EUROPEAN PATENT SPECIFICATION

GLASS PLATE FOR CONCRETE CONVEYING PUMP
GLASPLATTE FÜR EINE BETONFÖRDERPUMPE
PLAQUE DE VERRE POUR POMPE DE TRANSPORT DU BÉTON

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Description

Field of the Invention

[0001] The present invention relates to a glass plate for a concrete conveying pump.

Description of the Prior Art

[0002] Existing glass plates for concrete conveying pumps comprise a steel base with two feeding through holes thereon, the end face of the steel base is embedded and welded with a wear-resistant material slide joint surface, and shear rings are assembled in the two feeding through holes of the steel base. In the Chinese Patent Authorized Publication No. CN201582092 U, shear rings are assembled in two feeding through holes of the steel base, one end of each shear ring is provided with a flange ring that is accommodated in a countersunk hole of the steel base. During use, the flange ring is pressed tightly in the countersunk hole by the assembly pressure between the steel base and the external conveying pump such that the shear ring will not become loose or turn and fall off in operations. On some steel bases, however, interference could take place between the countersunk holes for accommodating the shear rings and sealing grooves on the end face thereof. Moreover, the assembly and disassembly thereof are relatively inconvenient. In addition, such a shear ring only has one face thereof utilized, which is a waste. Typical Prior art is disclosed in DE 10 2004 015 181.

Summary of the Invention

[0003] The object of the present invention is to provide a glass plate for a concrete conveying pump, eliminate countersunk holes for accommodating the shear rings and a flange ring at one end of each shear ring, avoid the interference of sealing grooves on the end face of the steel base and the countersunk holes for accommodating the shear rings thereon, and achieve convenient assembly and disassembly. The invention is defined by appended claims.

[0004] To attain the above object, the glass plate for a concrete conveying pump according to the present invention comprises a steel base with two feeding through holes thereon, the end face of the steel base is embedded and welded with a wear-resistant material slide joint surface, shear rings are assembled in the two feeding through holes of the steel base, which are provided with openings, grooves are formed on inner circular faces of the feeding through holes, and outer circular faces of the shear rings are provided with flanges matched with the grooves.

[0005] With the structure according to the present invention, the flange ring on the shear ring is eliminated and the interference of sealing grooves on the end face of the steel base and the countersunk holes for accommodating the shear rings thereon is avoided, leading to convenient assembly and disassembly. At the same time, the engagement of the grooves and the flange can effectively prevent displacement of the shear ring along the axial direction of the feeding through hole.

[0006] Along the axial direction, a centrally dividing plane of the shear ring is taken as a symmetry plane, and the grooves and the flanges are symmetrically arranged with respect to the symmetry plane.

[0007] With such a structure, the front of shear ring can be reversed to become the back, which is re-assembled in the feeding through hole for use, i.e. two end faces of the shear ring can be utilized, which doubles the service life of the shear ring relative to the past.

[0008] In such a structure, the structure of grooves and flange is simple, which facilitates design, processing and production.

[0009] The groove comprises at least one groove arc segment in the circumferential direction, the flange matches the groove and comprises the same number of arc segments as that of the groove are segments.

[0010] Such a structure replaces continuous grooves and flanges with discontinuous grooves and flanges, which can prevent the shear ring from turning circumferentially.

[0011] The cross-sectional shape of the grooves and flanges is rectangular, which can improve the precision of axial positioning of the shear ring.

[0012] An expansion device is provided at the opening of the shear ring.

[0013] When the shear ring is placed in the feeding through hole, the expansion of the expansion device increases the diameter of the shear ring such that the shear ring is more reliably pressed tight onto the inner wall of the feeding through hole, which ensures that the shear ring will not become loose during operations.

[0014] The expansion device is composed of two mutually matching expansion wedge blocks, and two side surfaces of the two expansion wedge blocks that match with the shear ring are both parallel to the axis of the shear ring.

[0015] With such a structure, when the shear ring is reversed and installed on the feeding through hole, the two expansion wedge blocks can still match with the opening of the shear ring such that the shear ring with the expansion device can also be used twice with its front and back.

[0016] The steel base is provided with radial holes that are open to the feeding through holes, a screw is provided within the radial hole, and a screw hole is formed on one of the expansion wedge blocks for threaded connection with the screw.

[0017] The above structure can ensure that the shear ring will not turn during operations and at the same time, is favorable for assembly and disassembly of the expansion wedge blocks.

[0018] The steel base is provided with a guide lifting groove that is open to the feeding through hole, and a
guide ear that matches with the guide lifting groove is provided on one of the expansion wedge blocks.

During operations, the guide lifting groove can limit the circumferential position of the expansion wedge block by means of the guide ear therein, thereby ensuring that the shear ring will not turn during operations.

The steel base is provided with radial holes that are open to the feeding through holes, a screw is provided within the radial hole for fixing the shear ring, thereby ensuring that the shear ring will not turn during operations.

Brief Description of the Drawings

Fig. 1 illustrates the 3-D structure of Example I of the present invention;

Fig. 2 illustrates the 3-D structure of the combination of a shear ring, an expansion wedge block and a screw in Example I;

Fig. 3 is an exploded local cross-sectional view of the 3-D structure of Example I;

Fig. 4 illustrates the 3-D structure of Example II;

Fig. 5 is an exploded local cross-sectional view of the 3-D structure of Example II;

Fig. 6 illustrates the 3-D structure of Example III;

Fig. 7 illustrates the 3-D structure of the combination of a shear ring, and big and small expansion wedge blocks in Example III;

Fig. 8 is an exploded local cross-sectional view of the 3-D structure of Example III;

Fig. 9 illustrates the 3-D structure of Example IV;

Fig. 10 is an exploded local cross-sectional view of the 3-D structure of Example IV;

Fig. 11 is an enlarged view of the shear ring part in Fig. 3;

Fig. 12 is an enlarged view of the steel base part in Fig. 3;

Fig. 13 is an enlarged view of the steel base part in Fig. 8;

Fig. 14 is an enlarged view of the base part in Fig. 10.

Detailed Description of Specific Embodiments

Example I

As shown in Fig. 1, Fig. 2, Fig. 3, Fig. 11 and Fig. 12, the glass plate for a concrete conveying pump according to the present invention comprises a steel base 2 with two feeding through holes 1 thereon, the end face of the steel base 2 is embedded and welded with a wear-resistant material slide joint surface 3, shear rings 4 are assembled in the two feeding through holes 1 of the steel base 2, the shear rings 4 are provided with openings, and an expansion device is provided at the opening of the shear ring 4. Grooves 5 are formed on inner circular faces of the feeding through holes 1, and outer circular faces of the shear rings 4 are provided with flanges 6 matched with the grooves 5.

Along the axial direction, a centrally dividing plane of the shear ring 4 is taken as a symmetry plane (the symmetry plane evenly divides the shear ring 4 into two parts with the thickness of each part being one half of the thickness of the entire shear ring 4), and the grooves 5 and the flanges 6 are symmetrically arranged with respect to the symmetry plane.

The cross-sectional shape of each of the grooves 5 and each of the flanges 6 is preferably mutually matching rectangle, or mutually matching triangle, trapezoid, semicircle, or other shapes.

The number of the grooves 5 and the flanges 6 each may be one, two, three or more.

All of the grooves 5 and the flanges 6 are continuous circumferentially.

The expansion device is composed of an expansion wedge block 7, and two inclined side surfaces 7C of the expansion wedge block 7 are provided with a V-shaped guide groove 8. The steel base 2 is provided with a radial hole 9 that is open to the feeding through hole 1, a screw 15 is provided within the radial hole 9, and one end of the shear ring 4 is formed with a screw hole 16 for threaded connection with the screw 15. Tightening holes 11 are formed at the openings of the two end faces of the shear ring 4 for using an internal caliper to assemble and disassemble.

Wherein, the inner holes and end faces of the shear ring 4 are coated with a wear-resistant material to improve the service life of the shear ring 4.

Example II

As shown in Fig. 4 and Fig. 5, this example is different from Example I in that the cross-sectional shape of the groove 5 and the flange 6 is rectangular and there are one groove 5 and one flange 6. The groove 5 comprises at least one groove arc segment in the circumferential direction, the flange 6 matches the groove 5 and comprises the same number of flange arc segments as that of the groove arc segments. The expansion device is composed of two mutually matching expansion wedge
As shown in Fig. 6 to Fig. 8 and Fig. 13, this machine after assembly, as shown in Fig. 5.

Example III

As shown in Fig. 6 to Fig. 8 and Fig. 13, this example is different from Example II in that there are two grooves 5 and two flanges 6, which are the first groove 5A, the second groove 5B, the first flange 6A and the second flange 6B, respectively. All of the grooves 5A, 5B and the flanges 6A, 6B are continuous circumferentially. The expansion device is composed of two expansion wedge blocks 7A and 7B, one big and one small, and two side surfaces 7C of the two expansion wedge blocks 7A and 7B that match with the shear ring 4 are both parallel to the axis of the shear ring 4. A V-shaped guide groove 8 is formed on the side surfaces 7C of the two expansion wedge blocks 7A and 7B and the side surfaces 4C of the openings of the shear ring 4 for mutual match. The big expansion wedge block 7A is provided with a flange 7D for matching with the groove 5. The small expansion wedge block 7B thereof is relatively long before the assembly, and the extra part is removed with a polishing machine after assembly, as shown in Fig. 5.

Example IV

As shown in Fig. 9, Fig. 10 and Fig. 14, this example is different from Example III in that the cross-sectional shape of the groove 5 and the flange 6 is rectangular and there are one groove 5 and one flange 6. The side surfaces 7C of the two expansion wedge blocks 7A and 7B that match with the shear ring 4 are all planes with no groove and parallel to the axis of the shear ring 4. The side surfaces 4C of the openings of the shear ring 4 are all planes as well. The steel base 2 is provided with a radial hole 9 that is open to the feeding through hole 1, a screw 15 is provided within the radial hole 9, and the big expansion wedge block 7A is formed with a screw hole 16 for threaded connection with the screw 15. The big expansion wedge block 7A is provided with a flange 7D for matching with the groove 5.

Claims

1. A glass plate for a concrete conveying pump, comprising a steel base (2) with two feeding through holes (1) thereon, the end face of the steel base (2) is embedded and welded with a wear-resistant material slide joint surface (3), shear rings (4) are assembled in the two feeding through holes (1) of the steel base (2), which are provided with openings, wherein grooves (5) are formed on inner circular faces of the feeding through holes (1), and outer circular faces of the shear rings (4) are provided with flanges (6) matched with the grooves (5), characterized in that along the axial direction, a centrally dividing plane of the shear ring (4) is taken as a symmetry plane, and the grooves (5) and the flanges (6) are symmetrically arranged with respect to the symmetry plane.

2. The glass plate for a concrete conveying pump as set forth in Claim 1, characterized in that all of the grooves (5) and the flanges (6) are continuous circumferentially.

3. The glass plate for a concrete conveying pump as set forth in Claim 1, characterized in that the groove (5) comprises at least one groove arc segment in the circumferential direction, the flange (6) matches the groove (5) and comprises the same number of flange arc segments as that of the groove arc segments.

4. The glass plate for a concrete conveying pump as set forth in Claim 1, characterized in that the cross-sectional shape of the grooves (5) and flanges (6) is rectangular.

5. The glass plate for a concrete conveying pump as set forth in any one of Claims 1 to 4, characterized in that an expansion device is provided at the open-
6. The glass plate for a concrete conveying pump as set forth in Claim 5, characterized in that the expansion device is composed of two mutually matching expansion wedge blocks (7A, 7B), and two side surfaces of the two expansion wedge blocks (7A, 7B) that match with the shear ring (4) are both parallel to the axis of the shear ring (4).

7. The glass plate for a concrete conveying pump as set forth in Claim 6, characterized in that the expansion device is composed of two mutually matching expansion wedge blocks (7A, 7B), and two side surfaces of the two expansion wedge blocks (7A, 7B) that match with the shear ring (4) are both parallel to the axis of the shear ring (4).

8. The glass plate for a concrete conveying pump as set forth in Claim 6, characterized in that the steel base (2) is provided with radial holes (9) that are open to the feeding through holes (1), a screw (15) is provided within the radial holes (9), and a screw hole (16) is formed on one of the expansion wedge blocks (7A, 7B) for threaded connection with the screw (15).

9. The glass plate for a concrete conveying pump as set forth in any one of Claims 1 to 4, characterized in that the steel base (2) is provided with radial holes (9) that are open to the feeding through holes (1), a screw (15) is provided within the radial hole (1) for fixing the shear ring.

Patentansprüche

1. Glasplatte für eine Betonförderpumpe, umfassend eine Stahlbasis (2) mit zwei Durchführungslöchern (1) daran, wobei die Endfläche der Stahlbasis (2) in eine Gleitverbindungsoberfläche (3) aus verschließbäständigem Material eingebettet und damit verschweißt ist, Scherringe (4), die mit Öffnungen versehen sind, in den zwei Durchführungslöchern (1) der Stahlbasis (2) montiert sind, wobei an inneren kreisförmigen Flächen der Durchführungslöcher (1) Rillen (5) ausgebildet sind und äußere kreisförmige Flächen der Scherringe (4) mit Flanschen (6) versehen sind, die mit den Rillen (5) zusammenpassen, dadurch gekennzeichnet, dass die Stahlbasis (2) mit radialen Löchern (9) versehen ist, die zu den Durchführungslöchern (1) hin offen sind, wobei innerhalb der radialen Löcher (9) eine Schraube (15) vorgesehen ist und an einem der Expansionskeilblöcke (7A, 7B) ein Schraubenloch (16) zur Gewindeverbindung mit der Schraube (15) ausgebildet ist.

2. Glasplatte für eine Betonförderpumpe nach Anspruch 1, dadurch gekennzeichnet, dass alle Rillen (5) und Flansche (6) in Umfangsrichtung durchgehend sind.

3. Glasplatte für eine Betonförderpumpe nach Anspruch 1, dadurch gekennzeichnet, dass die Rille (5) mindestens ein Rillenbogensegment in der Umfangsrichtung umfasst, wobei der Flansch (6) mit der Rille (5) zusammenpasst und dieselbe Anzahl an Flanschbogensegmenten wie jene der Rillenbogensegmente umfasst.

4. Glasplatte für eine Betonförderpumpe nach Anspruch 1, dadurch gekennzeichnet, dass die Querschnittsform der Rillen (5) und Flansche (6) rechteckig ist.

5. Glasplatte für eine Betonförderpumpe nach einem beliebigen der Ansprüche 1 bis 4, dadurch gekennzeichnet, dass an der Öffnung des Scherrings (4) eine Expansionsvorrichtung vorgesehen ist.


7. Glasplatte für eine Betonförderpumpe nach Anspruch 6, dadurch gekennzeichnet, dass die Stahlbasis (2) mit radialen Löchern (9) versehen ist, die zu den Durchführungslöchern (1) hin offen sind, wobei innerhalb der radialen Löcher (9) eine Schraube (15) vorgesehen ist und an einem der Expansionskeilblöcke (7A, 7B) ein Schraubenloch (16) zur Gewindeverbindung mit der Schraube (15) ausgebildet ist.

8. Glasplatte für eine Betonförderpumpe nach Anspruch 6, dadurch gekennzeichnet, dass die Stahlbasis (2) mit einer Führungshubnut (12), die zu dem Durchführungslöch (1) hin offen ist, versehen ist und ein Führungsohr (13), das mit der Führungshubnut (12) zusammenpasst, an einem der Expansionskeilblöcke (7A, 7B) vorgesehen ist.

9. Glasplatte für eine Betonförderpumpe nach einem beliebigen der Ansprüche 1 bis 4, dadurch gekennzeichnet, dass die Stahlbasis (2) mit radialen Löchern (9) versehen ist, die zu den Durchführungslöchern (1) hin offen sind, wobei innerhalb des radialen Loches (1) eine Schraube (15) zum Befestigen des Scherrings vorgesehen ist.
Revendications

1. Plaque de verre pour pompe de transport de béton, comprenant une base en acier (2) avec deux trous débouchants d'alimentation (1) sur cette dernière, la face d'extrémité de la base en acier (2) est encastrée et soudée avec une surface de joint coulissante en matériau résistant à l'usure (3), des bagues de cisaillement (4) sont assemblées dans les deux trous débouchants d'alimentation (1) de la base en acier (2), qui sont prévus avec des ouvertures, dans laquelle des rainures (5) sont formées sur les faces circulaires internes des trous débouchants d'alimentation (1), et des faces circulaires externes des bagues de cisaillement (4) sont prévues avec des brides (6) correspondant aux rainures (5), caractérisé en ce que, le long de la direction axiale, un plan de division central de la bague de cisaillement (4) est pris en tant que plan de symétrie, et les rainures (5) et les brides (6) sont agencées symétriquement par rapport au plan de symétrie.

2. Plaque en verre pour une pompe de transport de béton selon la revendication 1, caractérisée en ce que toutes les rainures (5) et les brides (6) sont continues de manière circonférentielle.

3. Plaque en verre pour une pompe de transport de béton selon la revendication 1, caractérisée en ce que la rainure (5) comprend au moins un segment d'arc de rainure dans la direction circonférentielle, la bride (6) correspond à la rainure (5) et comprend le même nombre de segments d'arc de bride que celui des segments d'arc de rainure.

4. Plaque en verre pour une pompe de transport de béton selon la revendication 1, caractérisée en ce que la forme transversale des rainures (5) et des brides (6) est rectangulaire.

5. Plaque en verre pour une pompe de transport de béton selon l'une quelconque des revendications 1 à 4, caractérisée en ce qu'un dispositif d'expansion est prévu au niveau de l'ouverture de la bague de cisaillement (4).}

6. Plaque en verre pour une pompe de transport de béton selon la revendication 5, caractérisée en ce que le dispositif d'expansion est composé de deux blocs de cale d'expansion (7A, 7B) mutuellement correspondants, et deux surfaces latérales des deux blocs de cale d'expansion (7A, 7B) qui correspondent à la bague de cisaillement (4) sont toutes deux parallèles à l'axe de la bague de cisaillement (4).

7. Plaque en verre pour une pompe de transport de béton selon la revendication 6, caractérisée en ce que la base en acier (2) est prévue avec des trous radiaux (9) qui sont ouverts sur les trous débouchants d'alimentation (1), une vis (15) est prévue à l'intérieur des trous radiaux (9), et un trou de vis (16) est formé sur l'un des blocs de cale d'expansion (7A, 7B) pour le raccordement fileté avec la vis (15).

8. Plaque en verre pour une pompe de transport de béton selon la revendication 6, caractérisée en ce que la base en acier (2) est prévue avec une rainure de levage de guidage (12) qui est ouverte sur le trou débouchant d'alimentation (1), et une oreille de guidage (13) qui correspond à la rainure de levage de guidage (12) est prévue sur l'un des blocs de cale d'expansion (7A, 7B).

9. Plaque en verre pour une pompe de transport de béton selon l'une quelconque des revendications 1 à 4, caractérisée en ce que la base en acier (2) est prévue avec des trous radiaux (9) qui sont ouverts sur les trous débouchants d'alimentation (1), une vis (15) est prévue à l'intérieur du trou radial (1) pour fixer la bague de cisaillement.
REFERENCES CITED IN THE DESCRIPTION

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