiten Durchflussöffnung (12) zum Verbindungspunkt (P) der zweiten Schaufelteile (30) und des ersten Schaufelteils (10) zur Breite (A) des zweiten Schaufelteils (30) 0,25-0,4 beträgt, worin der erste Schaufelteil (10) sich nach innen von der Innenwand des Trommelkörpers (40) erstreckt, wodurch eine erste Seite und eine zweite Seite gebildet werden, die einander gegenüberliegen, **dadurch gekennzeichnet, dass** die erste Seite mit der Innenwand der Mischtrommel verbunden ist, und der zweite Schaufelteil (30) an der zweiten Seite angeordnet ist oder zwischen der ersten Seite und der zweiten Seite angeordnet ist, und worin sowohl die erste Seite als auch die zweite Seite sich nach Art einer schneckenförmigen Struktur entlang der Innenwand des Trommelkörpers (40) der Mischtrommel erstrecken, und der zweite Schaufelteil (30) kontinuierlich oder intermittierend entlang der schneckenförmigen Struktur angeordnet ist.

2. Mischtrommelschaufelstruktur nach Anspruch 1, worin es einen Winkel (a) zwischen dem ersten Schaufelteil (10) und dem zweiten Schaufelteil (30) gibt.

3. Mischtrommelschaufelstruktur nach Anspruch 2, worin der Winkel (a) 45°-90° beträgt.

4. Mischtrommelschaufelstruktur nach Anspruch 1, worin das Verhältnis der Breite (A) des zweiten Schaufelteils (30) zur Höhe (B) des ersten Schau-

felteils (10) 0,05-0,6 beträgt.

5. Mischtrommelschaufelstruktur nach Anspruch 1, worin der zweite Schaufelteil (30) in einer gleich geteilten Weise in Bezug auf den ersten Schaufelteil (10) angeordnet ist.

6. Mischtrommelschaufelstruktur nach Anspruch 1, worin der zweite Schaufelteil (30) in einer abgelenkten Weise in Richtung auf eine Seite des ersten Schaufelteils (10) angeordnet ist.

7. Mischtrommelschaufelstruktur nach Anspruch 6, worin das Verhältnis des Abstands vom Verbindungspunkt (P) des zweiten Schaufelteils (30) und des ersten Schaufelteils (10) zu einem Ende des zweiten Schaufelteils (30) und der Breite (A) des zweiten Schaufelteils (30) 0,15-0,8 beträgt.

8. Mischtrommelschaufelstruktur nach Anspruch 1, worin die ersten Durchflussöffnungen (11) eine runde Form aufweisen, und das Verhältnis des Durchmessers (L1) der ersten Durchflussöffnungen (11) zur Höhe (B) des ersten Schaufelteils (10) 0,1-0,5 beträgt.

9. Mischtrommelschaufelstruktur nach Anspruch 8, worin das Verhältnis des Abstands (K) vom Mittelpunkt der ersten Durchflussöffnung (11) zum Verbindungspunkt (P) des zweiten Schaufelteils (30) und des ersten Schaufelteils (10) zur Höhe (B) des ersten Schaufelteils (10) 0,3-0,75 beträgt.

10. Mischtrommel eines auf einem Lkw montierten Betonmischers, umfassend einen Trommelkörper (40) mit einer Trommelöffnung und einem Trommelboden, die jeweils an den beiden Enden des Trommelkörpers (40) vorgesehen sind, **dadurch gekennzeichnet, dass** die Mischtrommel ferner die Mischtrommelschaufelstruktur nach einem der Ansprüche 1-9 umfasst, die an der Innenwand des Trommelkörpers (40) vorgesehen ist.

11. Mischtrommel nach Anspruch 10, worin entlang der axialen Richtung die Mischtrommel einen Trommelöffnungsteil (50), der nahe bei der Trommelöffnung ist, einen Trommelbodenteil (90), der nahe bei dem Trommelboden ist, und einen mittleren Teil (70) zwischen dem Trommelöffnungsteil (50) und dem Trommelbodenteil (90) umfasst, und die Mischtrommelschaufelstrukturen, die an dem Trommelöffnungsteil (50), am mittleren Teil (70) und am Trommelbodenteil (90) vorgesehen sind, voneinander verschieden sind.

12. Mischtrommel nach Anspruch 11, worin der zweite Schaufelteil (30) der Mischtrommelschaufelstruktur, der an dem Trommelöffnungsteil (50) angeordnet ist, am ersten Schaufelteil (10) in einer abgelenkten Weise in Richtung auf die Trommelöffnung angeordnet ist; der zweite Schaufelteil (30) der Mischtrommelschaufelstruktur, der an dem mittleren Teil (70) angeordnet ist, am ersten Schaufelteil (10) in einer gleich geteilten Weise in Bezug auf den ersten Schaufelteil (10) angeordnet ist; der zweite Schaufelteil (30) der Mischtrommelschaufelstruktur, der an dem Trommelbodenteil (90) angeordnet ist, am ersten Schaufelteil (10) in einer abgelenkten Weise in Richtung auf den Trommelboden angeordnet ist.

13. Auf einem Lkw montierter Betonmischer, **dadurch gekennzeichnet, dass** der auf einem Lkw montierte Betonmischer eine Mischtrommel eines auf einem Lkw montierten Betonmischers nach einem der Ansprüche 10-12 aufweist.

Revendications

1. Un structure de pale de tambour de mélange d'un malaxeur à béton monté sur camion, comprenant une première partie de pale (10) reliée à la paroi interne du corps de tambour (40) d'un tambour de mélange, la structure de pale de tambour de mélange comprenant en outre une deuxième partie de pale (30) qui est reliée à la première partie de pale (10) avec intersection, une pluralité de premiers trous traversants (11) d'écoulement étant agencés sur la première partie de pale (10), une pluralité de deuxièmes trous traversants (12) d'écoulement étant agencés sur la deuxième partie de pale (30), et le rapport entre la distance (H) du centre du deuxième trou traversant (12) d'écoulement au point de connexion (P) de la deuxième partie de pale (30) et de la première partie de pale (10) et la largeur (A) de la deuxième partie de pale (30) est compris entre 0,25 et 0,4, la première partie de pale (10) s'étendant vers l'intérieur à partir de la paroi interne du corps de tambour (40), formant un premier côté et un deuxième côté qui sont opposés l'un à l'autre, **caractérisé en ce que** le premier côté est relié à la paroi interne du tambour de mélange, et la deuxième partie de pale (30) est agencée sur le deuxième côté ou agencée entre le premier côté et le deuxième côté, le premier côté et le deuxième côté s'étendant selon une structure hélicoïdale le long de la paroi interne du corps de tambour (40) du tambour de mélange, et la deuxième partie de pale (30) est agencée de manière continue ou intermittente le long de la structure hélicoïdale.

2. La structure de pale de tambour de mélange selon la revendication 1, dans laquelle il y a un angle (a) entre la première partie de pale (10) et la deuxième partie de pale (30).

3. La structure de pale de tambour de mélange selon la revendication 2, dans laquelle l'angle (a) est compris entre 45° et 90°.

4. La structure de pale de tambour de mélange selon la revendication 1, dans laquelle le rapport de la largeur (A) de la deuxième partie de pale (30) à la hauteur (B) de la première partie de pale (10) est compris entre 0,05 et 0,6.

5. La structure de pale de tambour de mélange selon la revendication 1, dans laquelle la deuxième partie de pale (30) est agencée de manière à être divisée de façon égale par rapport à la première partie de pale (10).

6. La structure de pale de tambour de mélange selon la revendication 1, dans laquelle la deuxième partie de pale (30) est agencée de manière défléchie vers un côté de la première partie de pale (10).

7. La structure de pale de tambour de mélange selon la revendication 6, dans laquelle le rapport entre la distance allant du point de connexion (P) de la deuxième partie de pale (30) et de la première partie de pale (10) à une extrémité de la deuxième partie de pale (30) et la largeur (A) de la deuxième partie de pale (30) est compris entre 0,15 et 0,8.

8. La structure de pale de tambour de mélange selon la revendication 1, dans laquelle les premiers trous traversants (11) d'écoulement sont de forme ronde, et le rapport entre le diamètre (L1) des premiers trous traversants (11) et la hauteur (B) de la première partie de pale (10) est compris entre 0,1 et 0,5.

9. La structure de pale de tambour de mélange selon la revendication 8, dans laquelle le rapport entre la distance (K) allant du centre du premier trou traversant (11) d'écoulement au point de connexion (P) de la deuxième partie de pale (30) et de la première partie de pale (10) et la hauteur (B) de la première partie de pale (10) est compris entre 0,3 et 0,75.

10. Un tambour de mélange d'un malaxeur de béton monté sur camion, comprenant un corps de tambour (40) avec une ouverture de tambour et un fond de tambour respectivement prévus aux deux extrémités du corps de tambour (40), **caractérisé en ce que** le tambour de mélange comprend la structure de pale de tambour de mélange selon l'une quelconque des revendications 1 à 9 aménagée sur la paroi interne du corps de tambour (40).

11. Le tambour de mélange selon la revendication 10, dans lequel, le long de la direction axiale, le tambour de mélange comprend une partie d'ouverture de tambour (50) proche de l'ouverture du tambour, une partie inférieure de tambour (90) proche du fond du tambour et une la partie médiane (70) entre la partie d'ouverture de tambour (50) et la partie de fond de tambour (90), et les structures de pales de tambour de mélange prévues sur la partie d'ouverture de tambour (50), la partie médiane (70) et la partie de fond de tambour (90) sont différents les unes des autres.

12. Le tambour de mélange selon la revendication 11, dans lequel la deuxième partie de pale (30) de la structure de pale de tambour de mélange disposée sur la partie d'ouverture de tambour (50) est agencée sur la première partie de pale (10) de manière défléchie vers l'ouverture du tambour ; la deuxième partie de pale (30) de la structure de pale de tambour de mélange agencée au niveau de la partie médiane (70) est agencée sur la première partie de pale (10) de manière à être divisée de façon égale par rapport à la première partie de pale (10) ; la deuxième partie de pale (30) de la structure de pale de tambour de mélange agencée sur la partie de fond de tambour (90) est agencée sur la première partie de pale (10) de manière défléchie vers le fond de tambour.

13. Un mélangeur de béton monté sur camion, **caractérisé en ce que** le mélangeur de béton monté sur camion a un tambour de mélange de malaxeur de béton monté sur camion selon l'une quelconque des revendications 10 à 12.

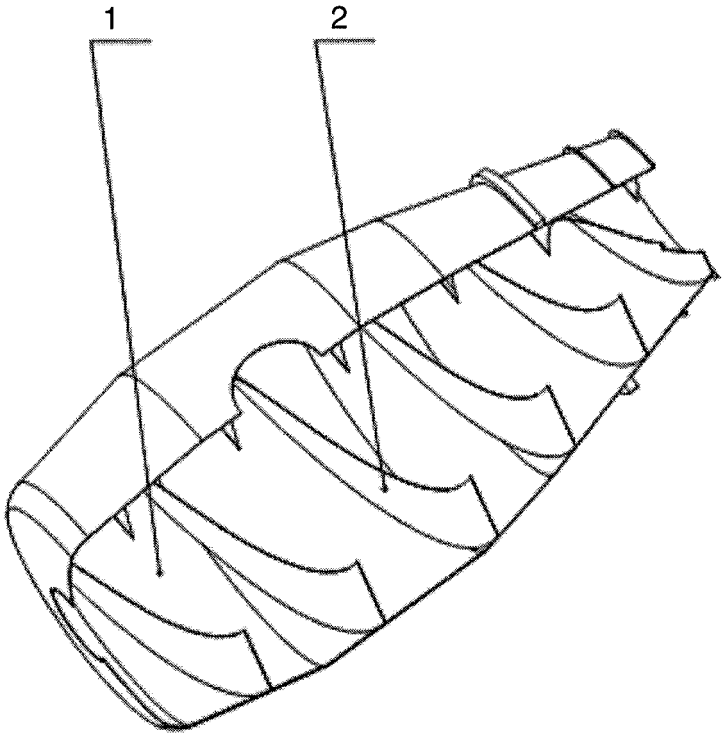

fig. 1

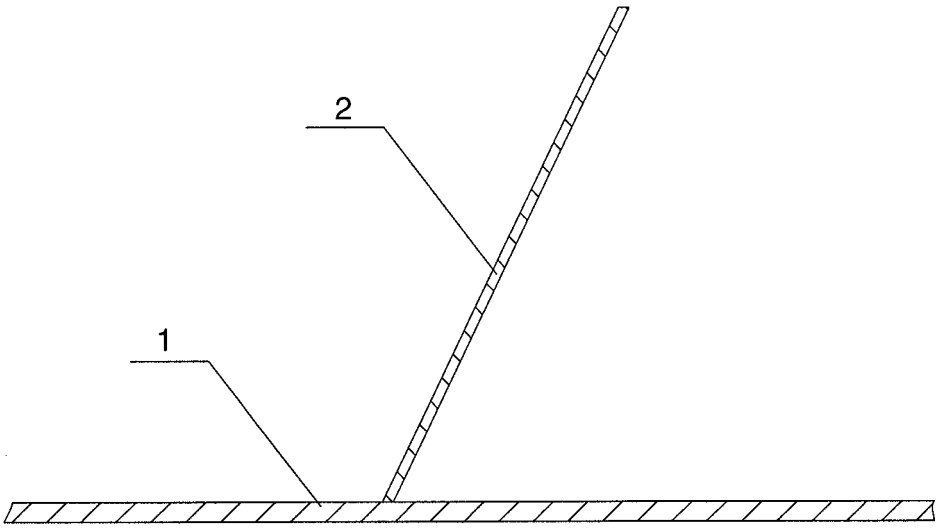

fig. 2

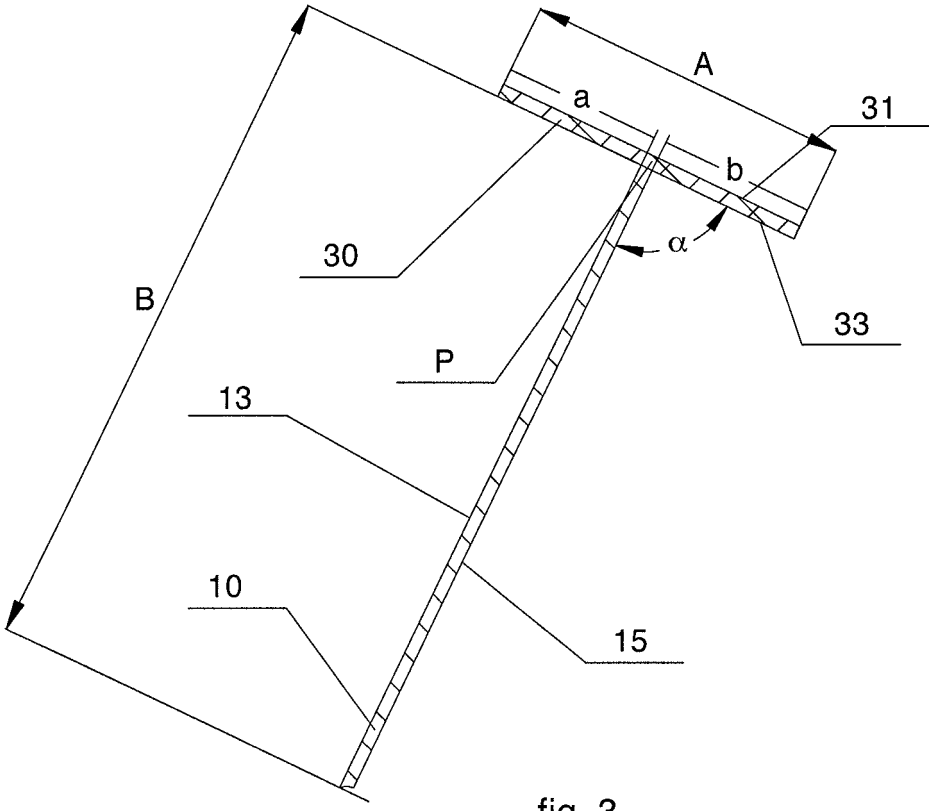

fig. 3

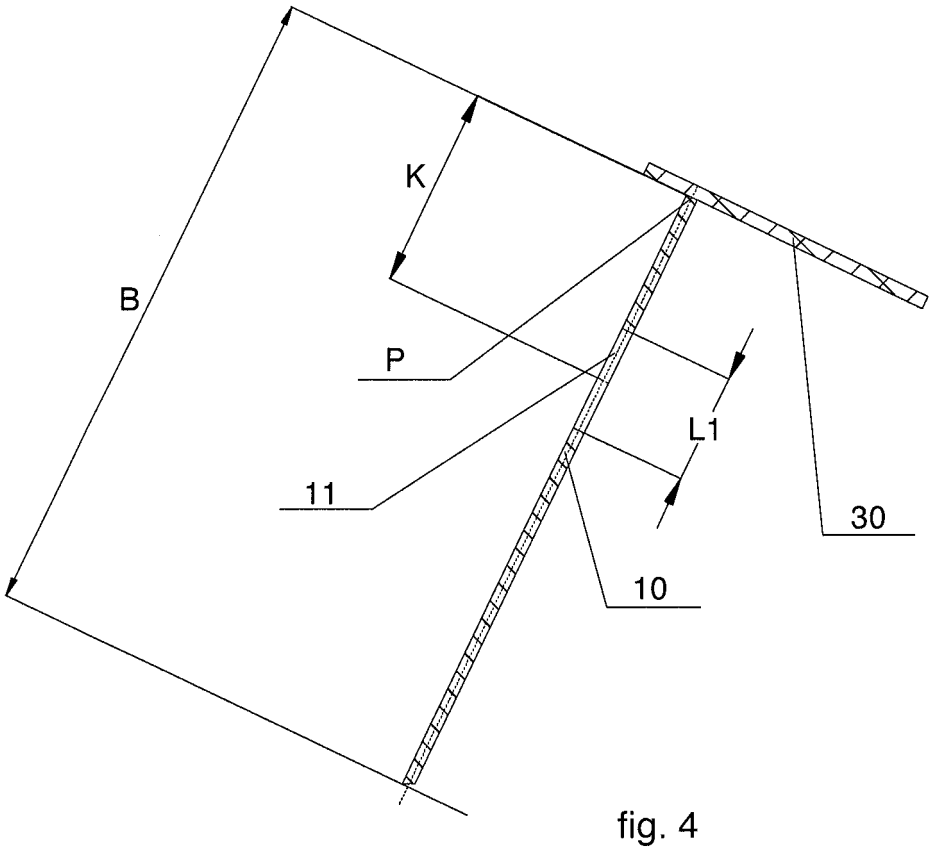

fig. 4

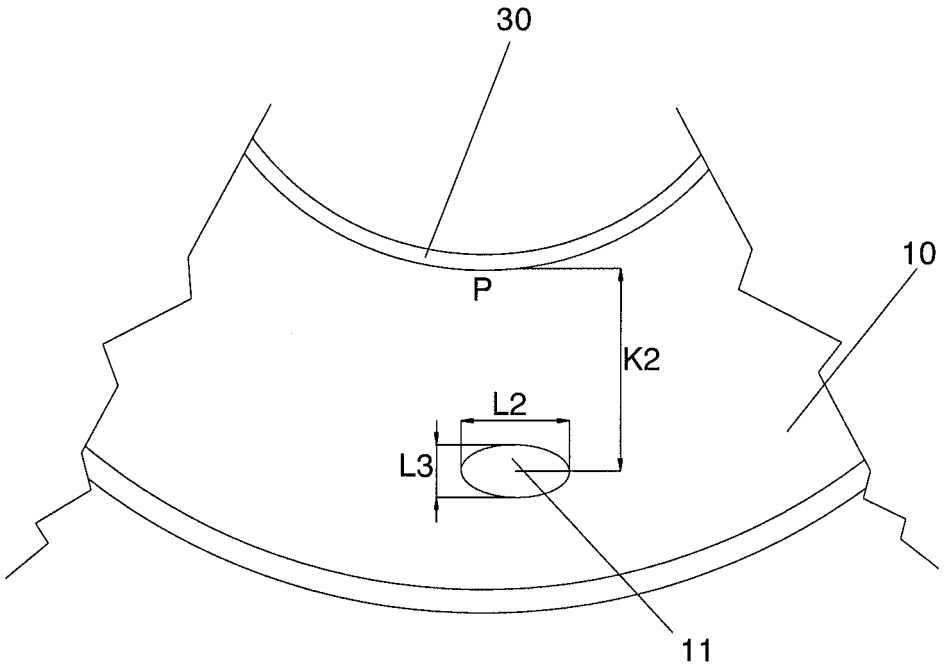

fig. 4A

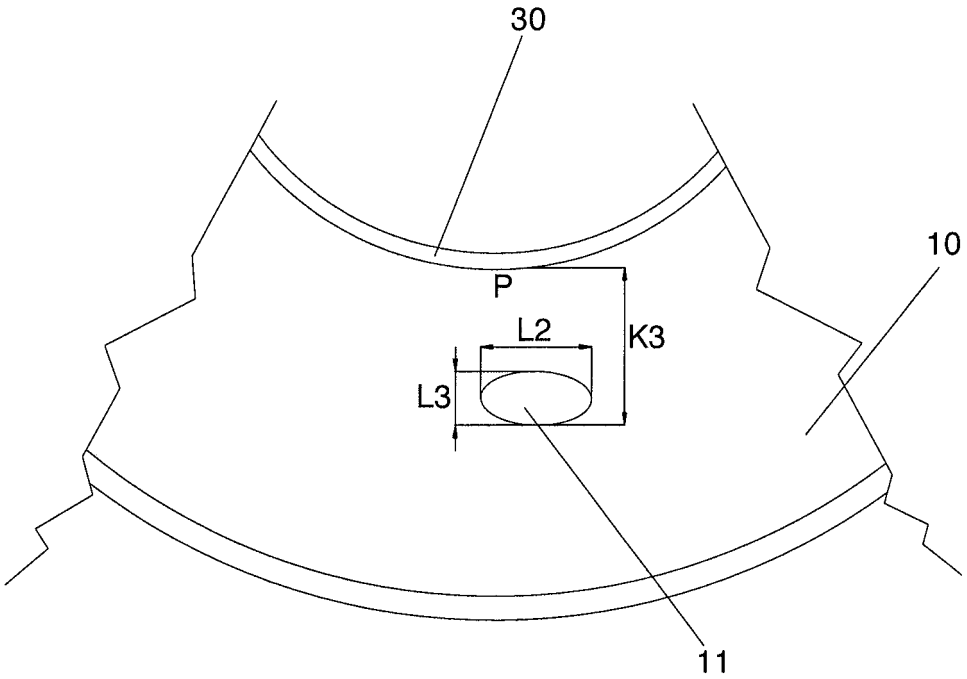

fig. 4B

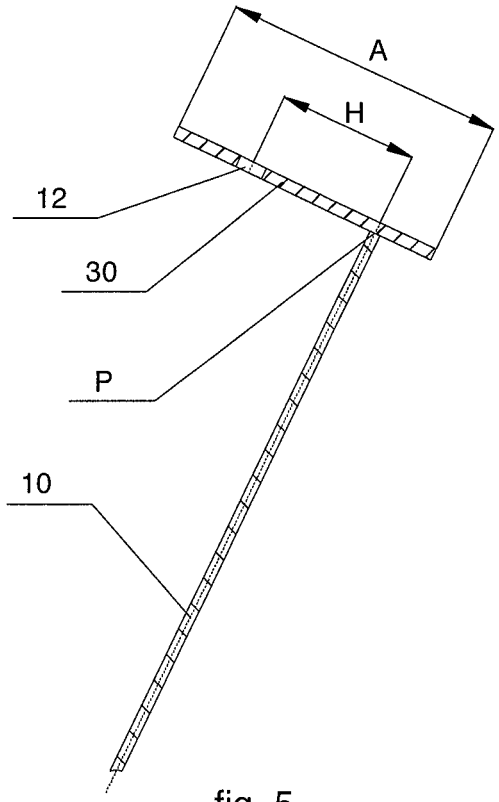

fig. 5

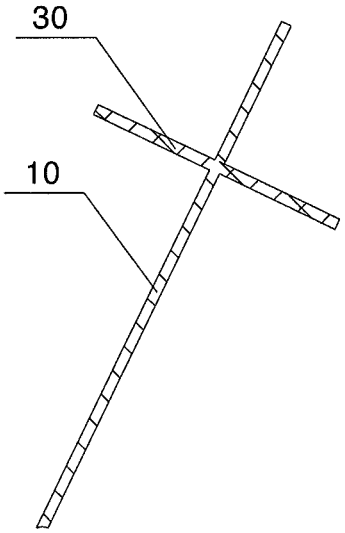

fig. 6

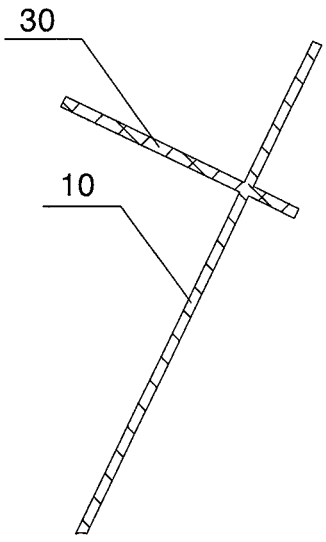

fig. 7

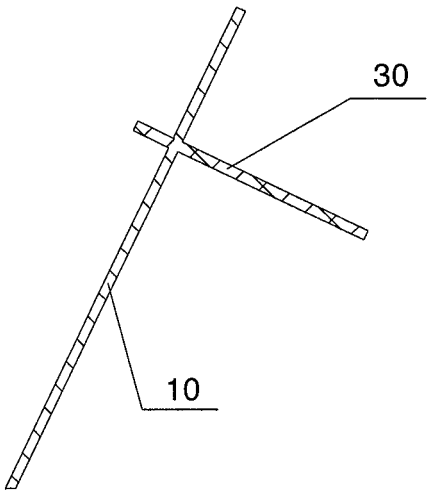

fig. 8

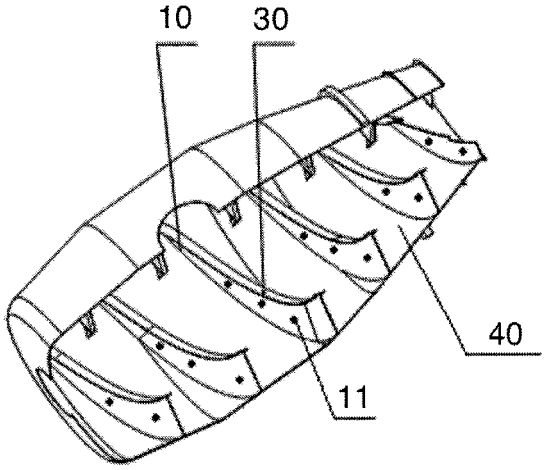

fig. 9

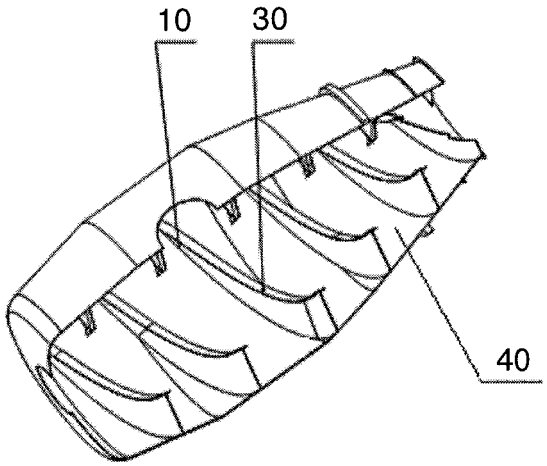

fig. 10

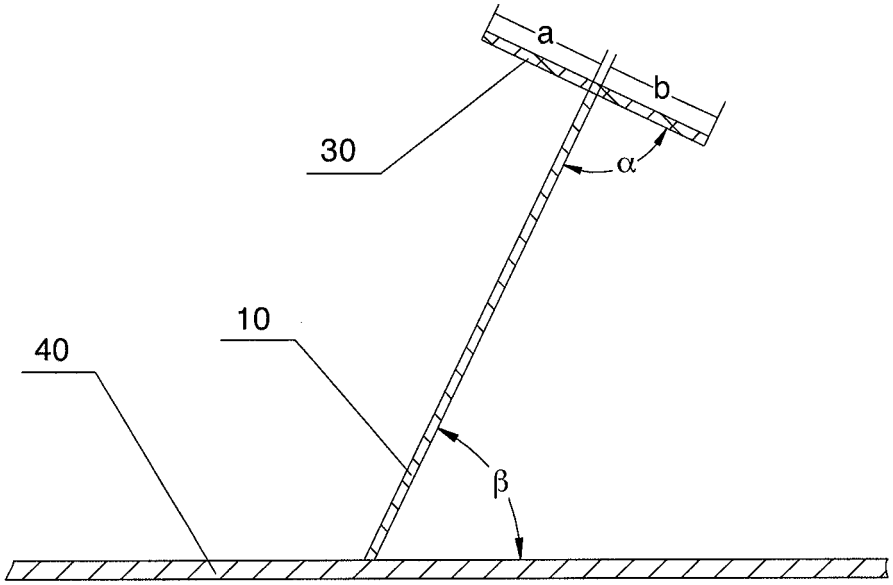

fig. 11

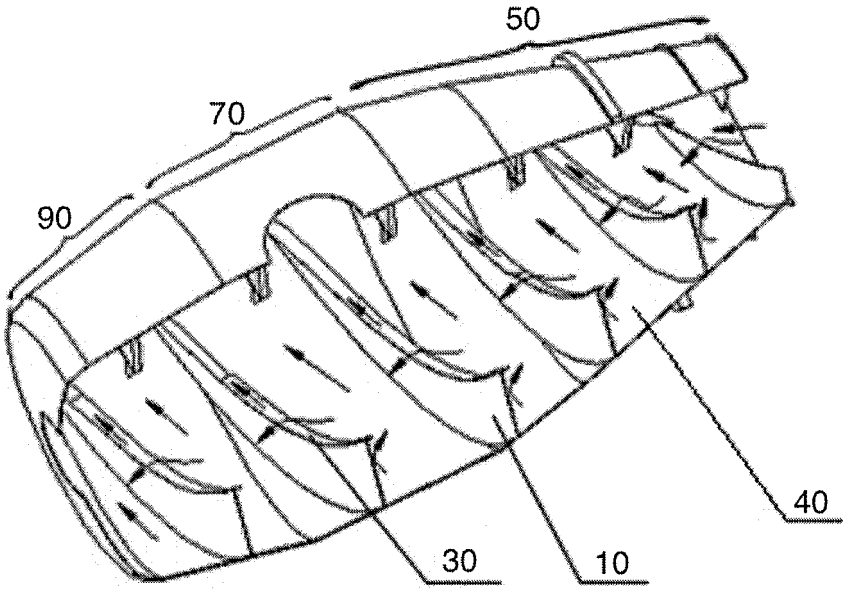

fig. 12

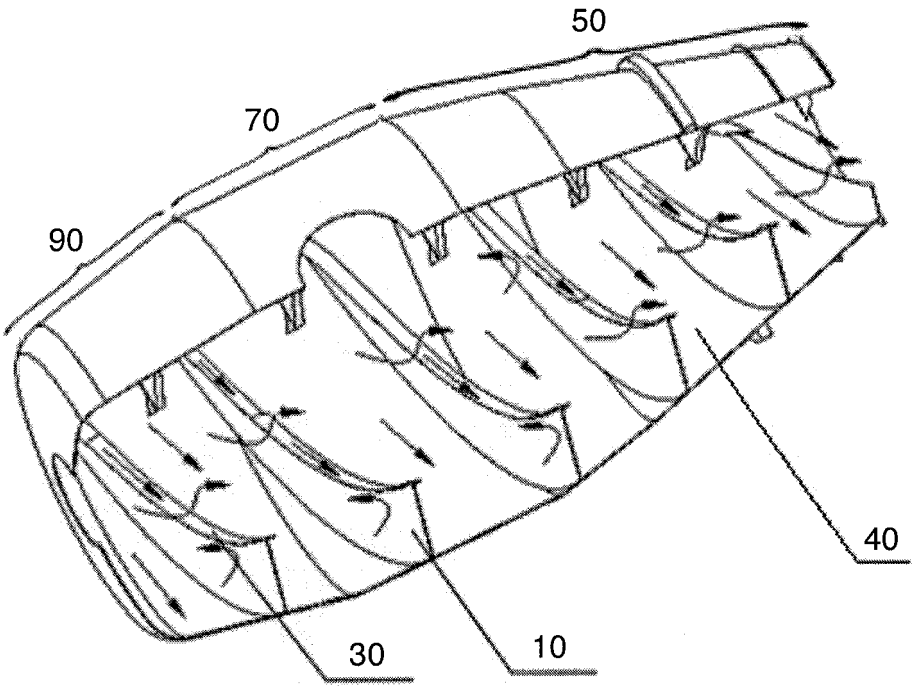

fig. 13

REFERENCES CITED IN THE DESCRIPTION

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