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(72) Inventors:
• **ALCALDE OTERO, Miguel**
15900 LA CORUÑA (ES)
• **REFOJO SECO, Sara**
15900 LA CORUÑA (ES)
• **RODRIGUEZ CODESAL, Martin**
15900 LA CORUÑA (ES)
• **BUSTELO VIDAL, Manuel**
15900 LA CORUÑA (ES)

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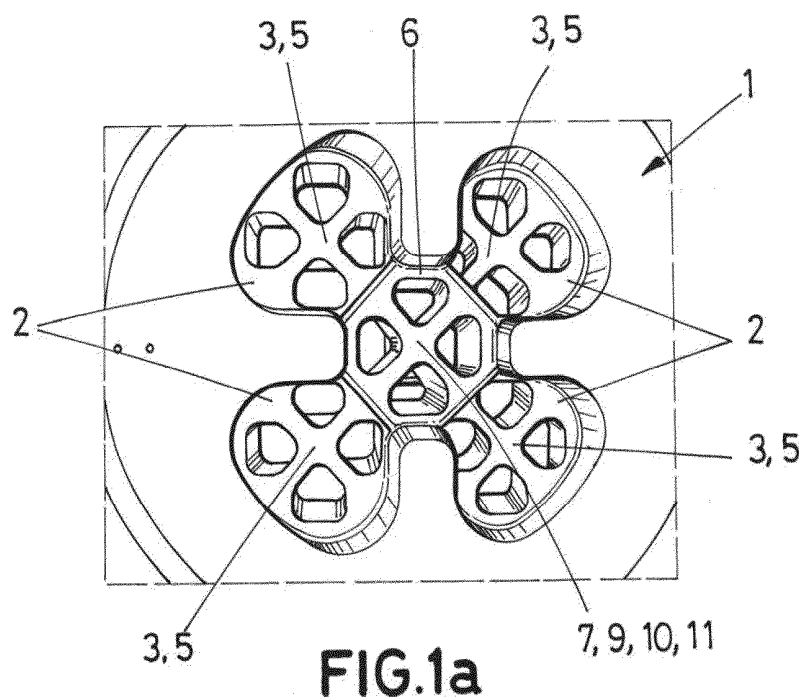
(71) Applicant: **Aluminios Cortizo, S.A.**
15900 A Coruña (ES)

(74) Representative: **Isern Patentes y Marcas S.L.**
Avda. Diagonal, 463 Bis, 2°
08036 Barcelona (ES)

(54) **EXTRUSION DIE FOR EXTRUSION PRESS**

(57) The die (1) comprises: - a die body (5) with a front face and a rear face; on the front face, at least three first feed chambers (2), each one having: a first inlet (9), for access of an extrusion material to the first feed chamber (2), and a first centre (3), the first centres (3) defining the vertices of a convex polygon; for each first inlet (9), one or more first outlets (4), located downstream in extension of the corresponding first inlet (9), through the die body (5),

to allow the extrusion material, once extruded, to exit through the rear face; and - a second feed chamber (6) with second inlet (11), and second centre (7) located within the convex polygon, and with one or more second outlets (8) in extension of the second inlet (11), through the die body (5), to allow the extrusion material, once extruded, to exit through the rear face.



EP 4 817 752 A1

Description

Technical field

[0001] The present invention relates to extrusion dies used in extrusion presses. In particular, the object of the invention relates to the design of said extrusion dies.

State of the art

[0002] The state of the art includes extrusion presses for extruding profiles made of an extrusion material, such as aluminium, and which are equipped with extrusion dies having a die body with a front face equipped with feed chambers. Each of the feed chambers comprises a respective inlet, for access of the extrusion material, and which extends to one or more outlets, wherein said feed chambers are symmetrically arranged around the geometrical centre of the die body. Extrusion is carried out along an extrusion direction that is perpendicular to the die body and in an extrusion sense from the inlets to the outlets. The feed chambers receive the extrusion material, which is extruded through the outlets. This arrangement of feed chambers and outlets is widely used to extrude multiple, substantially identical parts, which increases extrusion output, as well as facilitates good distribution of the extrusion pressure, which improves the useful life of the die.

[0003] There is a desire, however, to increase the output of the extrusion presses without negatively affecting the useful life of the dies.

Description of the invention

[0004] The present invention solves the need indicated in the background by means of an extrusion die for an extrusion press as disclosed in claim 1.

[0005] Further optional advantageous embodiments can be found in the detailed description and in the dependent claims. In particular, the invention further relates to an extrusion press including said extrusion die.

[0006] In this specification, the terms "centre" and "central point" refer to geometric centres.

[0007] The extrusion die for an extrusion press allows an extrusion material to be extruded along an extrusion direction. The die comprises a die body, on a front face of which, considered upstream relative to the extrusion direction, there are at least three first feed chambers and a second feed chamber. The first feed chambers comprise respective first inlets, while the second feed chamber comprises a second inlet, to allow access of the extrusion material to the respective feed chambers. Moreover, each of the first inlets comprises a first centre, while the second inlet comprises a second centre. The first centres define a convex polygon which is preferably regular.

[0008] To carry out extrusion, each of the first feed chambers comprises one or more first outlets, and the

second feed chamber comprises one or more second outlets, the first and second outlets being located downstream in extension of the corresponding feed chamber, through the die body, to allow the extrusion material, once extruded, to exit through a rear face, opposite to the front face, of the die body.

[0009] The die of the invention is notable for the fact that the second feed chamber is located inside the space defined by the first feed chambers. In particular, the second centre, preferably the entire second feed chamber, is contained within the polygon defined by the first centres.

[0010] The use of the die defined above makes it possible to increase extrusion output by means of the additional incorporation of the second feed chamber which, being located in the space defined between the first feed chambers, preferably in a central position, does not require an increase in the size of the die and, above all, does not affect the useful life of the die. This last point regarding the useful life of the die is particularly relevant since, by including the second feed chamber within the space defined by the first feed chambers, a more uniform distribution of the stresses to which the die is subjected during extrusion is achieved, and therefore there is a reduction in the value of the maximum stresses, which improves the behaviour of the die in view of mechanical fatigue and thus increases its useful life. This is considered a surprising effect because in the state of the art this second feed chamber and second hole(s) were not used, possibly because of the assumption that they would lead to an increase in the maximum stresses experienced. It has also been found that, without the second feed chamber and the additional second outlets proposed by the present invention, the extrusion material exerts a pressure on the front face of the die which tends to deform the die, affecting the tolerances of the extruded profiles. However, by incorporating the second feed chamber and the additional second outlets described in the present invention, the extrusion material finds an additional outlet, which facilitates the flow of the material, reducing the pressure exerted, avoiding deformations in the die and, therefore, improving the dimensional stability of the extruded profiles.

Brief description of the figures

[0011] The foregoing and other advantages and features will be more fully understood from the following detailed description of exemplary embodiments with reference to the accompanying drawings, which should be considered by way of illustration and not limitation, wherein:

Figure 1A is a front view of a first example of the die of the invention as seen upstream relative to the extrusion direction.

Figure 1B is a rear view of the die in figure 1A as seen

downstream relative to the extrusion direction.

Figure 2A is a front view of a second example of the die of the invention viewed upstream relative to the extrusion direction.

Figure 2B is a perspective view of the die in figure 2A as seen downstream relative to the extrusion direction.

List of references

[0012]

1. Die
2. First feed chambers
3. First centres
4. First outlets
5. Die body
6. Second feed chamber
7. Second centre
8. Second outlets
9. First inlet
10. Central point
11. Second inlet

Detailed description of an exemplary embodiment

[0013] In the following detailed description, specific details are set forth in the form of examples to provide a thorough understanding of the relevant teachings.

[0014] The embodiments of the invention shown in figures 1A-2B disclose a cylindrical extrusion die (1) for an extrusion press (not shown). The die (1) comprises a die body (5), with a front face and a rear face. The front face has four first feed chambers (2) which comprise respective first inlets (9), equipped with corresponding first centres (3). The first centres (3) define the vertices of a regular polygon which in turn has a central point (10), in other words, the first centres (3) are equidistant from the central point (10) and have uniform spacing between every two adjacent first centres (3). In an example not shown, the first centres (3) defining the vertices of the polygon may only be equidistant from the central point (10) of said polygon, but are not necessarily uniformly spaced apart. The arrangement of the first centres (3) such that they define a regular polygon increases the symmetry and thus improves the distribution of generated stresses during extrusion, in other words, it reduces the maximum stresses that the die (1) experiences. As an additional advantage, the die (1) is easier to manufacture.

[0015] On the other hand, as can be seen in said figures 1A-2B, from each of the first inlets (9), one or more first outlets (4) extend through the die body (5) to the rear face, to obtain a profile by extrusion for each first outlet (4). Furthermore, the die (1) comprises a second feed chamber (6) with a second centre (7) substantially

coinciding with the central point (10). The second feed chamber (6) comprises, similarly to the first feed chambers (2), a second inlet (11), with one or more second outlets (8).

5 [0016] Preferably, the first outlets (4) and the second outlets (8) are symmetrically arranged in their corresponding feed chambers (2, 6), which, together with the second centre (7) coinciding with the central point (10), improves the distribution of generated stresses (in other words, it reduces the maximum stresses that the die (1) experiences during extrusion into the die (1), as well as facilitates the manufacture of the die (1)).

10 [0017] In general, there may be one or more first outlets (4) in each of the first feed chambers (2). In particular, figures 1A and 1B show a first example with four outlets (4, 8) for each feed chamber (2, 6), while figures 2A and 2B show a second example with only one outlet (4, 8) for each feed chamber (2, 6).

[0018] On the other hand, in the first example, figures 1A-1B, the first outlets (4) of each first feed chamber (2) are equal to the second outlets (8) of the second feed chamber (6), and in the second example, figures 2A-2B, the first outlet (4) of each first feed chamber (2) is equal to the second outlet (8) of the second feed chamber (6). This facilitates the manufacture of the die (1) and improves the distribution of generated stresses (in other words, it reduces the maximum stresses that the die (1) experiences) during extrusion into the die (1). In general, the die (1) can be designed such that the first outlet(s) (4) of each first feed chamber (2) are substantially the same as the second outlet(s) (8) of the second feed chamber (6). This improves the distribution of generated stresses during extrusion by reducing the maximum stresses experienced by the die (1) and improving the mechanical fatigue strength of the same.

[0019] In an example not shown, the invention provides an extrusion press comprising the die (1) according to the teachings described above.

Claims

1. An extrusion die (1) for an extrusion press, for extruding an extrusion material along an extrusion direction, wherein the die (1) comprises:

- a die body (5) with a front face and a rear face, opposite to the front face, arranged respectively upstream and downstream relative to the extrusion direction;
- at least three first feed chambers (2), arranged in the front face of the die body (5), each first feed chamber (2) having a first inlet (9), located in a front part of said first feed chamber (2), to allow access of the extrusion material to the first feed chamber (2), as well as said first feed chamber (2) being equipped with a first centre (3), the first centres (3) defining the vertices of a convex

polygon;

- for each of the first inlets (9), one or several first outlets (4), located downstream in extension of the corresponding first inlet (9), through the die body (5), to allow the extrusion material, once extruded, to exit through the rear face of the die body (5); 5

characterised in that the die (1) further comprises a second feed chamber (6) equipped with: 10

- a second inlet (11) with a second centre (7) that is located within the polygon defined by the first centres (3), and
- one or more second outlets (8) in extension of the second inlet (11), through the die body (5), to allow the extrusion material, once extruded, to exit through the rear face of the die body (5). 15

2. The die (1) according to claim 1, wherein the polygon has a central point (10), the first centres (3) being equidistant from the central point (10). 20
3. The die (1) according to claim 2, wherein the polygon is a regular polygon. 25
4. The die (1) according to any of claims 1-3, wherein the second centre (7) coincides with the central point (10) of the polygon. 30
5. The die (1) according to any one of claims 1-4, wherein the second feed chamber (6) is entirely contained in the polygon. 35
6. An extrusion press comprising the die (1) according to any of claims 1-5. 35

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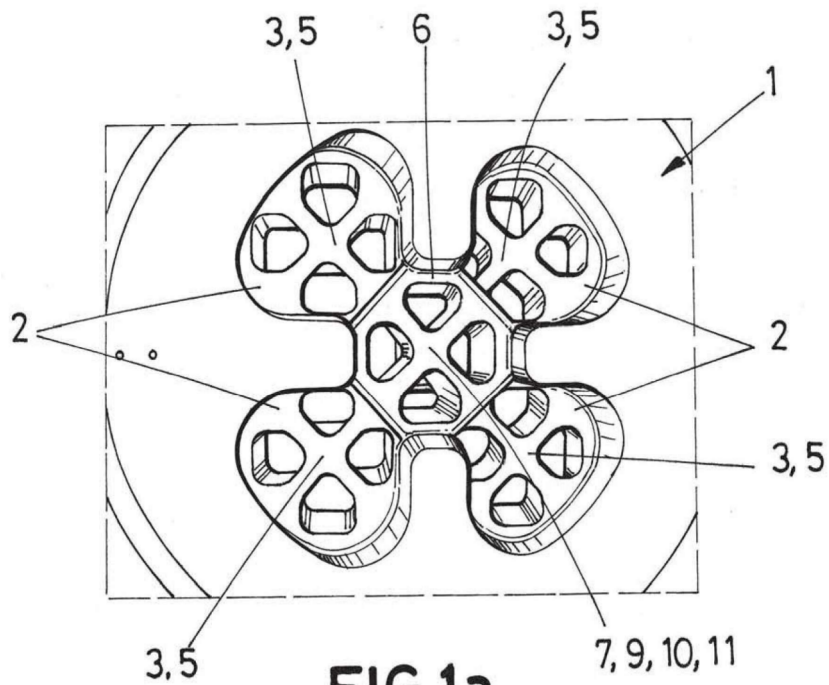


FIG. 1a

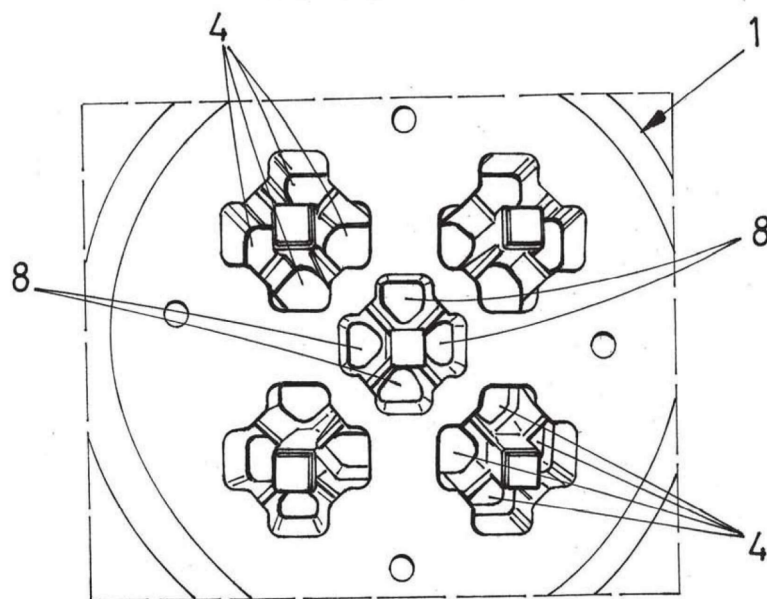


FIG. 1b

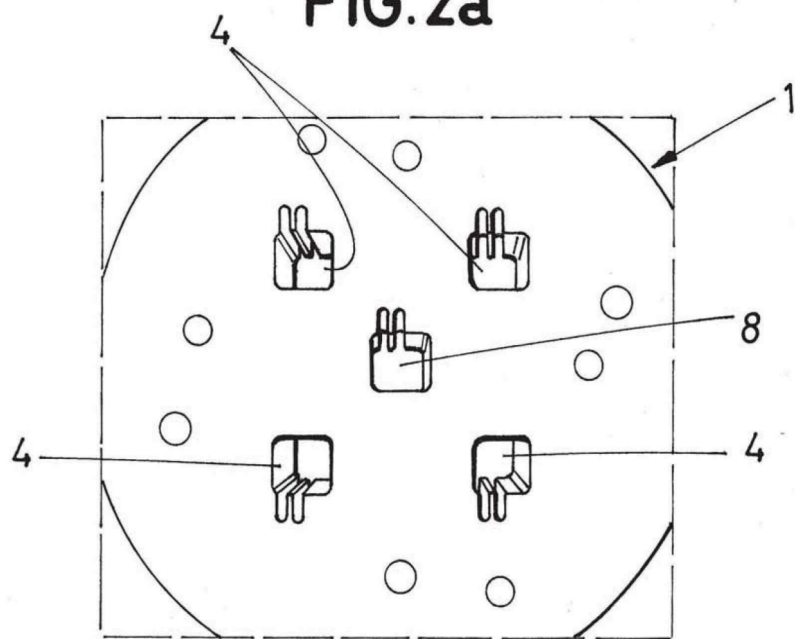
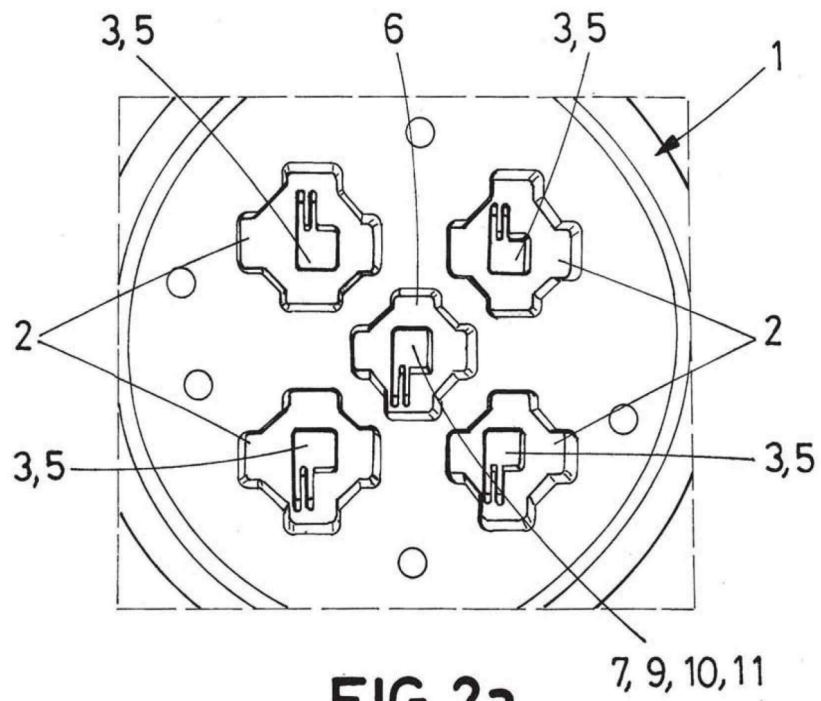


FIG. 2b



EUROPEAN SEARCH REPORT

Application Number

EP 25 38 3317

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	CN 220 005 439 U (SUZHOU LAIEN PREC ALLOY CO LTD) 14 November 2023 (2023-11-14) * figures *	1-6	INV. B21C25/02
A	NL 2 017 715 B1 (BOAL B V [NL]) 23 May 2018 (2018-05-23) * figures *	1-6	
A	CN 206 854 384 U (SUZHOU LOPSKING ALUMINUM CO LTD) 9 January 2018 (2018-01-09) * figures *	1-6	
A	US 2008/209976 A1 (DENEUVILLE PATRICK [FR]) 4 September 2008 (2008-09-04) * figures *	1-6	
A	DE 34 26 240 A1 (DUERRWAECHTER E DR DODUCO [DE]) 30 January 1986 (1986-01-30) * figures *	1-6	
			TECHNICAL FIELDS SEARCHED (IPC)
			B21C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		11 May 2026	Charvet, Pierre
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EP 25 38 3317

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 220005439 U	14-11-2023	NONE	

NL 2017715 B1	23-05-2018	-----	
CN 206854384 U	09-01-2018	NONE	

US 2008209976 A1	04-09-2008	AT E542614 T1	15-02-2012
		EP 1933995 A1	25-06-2008
		JP 2009506895 A	19-02-2009
		US 2008209976 A1	04-09-2008
		WO 2007028410 A1	15-03-2007

DE 3426240 A1	30-01-1986	NONE	

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