(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 108 979 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
09.08.2017 Bulletin 2017/32

(51) Int Cl.:
B21C 26/00 *(2006.01)*

(21) Application number: **15173525.5**

(22) Date of filing: **24.06.2015**

(54) A DUMMY BLOCK FOR AN EXTRUSION PRESS

PRESSSCHEIBE FÜR EINE STRANGPRESSE

GRAIN DE POUSSÉE POUR UNE PRESSE D'EXTRUSION

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(43) Date of publication of application:
28.12.2016 Bulletin 2016/52

(73) Proprietor: **Uddeholm Svenska AB**
431 22 Mölndal (SE)

(72) Inventor: **WARD, Peter**
683 92 HAGFORS (SE)

(74) Representative: **Johansson, Lars E.**
Hynell Patenttjänst AB
P.O. Box 138
683 23 Hagfors (SE)

(56) References cited:
WO-A1-03/099480
CN-U- 202 155 388
DE-U1- 20 022 762
US-A1- 2013 247 640

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 3 108 979 B1

Description

TECHNICAL FIELD

[0001] The present invention relates to a dummy block for an extrusion press having a die, a container for receiving a billet to be extruded through the die, and an extrusion stem for exerting a pressure on the billet sufficient to extrude it through the die, said dummy block being positioned between the extrusion stem and the billet and comprising:

- a dummy block body having a rear face adapted to be connected to the stem, and a front face provided with a groove defining a central pressing surface for exerting a pressure on the billet, and outside the groove a peripheral pressing surface for exerting a pressure on the billet, a sealing lip formed radially outside the groove being sufficiently elastically deformable to be pressed outward by the extrusion pressure to seal against an inside wall of the container, said groove having an inner wall portion, an outer wall portion, and a bottom, said outer wall portion being conical to make the groove open outward; and
- a filler ring adapted to fit in an upper part of the groove while forming a gap toward the bottom of the groove, said ring having a conical outer wall portion complementary to the conical outer wall portion of the groove, said ring, when being pressed toward the bottom of the groove, forcing said elastically deformable sealing lip outward against the inside container wall.

BACKGROUND ART

[0002] Such a dummy block is disclosed in US 2013/0247640 (Heydasch), on which the preamble of claim 1 is based, but is of a complicated design involving many parts and thereby requiring an unnecessarily large amount of structural material, advanced mounting routines and high costs.

SUMMARY OF THE INVENTION

[0003] The object of the present invention is to provide a dummy block of a less complicated design, which can be produced with a reduced consumption of structural material, simple mounting and at lower costs compared with the dummy blocks described in the prior art.

[0004] This object is achieved while the dummy block according to the present invention is characterized by

- said inner wall portion of the groove is conical to make a cross-section of the groove substantially symmetrical; and
- said filler ring having a conical inner wall portion complementary to the conical inner wall portion of the groove.

[0005] Such a dummy block consists of few components (only two, apart from screws), and is of a very simple and axially compact design, reducing the required amount of structural material considerably. In addition, both of the groove sides of the dummy body and both of the matching sides of the filler ring are conical, they converge toward the bottom of the groove. As the central pressing surface of the dummy block body is rigid, the filler ring will expand radially when being pressed into the groove, and the sealing lip will consequently be expanded radially both by conical outer wall portion and by the conical inner wall portion of the filler ring.

[0006] Preferably, the central pressing surface is located in a first plane, the peripheral pressing surface is located in a second plane parallel to the first plane but closer to the rear face of the dummy block body, and the filler ring has a pressing surface located in a position between said first and said second plane. Thereby, during the extrusion the central pressing surface of the dummy block will start deforming the billet while reducing its length and increasing its diameter, so that the air surrounding the billet in the container will be pressed backward through the peripheral gap between the interior wall of the container and the sealing lip formed radially outside the groove and further will pass the dummy block and the extrusion stem to reduce the risk of blisters in the extruded material.

[0007] It is preferred that the pressing surface of the filler ring is located in a third plane parallel to the two other planes described above. Thereby, most of the air is evacuated through said gap before the rear face of the deformed billet abuts the pressing surface of the filler ring and the pressing surface of said sealing lip. As soon as the pressure from the billet on the filler ring is sufficiently high, it presses the filler ring downward into the groove, thereby causing said sealing lip radially outside the groove to elastically expand radially to seal against the interior wall of the container. This design results in a delayed sealing effect which makes it possible for all air to come out during the compression.

[0008] Suitably, the rear face of the dummy block body is provided with at least one stepped through bore opening in the bottom of the groove, the filler ring has a bottom surface provided with at least one threaded bore aligned with the stepped through bore of the dummy block body, and a screw extends through the stepped bore into the threaded bore to anchor the filler ring in the groove. Thereby, the filler ring is prevented from falling out of the groove when handling the dummy block outside of the container.

[0009] To improve the safety against a skew mounting of the filler ring in the groove, it is suitable that both the dummy block body and the filler ring have two or more such bores, which are equiangularly spaced from each other.

[0010] When the filler ring is being pressed down into

the groove, the air enclosed in the gap formed between the bottom surface of the ring and the groove will be compressed. To make sure that all compressed air will be removed, it is suitable that a venting channel is provided for permitting air to escape from the bottom of the groove through the stepped bore and between the extrusion stem and the rear face of the dummy block body and out to a space radially outside the stem.

[0011] The dummy block body preferably has a female receptor of a bayonet mount for receiving a mating male portion on the stem. The female receptor of a bayonet mount suitably has two or more equiangularly spaced internal cams for cooperation with two or more equiangularly spaced external cams on the male portion of the stem. Thereby the dummy block of the present invention is short and compact. Moreover, the bayonet mount gives a stable assemblage of the dummy block to the stem with low risk for misalignment as well as it opens for effortless employment and interchange of various assembles provided with similar bayonet mount.

[0012] It is preferred that the rear face of the dummy block body has at least one threaded bore located close to an outer circumference thereof, and the extrusion stem has a slot-shaped recess placed correspondingly to said at least one threaded bore, the recess permitting insertion and tightening of a machine screw having a head that prevents an involuntary uncoupling of the bayonet mount by being stopped by sides of the slot-shaped recess. Further, it is recommendable that the rear face of the dummy block body has two or more such threaded bores that are equiangularly spaced and the extrusion stem has two or more such slot-shaped recesses that are equiangularly spaced.

[0013] It is also preferred that the elastically deformable sealing lip formed radially outside the groove is stepped in its longitudinal direction and has a larger diameter at said front face than at said rear face, thereby, when under pressure, during the extrusion generating a sealing surface for sealing against the inside wall of the container lining. This sealing feature surceases once the billet is extruded and the pressure against the dummy block disappears; the elastically deformable sealing lip retakes its initial dimensions and permits a friction free retreat of the stem out of the container.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] In the following, the invention will be described in more detail with reference to preferred embodiments and the appended drawings.

Fig. 1 is a longitudinal cross-sectional view through an extrusion press having a container with a lining, a die and a stem with a dummy block for pressing a billet in the container through the die.

Fig. 2 is a cross-sectional view similar to fig 1, where pressure is added to the billet and showing a plastic deformation of the billet in the front of the extrusion press, which forces remaining air backwards.

Fig. 3 is a cross-sectional view similar to fig 1, where the billet is deformed by high pressure that starts the extrusion and now also touches the face of the filler ring in the dummy block, while air still escapes backwards.

Fig. 4 is a cross-sectional view similar to fig 1, showing high axial pressure exerted on the ring, which forces the dummy block to expand radially due to conical contact surfaces so as to create a metal flashing free seal between the dummy block and the lining, while no air is left in the extrusion compartment.

Fig. 5 is a longitudinal cross-sectional view through a front end body of a stem connected to a dummy block having a filler ring mounted in the body of the dummy block.

Fig. 6 is a longitudinal cross-sectional view of the components shown in Fig. 5 separated from one another.

Fig. 7 is a cross-sectional view of the dummy block body taken along the line VII-VII in Fig. 8.

Fig. 8 is an end view of the dummy block body taken along line VIII-VIII in Fig. 7.

Fig. 9 is a cross-sectional view of the filler ring taken along line IX-IX in Fig. 10.

Fig. 10 is an end view of the filler ring taken along line X-X in Fig. 9.

MODE(S) FOR CARRYING OUT THE INVENTION

[0015] Figs. 1-4 illustrates the working principle of the dummy block of the present invention by showing a starting sequence of an extrusion. The shown extrusion press has a container 71 with a lining 72, a die 73 and an extrusion stem 30 with a dummy block 20 for pressing a billet 74 in the container 71 through the die 73 to form an extruded profile 75. In Fig. 1, a billet 74 is placed in the container 71, which billet 74 is pressed against the die 73 by a central portion of the dummy block 2. In Fig. 2, the pressure from the extrusion stem 30 on the billet 74 is increased to cause a plastic deformation at the front of the billet 74, which expands radially and also starts to enter the die 73, so that air remaining in the extrusion compartment is forced backward to pass the dummy block 2 as there is no seal between the dummy block 2 and the lining 72. The escaping air is marked with refer-

ence numeral 76 in Figs. 2 and 3.

[0016] The material of the billet is preferably metal, including steel, aluminum, copper, zirconium, titanium, molybdenum, beryllium, vanadium, or niobium.

The dummy block of the present invention is applicable primarily for hot extrusion, more preferably for metals at a temperature between 100 and 1300 °C.

[0017] In Fig. 3, the pressure from the extrusion stem 30 on the billet 74 is increased even more, and the billet 74 is deformed so that it now touches the face of a filler ring 10 included in the dummy block 2 and starts to press the ring 10 down into a groove 40 located in a body of the dummy block 20. Air is still escaping backwards, but as the ring 10 approaches the bottom 22 of the groove 40, conical contact surfaces force an elastically deformable sealing lip 28 (Figs. 5, 6 and 7) formed radially outside the groove 40 in the dummy block 2 to expand radially so as to create a metal flashing free seal between the lining 72 and the dummy block 2 as illustrated in Fig. 4. Now, no air is left in extrusion compartment, extrusion commences without a burp cycle, and the extruded profile 75 is free from blisters.

[0018] Figs. 5-10 show the invention more in detail. The extrusion stem 30, or more specifically an adapter 31 carried by the extrusion stem 30, is connected to the dummy block 2 by means of a first connecting member 32 of the adapter 31 mating with a second connecting member of the dummy block 2. The two connecting members suitably are a male member on the adapter 31 and a female member formed by a recess in the dummy block 2, and together they preferably form a bayonet coupling. However, if desired, any other suitable coupling may be used, e.g. threaded, pin locking system, etc.

[0019] The dummy block 2 comprises a dummy block body 20 with a rear face 201 adapted to be connected to the extrusion stem 30, and a front face provided with a circular groove 40 defining a central pressing surface 21 for exerting a pressure on the billet 74. Outside of the groove 40, the dummy block body 20 has a peripheral annular pressing surface 281 for exerting a pressure on the billet 74. The peripheral annular pressing surface 281 is located on said elastically deformable sealing lip 28 formed radially outside the groove 40, and the sealing lip 28 is sufficiently elastically deformable to be pressed outward by the extrusion pressure to seal against an inside wall of the lining 72 in the container 71. The circular groove 40 has a radially inner wall portion 23, a radially outer wall portion 24, and a bottom 22; the outer wall portion 24 is conical to make the groove 40 open axially outward.

[0020] As indicated above, the dummy block 2 also comprises said filler ring 10 adapted to fit in an upper part of the groove 40 while forming a gap 41 toward the bottom 22 of the groove 40. The ring 10 has a conical outer wall portion 14 complementary to the conical outer wall portion 24 of the groove 40. When the ring 10 is being pressed toward the bottom 22 of the groove 40, the elastically deformable sealing lip 28 will be forced radially outward to seal against the inside wall of the lining 72 in the container 71. Accordingly, the elastically deformable sealing lip 28 will deform 0.05-4 mm, more preferably 0.1-3 mm, even more preferably 0.2-2 mm, most preferably 0.5-1 mm.

[0021] In accordance with the present invention also the inner wall portion 23 of the groove 40 is conical to make a cross-section of the groove 40 substantially symmetrical, and the filler ring 10 has an conical inner wall portion 13 complementary to the conical inner wall portion 23 of the groove 40.

[0022] The dummy block 2 of the present invention consists of few components (only two, *viz.* the dummy block body 20 and the filler ring 10, apart from screws), and is of a very simple and axially compact design, reducing the required amount of structural material considerably. In addition, both of the groove sides 23 and 24 and both of the matching sides 13 and 14 of the filler ring 10 are conical, they converge toward the bottom 22 of the groove 40. As the central pressing surface 21 of the dummy block body 20 is rigid, the filler ring 10 will expand radially when being pressed downward, and the sealing lip 28 will consequently be expanded radially both by the conical taper of the radial outside 14 of the ring 10 and by the conical taper of the radial inside 13 of the filler ring 10. As the cone angle of both of the groove sides 23 and 24 and both of the matching sides 13 and 14 of the filler ring 10 are sufficiently large to prevent the ring 10 from getting stuck in the groove 40, and as the sealing lip 28 is elastically deformable, after completed extrusion the sealing lip 28 will press back the filler ring 10 and resume its original shape, so that the dummy block 2 is reusable.

[0023] Preferably, the central pressing surface 21 is located in a first plane 80, the peripheral annular pressing surface 281 on the sealing lip 28 is located in a second plane 81 parallel to the first plane but closer to the rear face 201 of the dummy block body 20, and as best shown in Fig. 5 the filler ring 10 has a pressing surface 11 located in a position between said first and second planes 80 and 81. Thereby, the central pressing surface 21 of the dummy block body 20 will start deforming the billet 74 by reducing its length but increasing its diameter, so that the air surrounding the billet 74 in the container 71 will be pressed backward through the peripheral gap between the inside wall of the lining 72 in the container 71 and sealing lip 28 formed radially outside the groove 40 and further past the dummy block 2 and the extrusion stem 30 to reduce the risk of blisters in the extruded profile 75 discharged from the extrusion press.

[0024] As shown in Fig. 5, it is preferred that the pressing surface 11 of the filler ring 10 is located in a third plane 82 parallel to the two other planes 80 and 81. Thereby, most of the air is evacuated through said gap before the rear face of the deformed billet 74 abuts the pressing surface 11 of the filler ring 10 and the pressing surface 281 of said sealing lip 28. As soon as the pressure from the billet 74 on the filler ring 10 is sufficiently high, it presses the filler ring 10 downward into the groove 40, thereby

causing said sealing lip 28 radially outside the groove to elastically expand radially to seal against the inside wall of the lining 72 in the container 71, while gap 41 decreases to 0 mm. This design results in a stepwise sealing effect which makes it possible for all air to come out during the compression and gives a fix and reproducible radial expansion of sealing lip 28. As no air is left in extrusion compartment, extrusion commences without a burp cycle, and the extruded profile 75 is free from blisters.

[0025] In the embodiment shown in the drawings, the lower portion of the groove sides 23 and 24 and also the lower portion of the matching sides 13 and 14 of the filler ring 10 are not conical but cylindrical and extend parallel to a longitudinal axis of the dummy block 2. In the filler ring 10, the length of the cylindrical portion and the height of the conical portion are of substantially the same size, while in the groove 40 the length of the cylindrical portion is slightly longer than the height of the conical portion. Thereby the pressing surface 11 of the filler ring 10 will be located in the third plane 82 and the pressing surface 281 of the sealing lip 28 in the second plane 81. Further, the gap 41 will be formed between the bottom surface 12 of the filler ring 10 and the bottom 22 of the groove 40. This design of the filler ring 10 and the groove 40 will prevent any possible tendency of skewing of the filler ring 10 in the groove 40 caused by uneven counter forces from the billet 74 during the extrusion.

[0026] Suitably, the rear face 201 of the dummy block body 20 is provided with at least one stepped through bore 25 opening in the bottom 22 of the groove 40, the filler ring 10 has a bottom surface 12 provided with at least one threaded bore 15 aligned with the stepped through bore 25 of the dummy block body 20, and a screw 50 extends through the stepped bore 25 into the threaded bore 15 to anchor the filler ring 10 in the groove 40. Thereby, the filler ring 10 is prevented from falling out of the groove 40 when handling the dummy block 2 outside of the container 71.

[0027] To improve the safety against a skew mounting of the filler ring 10 in the groove 40, it is suitable that both the dummy block body 20 and the filler ring 10 have two or more such bores 15 and 25, which are equiangularly spaced from each other.

[0028] When the filler ring 10 is being pressed down in the groove 40, the air enclosed in the gap 41 formed between the bottom surface 12 of the ring 10 and the bottom 22 of the groove 40 will be compressed. To make sure that all compressed air will be removed, it is suitable that a venting channel 251 is provided for permitting air to escape from the bottom 22 of the groove 40 through the stepped bore 25 and between the extrusion stem 30 and the rear face 201 of the dummy block body 20 and out to a space radially outside the extrusion stem 30.

[0029] The dummy block body 20 preferably has a female receptor 27 of a bayonet mount for receiving a mating male portion 32 on the extrusion stem 30. Thereby the dummy block 2 can be made short and compact.

[0030] The female receptor 27 of the bayonet mount suitably has two or more equiangularly spaced internal cams 271 for cooperation with two or more equiangularly spaced external cams 33 on the male portion of the extrusion stem 30.

[0031] It is preferred that the rear face 201 of the dummy block body 20 has at least one threaded bore 26 located close to an outer circumference thereof, and the extrusion stem 30 has a correspondingly placed slot-shaped recess 36 that permits insertion and tightening of a machine screw 60 having a head that prevents an involuntary uncoupling of the bayonet mount by being stopped by sides of the slot-shaped recess 36. Further, it is recommendable that the rear face 201 of the dummy block body 20 has two or more such threaded bores 26 that are equiangularly spaced and the extrusion stem 30 has two or more such slot-shaped recesses 36 that are equiangularly spaced.

[0032] It is also preferred that the elastically deformable sealing lip 28 formed radially outside the groove 40 is stepped in its longitudinal direction and has a larger diameter at said front face 281 than at said rear face 201, thereby forming a sealing surface 29 for sealing against an inside wall of the container lining 72.

[0033] The scope of the present invention is not restricted to the preferred embodiment shown in the drawings and described in the specification but can be varied without departing from the scope of the appended claims. As an example, if desired, it would be possible without any inventive activity to employ a bayonet mount between the ring 10 and the dummy block body 20. Another example is the material used for extrusion, which is preferably a metal, but can as well be a non-metal based material, as composite or other material. The construction of ring 10 can for example be other than circular, e.g. rectangular, etc.

INDUSTRIAL APPLICABILITY

[0034] The dummy block of the present invention is applicable primarily for hot extrusion of metals in both front and back loaded extrusion presses, but can be used also for cold extrusion.

Claims

1. A dummy block (2) for an extrusion press having a die (73), a container (71) for receiving a billet (74) to be extruded through the die (73), and an extrusion stem (30) for exerting a pressure on the billet (74) sufficient to extrude it through the die (73), said dummy block (2) being, in use, positioned between the extrusion stem (30) and the billet (74) and comprising:

   a dummy block body (20) having a rear face (201) adapted to be connected to the extrusion stem (30), and a front face provided with a

groove (40) defining a pressing surface (21) for exerting a pressure on the billet (74), and outside of the groove (40) a peripheral pressing surface (281) for exerting a pressure on the billet (74), a sealing lip (28) formed radially outside the groove (40), said groove (40) having an inner wall portion (23), an outer wall portion (24), and a bottom (22), said outer wall portion (24) being conical to make the groove (40) open outward; and

a filler ring (10) adapted to fit in an upper part of the groove (40) while forming a gap (41) toward the bottom (22) of the groove (40), said ring (10) having a conical outer wall portion (14) complementary to the conical outer wall portion (24) of the groove (40), said ring (10), when being pressed toward the bottom (22) of the groove (40), forcing said sealing lip (28) outward to seal against the inside lining (72) of the container (71);

characterized by

said inner wall portion (23) of the groove (40) being conical to make a cross-section of the groove (40) substantially symmetrical; and said filler ring (10) having a conical inner wall portion (13) complementary to the conical inner wall portion (23) of the groove (40).

2. A dummy block according to claim 1, wherein the sealing lip (28) is being sufficiently elastically deformable to be pressed outward by the extrusion pressure to seal against the inside lining (72) of the container (71).

3. A dummy block according to claim 1 or 2, wherein the central pressing surface (21) is located in a first plane (80), the peripheral annular pressing surface (281) is located in a second plane (81) parallel to the first plane but closer to the rear face (201) of the dummy block body (20), and the filler ring (10) has a pressing surface (11) located in a position between said first and second plane (80, 81).

4. A dummy block according to any one of claims 1 to 3, wherein the pressing surface (11) of the filler ring (10) is located in a third plane (82) parallel to the two other planes (80, 81).

5. A dummy block according to any one of claims 1-4, wherein the rear face (201) of the dummy block body (20) is provided with at least one stepped through bore (25) opening in the bottom (22) of the groove (40), the filler ring (10) has a bottom surface (12) provided with at least one threaded bore (15) aligned with the stepped through bore (25) of the dummy block body (20), and a screw (50) extends through the stepped bore (25) into the threaded bore (15) to anchor the filler ring (10) in the groove (40).

6. A dummy block according to claim 5, wherein both the dummy block body (20) and the filler ring (10) has two or more such bores (25; 15), which are equiangularly spaced from each other.

7. A dummy block according to claim 5 or 6, wherein a venting channel (251) is provided for permitting air to escape from the bottom (22) of the groove (40) through the stepped bore (25) and between the extrusion stem (30) and the rear face (201) of the dummy block body (20) and out to a space radially outside the extrusion stem (30).

8. A dummy block according to any one of claims 1-7, wherein the dummy block body (20) has a female receptor of a bayonet mount, for receiving a mating male portion (32) on the extrusion stem (30).

9. A dummy block according to claim 8, wherein the female receptor of a bayonet mount has two or more equiangularly spaced internal cams (27) for cooperation with two or more equiangularly spaced external cams (33) on the male portion (32) of the extrusion stem (30).

10. A dummy block according to claim 8 or 9, wherein the rear face (201) of the dummy block body (20) has at least one threaded bore (26) located close to an outer circumference thereof, and the extrusion stem (30) has a slot-shaped recess (36) placed correspondingly to said at least one threaded bore (26), the recess (36) permitting insertion and tightening of a machine screw (60) having a head that prevents an involuntary uncoupling of the bayonet mount by being stopped by sides of the slot-shaped recess (36).

11. A dummy block according to claim 10, wherein the rear face (201) of the dummy block body (20) has two or more such threaded bores (26) that are equiangularly spaced and the extrusion stem (30) has two or more such slot-shaped recesses (36) that are equiangularly spaced.

12. A dummy block according to any one of claims 1-11, wherein the elastically deformable sealing lip (28) formed radially outside the groove (40) is stepped in its longitudinal direction and has a larger diameter at said front face (281) than at said rear face (201).

Patentansprüche

1. Pressscheibe (2) für eine Extruderpresse aufweisend eine Matrize (73), einen Behälter (71) zum Aufnehmen eines Rohlings (74), der durch die Matrize (73) extrudiert werden soll, und einen Extruderstempel (30) zum Ausüben eines Drucks auf den Rohling

(74), der ausreichend ist, ihn durch die Matrize (73) zu extrudieren, wobei die Pressscheibe (2), während des Gebrauchs, zwischen dem Extruderstempel (30) und dem Rohling (74) positioniert ist und umfasst:

einen Pressscheibenkörper (20) aufweisend eine Rückfläche (201), die angepasst ist, mit dem Extruderstempel (30) verbunden zu werden, und eine Vorderfläche, die mit einer Rille (40) versehen ist, die eine Pressoberfläche (21) zum Ausüben eines Drucks auf den Rohling (74) und außerhalb der Rille (40) eine umfangseitige Pressoberfläche (281) zum Ausüben eines Drucks auf den Rohling (74) definiert, eine Dichtlippe (28), die radial außerhalb der Rille (40) gebildet ist, wobei die Rille (40) einen inneren Wandabschnitt (23), einen äußeren Wandabschnitt (24) und einen Boden (22) aufweist, wobei der äußere Wandabschnitt (24) konisch ist, damit sich die Rille (40) nach außen öffnet; und
einen Füllring (10), der angepasst ist in einen oberen Teil der Rille (40) zu passen, während eine Lücke (41) in Richtung des Bodens (22) der Rille (40) gebildet wird, wobei der Ring (10) einen konischen äußeren Wandabschnitt (14) aufweist, der komplementär zu dem konischen äußeren Wandabschnitt (24) der Rille (40) ist, wobei der Ring (10), wenn er in Richtung des Bodens (22) der Rille (40) gedrückt wird, die Dichtlippe (28) nach außen drängt, um an der Innenauskleidung (72) des Behälters (71) abzudichten;

dadurch gekennzeichnet, dass

der innere Wandabschnitt (23) der Rille (40) konisch ist, um einen Querschnitt der Rille (40) im Wesentlichen symmetrisch zu machen; und
wobei der Füllring (10) einen konischen inneren Wandabschnitt (13) aufweist, der komplementär zu dem konischen inneren Wandabschnitt (23) der Rille (40) ist.

2. Pressscheibe gemäß Anspruch 1, wobei die Dichtlippe (28) ausreichend elastisch verformbar ist, um durch den Extruderdruck nach außen gedrückt zu werden, um an der Innenauskleidung (72) des Behälters (71) abzudichten.

3. Pressscheibe gemäß Anspruch 1 oder 2, wobei sich die zentrale Pressoberfläche (21) in einer ersten Ebene (80) befindet, sich die umfangsseitige ringförmige Pressoberfläche (281) in einer zweiten Ebene (81) befindet, die parallel zu der ersten Ebene ist, jedoch näher zu der Rückfläche (201) des Pressscheibenkörpers (20), und der Füllring (10) eine Pressoberfläche (11) aufweist, die sich in einer Position zwischen der ersten und zweiten Ebene (80, 81) befindet.

4. Pressscheibe gemäß irgendeinem der Ansprüche 1 bis 3, wobei sich die Pressoberfläche (11) des Füllrings (10) in einer dritten Ebene (82) befindet, die parallel zu den zwei anderen Ebenen (80, 81) ist.

5. Pressscheibe gemäß irgendeinem der Ansprüche 1 - 4, wobei die Rückfläche (201) des Pressscheibenkörpers (20) in dem Boden (22) der Rille (40) mit mindestens einer abgestuften Durchgangsbohrungs (25)-Öffnung versehen ist, der Füllring (10) eine Bodenoberfläche (12) aufweist, die mit mindestens einer Gewindebohrung (15) versehen ist, die mit der abgestuften Durchgangsbohrung (25) des Pressscheibenkörpers (20) ausgerichtet ist, und sich eine Schraube (50) durch die abgestufte Bohrung (25) in die Gewindebohrung (15) erstreckt, um den Füllring (10) in der Rille (40) zu befestigen.

6. Pressscheibe gemäß Anspruch 5, wobei sowohl der Pressscheibenkörper (20) als auch der Füllring (10) zwei oder mehr derartige Bohrungen (25; 15) aufweisen, welche gleichwinklig voneinander beabstandet sind.

7. Pressscheibe gemäß Anspruch 5 oder 6, wobei ein Lüftungskanal (251) bereitgestellt ist, um es Luft zu ermöglichen, von dem Boden (22) der Rille (40) durch die abgestufte Bohrung (25) und zwischen dem Extruderstempel (30) und der Rückfläche (201) des Pressscheibenkörpers (20) und hinaus in einen Raum radial außerhalb des Extruderstempels (30) zu entweichen.

8. Pressscheibe gemäß irgendeinem der Ansprüche 1 - 7, wobei der Pressscheibenkörper (20) eine weibliche Aufnahme eines Bajonettverschlusses aufweist, zum Aufnehmen eines zugehörigen männlichen Abschnitts (32) an dem Extruderstempel (30).

9. Pressscheibe gemäß Anspruch 8, wobei die weibliche Aufnahme eines Bajonettverschlusses zwei oder mehr gleichwinklig beabstandete Innennocken (27) aufweist, um mit zwei oder mehr gleichwinklig beabstandeten Außennocken (33) an dem männlichen Abschnitt (32) des Extruderstempels (30) zusammenzuwirken.

10. Pressscheibe gemäß Anspruch 8 oder 9, wobei die Rückfläche (201) des Pressscheibenkörpers (20) mindestens eine Gewindebohrung (26) aufweist, die sich nahe eines äußeren Umfangs davon befindet, und der Extruderstempel (30) eine schlitzförmige Vertiefung (36) aufweist, die entsprechend der mindestens einen Gewindebohrung (26) angeordnet ist,

wobei die Vertiefung (36) Einsetzen und Festziehen einer Maschinenschraube (60) ermöglicht, die einen Kopf aufweist, der eine unbeabsichtigte Entkopplung des Bajonettverschlusses verhindert, indem er durch Seiten der schlitzförmigen Vertiefung (36) gehalten wird.

11. Pressscheibe gemäß Anspruch 10, wobei die Rückfläche (201) des Pressscheibenkörpers (20) zwei oder mehr derartige Gewindebohrung (26) aufweist, die gleichwinklig beabstandet sind, und der Extruderstempel (30) zwei oder mehr derartige schlitzförmige Vertiefungen (36) aufweist, die gleichwinklig beabstandet sind.

12. Pressscheibe gemäß irgendeinem der Ansprüche 1 - 11, wobei die elastisch verformbare Dichtlippe (28), die radial außerhalb der Rille (40) gebildet ist, in ihrer Längsrichtung abgestuft ist und an der Vorderfläche (281) einen größeren Durchmesser aufweist als an der Rückfläche (201).

Revendications

1. Un bloc de poussée (2) pour une presse à extrusion comportant une filière (73), un récipient (71) pour recevoir une billette (74) destinée à être extrudée à travers la filière (73) et une tige d'extrusion (30) pour exercer une pression sur la billette (74) suffisante pour l'extruder à travers la filière (73), ledit bloc de poussée (2)en utilisation, positionné entre la tige d'extrusion (30) et la billette (74) et comprenant :

un corps (20) de bloc de poussée ayant une face arrière (201) adaptée pour être connectée à la tige d'extrusion (30), et une face avant présentant une rainure (40) définissant une surface de pression (21) pour exercer une pression sur le billet (74), et, à l'extérieur de la rainure (40), une surface de pression (281) périphérique pour exercer une pression sur la billette (74), une lèvre d'étanchéité (28) formée radialement à l'extérieur de la rainure (40), ladite rainure (40) ayant une partie de paroi interne (23), une partie de paroi externe (24) et un fond (22), ladite partie de paroi extérieure (24) étant conique pour faire que la rainure (40) soit ouverte vers l'extérieur ; et

une bague de remplissage (10) adaptée pour s'adapter dans une partie supérieure de la rainure (40) tout en formant un espace (41) vers le fond (22) de la rainure (40), ladite bague (10) ayant une partie de paroi externe (14) conique, complémentaire de la partie de paroi extérieure (24) conique de la rainure (40), ladite bague (10), lorsqu'elle est pressée en direction du fond (22) de la rainure (40), forçant ladite lèvre d'étanchéité (28) vers l'extérieur de façon qu'elle s'applique avec étanchéité contre la doublure intérieure (72) du récipient (71) ;

caractérisé par le fait que :

ladite partie de paroi interne (23) de la rainure (40) est conique pour faire en sorte qu'une coupe transversale de la rainure (40) soit sensiblement symétrique ; et
ladite bague de remplissage (10) présente une partie de paroi intérieure conique (13) complémentaire de la partie de paroi intérieure conique (23) de la rainure (40).

2. Un bloc de poussée selon la revendication 1, dans lequel la lèvre d'étanchéité (28) est suffisamment déformable élastiquement pour être pressée vers l'extérieur par la pression d'extrusion de façon à venir en application étanche contre la doublure intérieure (72) du récipient (71).

3. Un bloc de poussée selon la revendication 1 ou la revendication 2, dans lequel la surface de pression (21) centrale est située dans un premier plan (80), la surface de pression annulaire périphérique (281) est située dans un deuxième plan (81) parallèle au premier plan, mais plus proche de la face arrière (201) du corps (20) de bloc de poussée, et la bague de remplissage (10) présente une surface de pression (11) située dans une position se trouvant entre lesdits premier et deuxième plans (80, 81).

4. Un bloc de poussée selon l'une quelconque des revendications 1 à 3, dans lequel la surface de pression (11) de la bague de remplissage (10) est située dans un troisième plan (82) parallèle aux deux autres plans (80, 81).

5. Un bloc de poussée selon l'une quelconque des revendications 1 à 4, dans lequel la face arrière (201) du corps (20) de bloc de poussée est pourvue d'au moins un alésage traversant (25) à épaulement, s'ouvrant dans le fond (22) de la rainure (40), la bague de remplissage (10) ayant une surface inférieure (12) présentant au moins un alésage fileté (15) aligné avec l'alésage traversant (25) à épaulement du corps (20) du bloc de poussée et une vis (50) s'étend à travers l'alésage (25) à épaulement jusque dans l'alésage fileté (15) pour ancrer la bague de remplissage (10) dans la rainure (40).

6. Un bloc de poussée selon la revendication 5, dans lequel à la fois le corps (20) du bloc de poussée et la bague de remplissage (10) présentent deux ou plusieurs alésages (25 ; 15) espacés de manière équiangulaire l'un de l'autre.

7. Un bloc de poussée selon la revendication 5 ou la revendication 6, dans lequel un conduit (251) d'évacuation d'air est prévu pour permettre à l'air de s'échapper du fond (22) de la rainure (40) à travers l'alésage (25) à épaulement et entre la tige d'extrusion (30) et la face arrière (201) du corps (20) du bloc de poussée et vers un espace situé radialement à l'extérieur de la tige d'extrusion (30).

8. Un bloc de poussée selon l'une quelconque des revendications 1 à 7, dans lequel le corps (20) du bloc de poussée présente un récepteur femelle d'un montage à baïonnette, pour recevoir une partie mâle (32) associée située sur la tige d'extrusion (30).

9. Un bloc de poussée selon la revendication 8, dans lequel le récepteur femelle d'un montage à baïonnette comporte deux ou plusieurs cames internes (27) espacées de manière équiangulaire pour coopérer avec deux ou plusieurs cames externes (33) espacées de manière équiangulaire sur la partie mâle (32) de la tige d'extrusion (30).

10. Un bloc de poussée selon la revendication 8 ou la revendication 9, dans lequel la face arrière (201) du corps (20) du bloc de poussée présente au moins un alésage fileté (26) situé à proximité d'une circonférence extérieure de celui-ci, et la tige d'extrusion (30) comporte un évidement (36) en forme de fente placé de manière correspondante audit alésage fileté (26), l'évidement (36) permettant l'insertion et le serrage d'une vis de machine (60) ayant une tête qui empêche un désaccouplement involontaire du montage à baïonnette en étant arrêtée par des côtés de l'évidement en forme de fente (36).

11. Un bloc de poussée selon la revendication 10, dans lequel la face arrière (201) du corps (20) du bloc de poussée comporte deux ou plusieurs desdits alésages filetés (26) qui sont espacés de manière équiangulaire et la tige d'extrusion (30) a deux ou plus desdits évidements (36) en forme de fente, qui sont espacés de manière équiangulaire.

12. Un bloc de poussée selon l'une quelconque des revendications 1 à 11, dans lequel la lèvre d'étanchéité (28) élastiquement déformable formée radialement à l'extérieur de la rainure (40) est inclinée dans sa direction longitudinale et a un diamètre plus grand sur ladite face avant (281) que sur ladite face arrière (201).

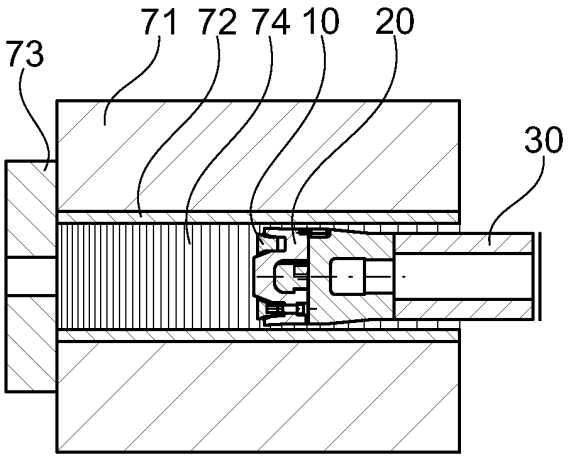

Fig. 1

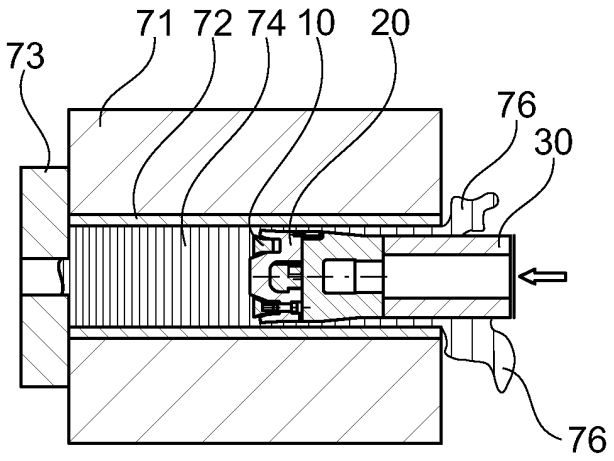

Fig. 2

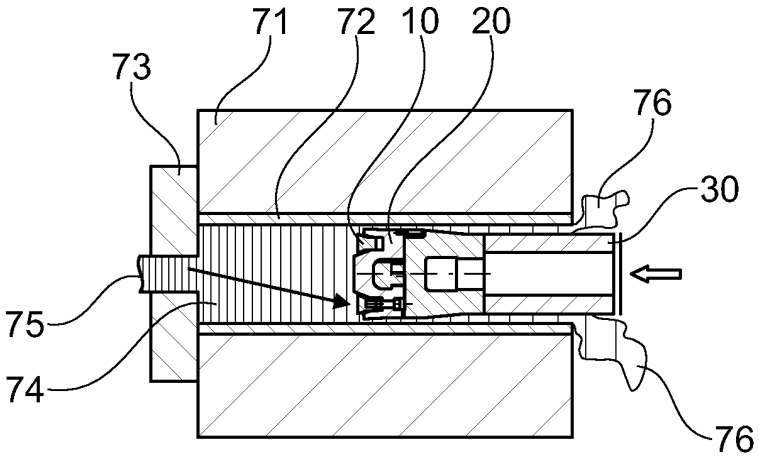

Fig. 3

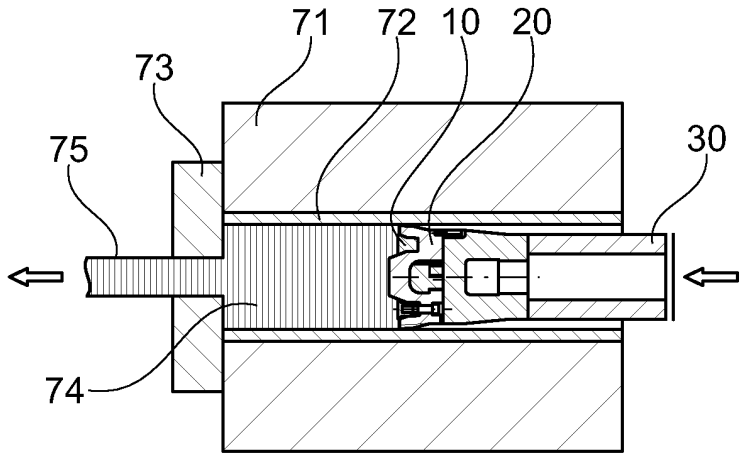

Fig. 4

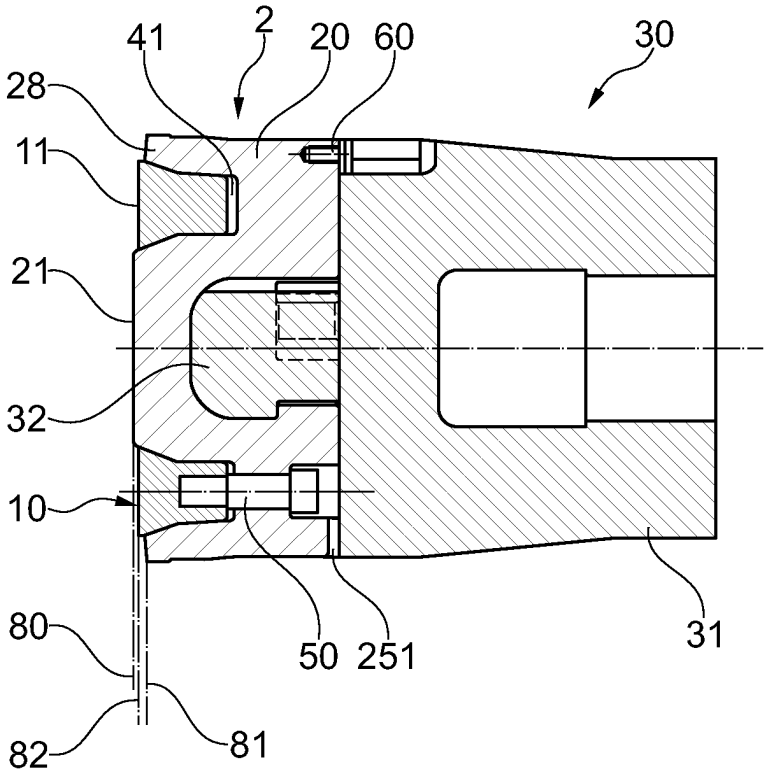
41
2
20
60
30
28
11
21
32
10
80
82
81
50
251
31

Fig. 5

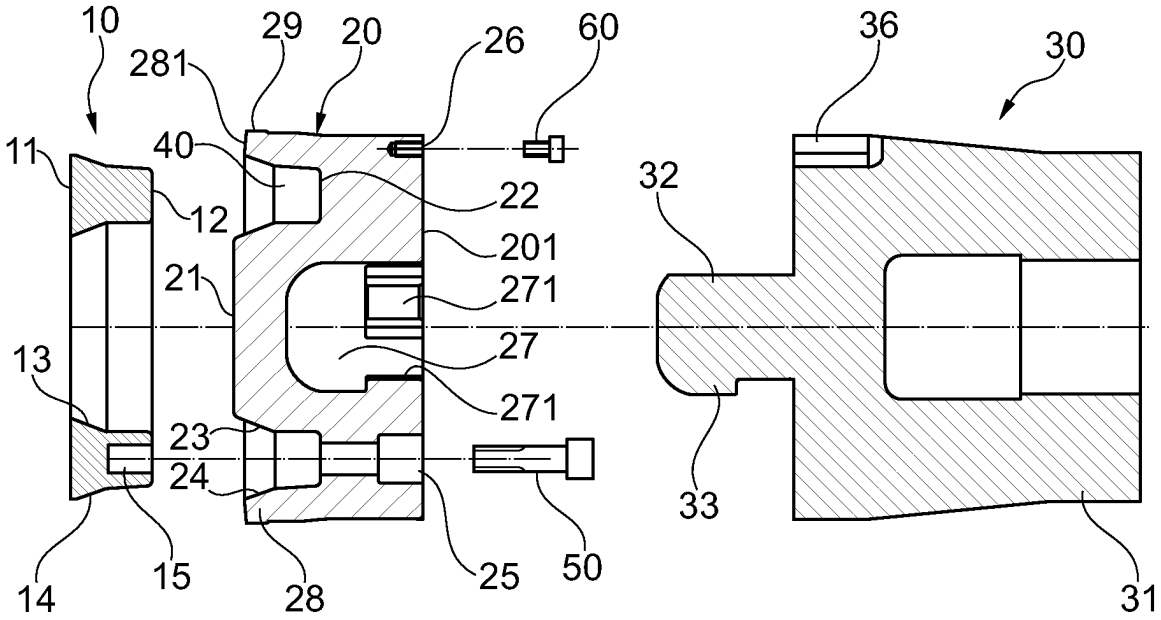
10
29
20
26
60
36
30
281
11
40
22
12
201
21
271
32
13
27
271
23
24
14
15
28
25
50
33
31

Fig. 6

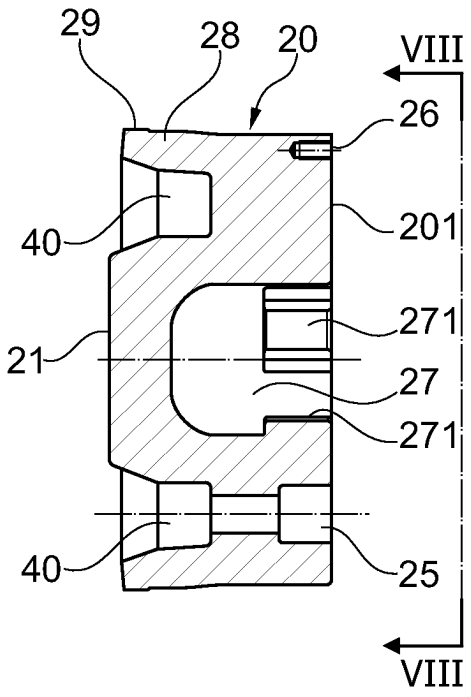

Fig. 7

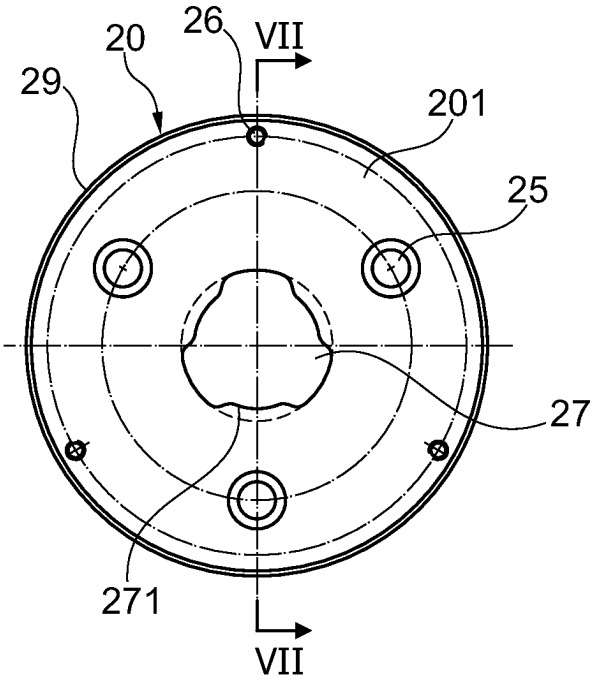

Fig. 8

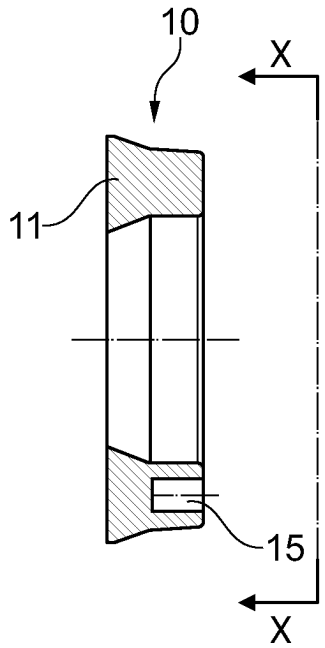

Fig. 9

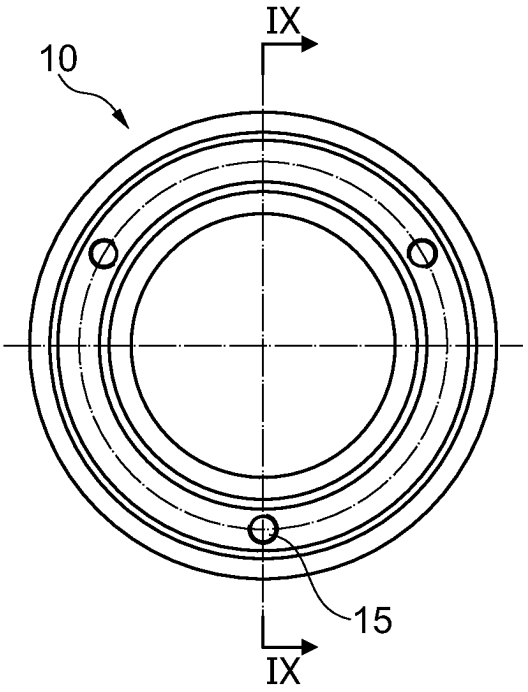

Fig. 10

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 20130247640 A, Heydasch **[0002]**