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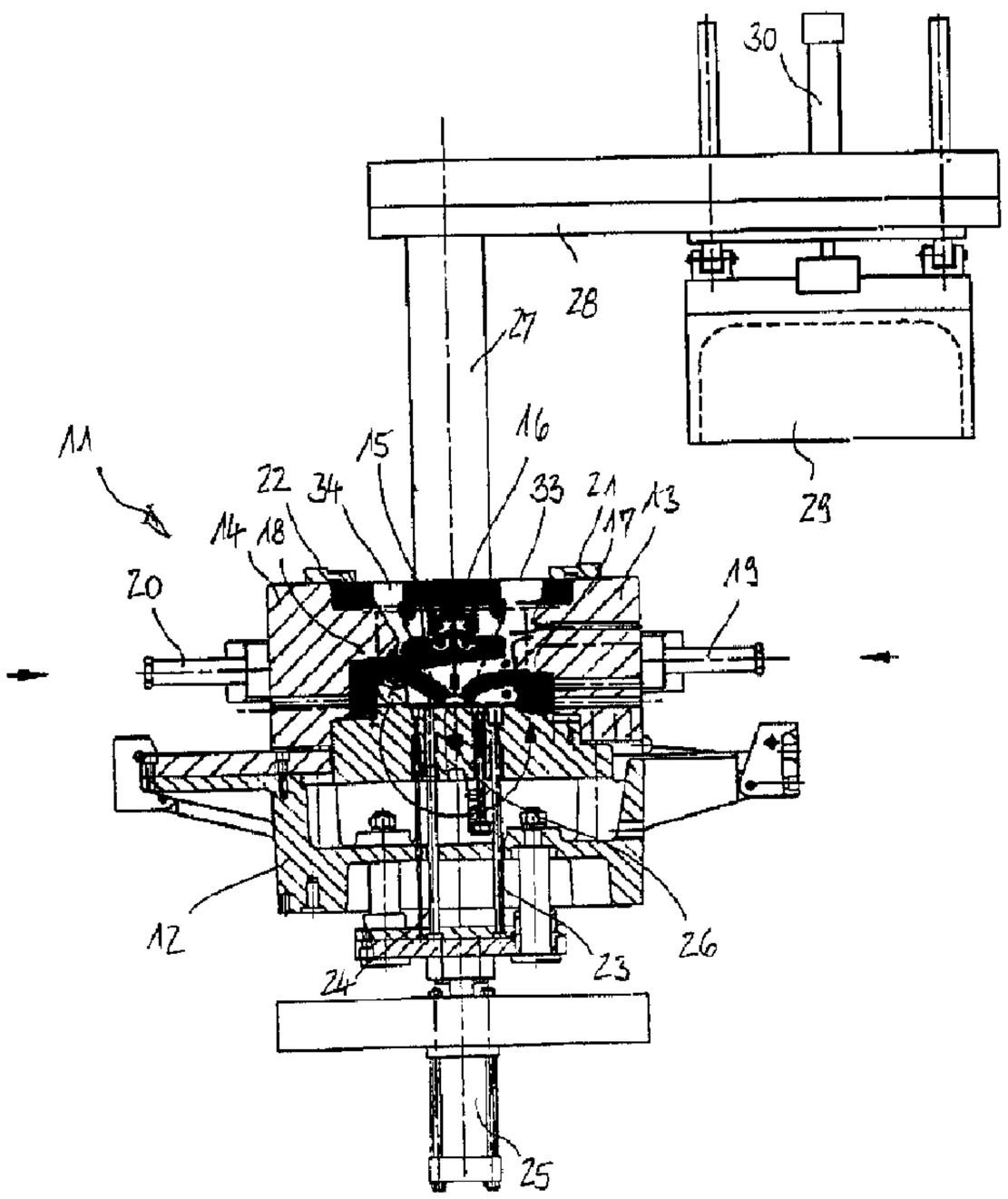
(54) Titre : MOULE COMPRENANT LES PARTIES EXTERNES DU MOULE ET LES MATERIAUX DES NOYAUX DE MOULAGE INSERES DANS CE MEME MOULE

(54) Title: MOULD COMPRISING OUTER MOULD PARTS AND MOULDING MATERIAL CORES INSERTED INTO SAME



(57) Abrégé/Abstract:
A mould comprising outer mould parts and inserted moulding material cores which, together, form a mould cavity, wherein inner cores consisting of moulding material are arranged in several layers one above the other and are clamped in between the outer mould parts and a final covering core consisting of mould material, with a continuous flow of force taking place therebetween and wherein the mould cavity is formed by surfaces of the outer mould and by surfaces of the inner cores and of the covering core.

Mould comprising outer mould parts and moulding material cores inserted into same

Abstract

A mould comprising outer mould parts and inserted moulding material cores which, together, form a mould cavity, wherein inner cores consisting of moulding material are arranged in several layers one above the other and are clamped in between the outer mould parts and a final covering core consisting of mould material, with a continuous flow of force taking place therebetween and wherein the mould cavity is formed by surfaces of the outer mould and by surfaces of the inner cores and of the covering core.

Figure 1

Mould comprising outer mould parts and moulding material cores inserted into same

Description

The invention relates to a mould comprising outer mould parts and inserted mould material cores which, together, form a mould cavity. The outer mould parts can be parts of a permanent mould and/or moulding material parts/outer cores.

For producing complicated mouldings, for example of cylinder heads, it is necessary to insert moulding material cores into the outer mould parts. It is already known to use outer moulding material cores as well, so that substantial parts of the outer casting faces are not formed by a metallic mould wall, but by outer cores consisting of moulding material. This method is particularly suitable for casting aluminium and magnesium alloys.

It is the object of the present invention to provide a mould of said type which can be used for complicated castings and which, in particular, is suitable for rotary casting.

The objective is achieved in that the inner cores consisting of moulding material are stacked in layers one above the other and are clamped in between the outer mould parts and the final covering core consisting of moulding material, with a

continuous flow of force taking place between the covering core, the inner cores, and the outer mould parts, wherein the mould cavity is formed by surfaces of the outer mould parts and by surfaces of the inner cores and of the covering core. In accordance with the invention, there are not provided any additional means for fixing the moulding material cores in the outer mould cores and for fixing the moulding material cores between each other. The multi-layer structure permits the production of complicated shapes. By using the final covering core consisting of moulding material, it is possible to directly connect a casting container (contact casting). The covering core preferably comprises at least one ingate aperture and at least one gas exit aperture.

According to a further embodiment it is proposed that the parts of the mould comprise a base plate and several side parts which are movable relative to said base plate. The side parts can comprise especially two longitudinal side parts which, relative to the base plate, can be displaced outwardly away from the mould cavity in opposite directions and/or at least one end side part which, relative to the base plate, can be pivoted away outwardly from the mould cavity. This measure permits a problem-free structure of the inner cores consisting of several stacked layers. The inner faces of the side parts can be provided with projections which hold individual inner cores additionally relative to the base plate. For securing the covering core, displaceable bolts or pivotable claws can be arranged at the base plate or at least at two side parts, which bolts or claws hold the package of moulding material cores within a mould in such a way that, even when the mould rotates, displacements between the inner cores cannot occur.

An inventive mould is used in a particularly advantageous way if the mould is first stacked on the base plate and is then rotated by 180° around a horizontal axis, so that the covering core comprising an ingate aperture comes to rest downwards. Subsequently, a casting container filled with melt for one casting operation is coupled to the covering core. When the assembly is again rotated by 180° around the horizontal axis, the melt flows through the ingate aperture in the covering core into the mould cavity. Thereafter, the melt container is removed and the casting solidifies whereupon the mould is removed. The mould is preferably rotated around an axis which extends parallel to the longitudinal extension of its mould cavity.

The base plate is provided in the form of a permanent mould part consisting of metal. The outer mould parts can also be permanent mould parts mechanically connected to the base plate, or they can be moulding material parts which, by mechanical clamping means, are clamped together and clamped on to the base plate from the sides and from above.

An embodiment of the invention is illustrated in the drawings and described below.

Figure 1 shows an inventive mould in a first position after having been assembled.

Figure 2 shows an inventive mould in a second position before the casting process starts.

Figures 1 and 2 will largely be described jointly. An inventive mould 11 comprises a multi-component base plate 12,

side parts 13, 14 each in the form of permanent mould parts, a plurality of inner cores 15 stacked in several layers one above the other on the base plate 12, and a covering core 16, each consisting of moulding material. The plurality of inner cores 15 are clamped in between the base plate 12 and the covering core 16 with a continuous flow of force existing therebetween. The side parts 13, 14 are provided with mould projections 17, 18 which additionally hold individual inner cores 15 against the base plate 12. By means of setting cylinders 19, 20, the side parts 13, 14 can be displaced in opposite directions relative to the base plate 12; they can be removed from one another relative to the illustrated position. Thereafter, the inner cores 15 can be stacked on the base plate 12. Following this operation, the side parts 13, 14 can be closed again, as indicated by the arrows pointing in opposite directions, to enable same, once again, to return into the indicated position. Then the covering core 16 is placed in position. On the side parts 13, 14, there are arranged bolts 21, 22 which, to permit assembly can be slid back relative to the side parts 13, 14, and after the covering core 16 has been placed in position, they can be moved forward into the illustrated position in which they hold the covering core 16 relative to the inner cores 15 and the side parts 13, 14. The base plate 12 is shown to have ejectors 23, 24 which are actuated by a setting cylinder 25 for the purpose of removing the casting from the mould. The base plate 12 and thus the entire mould 11 can be rotated around a horizontal axis 27 extending perpendicularly relative to the drawing plane. This applies in the same way to the column 27 on which there is supported a pivot arm 28 carrying a casting container 29 which, by means of a setting cylinder 30, can be displaced parallel to the column 27 on the pivot arm 28.

Figure 1 shows the finish-assembled mould 11 in its position assumed directly after the stacking operation. The casting container 29 is suspended upside down, has been removed by the setting cylinder 30 from the mould 11 and has been pivoted by the pivot arm 28 on the column 27
by 90° relative to the mould.

In Figure 2, the mould 11 together with the column 27 and the casting container 29 has been rotated by 180° around the axis 26. The casting container 29 is still in the same position relative to the mould 11 as shown in Figure 1, but it is now open towards the top and is just being filled by a dispensing ladle 31 with melt 32 for one casting operation.

After the casting container 29 has been filled, the pivot arm 28 is pivoted by 90° relative to the column 27, so that the casting container 29 comes to rest underneath the mould 11 in front of the column 27. The casting container 29 is then lifted by the cylinder 30 towards the mould 11 until the casting container 29 rests sealingly against the covering core 16. In the position now assumed, the mould 11 with the coupled casting container 29 is again rotated by 180° around the axis 26. The melt 32 weighed to fill the mould cavity flows through the ingate 33 into the mould cavity, with gas being able to escape from the gas exit 34 provided in the casting container 29. After completion of the rotating operation and thus of the casting operation in which, once again, the mould 11 assumes the position as shown in Figure 1, the casting container 29 is lifted by the setting cylinder 30 from the mould 11 and rotated by the pivot arm 28 back into the position as shown in Figure 1. After the metal has solidified, the casting can be removed from the mould by withdrawing the side parts 13, 14 and actuating the ejectors 23, 24.

The side parts 13, 14 can consist of moulding material, in which case the bolts 21, 22 can be replaced by holding-down devices connected to the base plate.

CLAIMS:

1. A mould comprising metal outer moulded parts, inserted inner cores made of moulding material and a covering core made of moulding material,

wherein a mould cavity is formed by surfaces of the outer mould parts (12, 23, 14) and by surfaces of the inner cores (15) and the covering core (16),

wherein the inner cores (15) are stacked in several layers one above the other and are clamped in between the outer mould parts (12, 13, 14) and the covering core (16), with a continuous clamping force taking place between the covering core, the inner cores and the outer mould parts,

wherein the outer mould parts comprise a base plate (12) and several side parts which are mechanically connected to and moveable relative to said base plate for enabling said side parts to be moved away from one another enabling stacking of said inner cores and moving said side parts back together after the stacking of the inner cores, and

wherein the mould (11) is suspended so as to be rotatable about a horizontal axis (16).

2. A mould according to claim 1, characterized in that the side parts (13, 14) comprise two longitudinal side parts which, relative to the base plate (12), can be displaced outwardly away from the mould cavity in opposite directions.

3. A mould according to claim 1 or claim 2, characterized in that the side parts comprise at least one end side part which, relative to the base plate (12), can be pivoted away outwardly from the mould cavity.

4. A mould according to any one of claims 1 to 3, characterized in that at the base plate or at least at two side parts (13, 14), there are arranged displaceable bolts (21, 22) for holding the covering core (16).

5. A mould according to any one of claims 1 to 3, characterized in that at the base plate or at least at two side parts (13, 14), there are arranged pivotable claws for holding the covering core (16).

6. A mould according to any one of claims 1 to 5, characterized in that at the inner faces of the side parts (13, 14), there are provided mould projections (17, 18) which hold individual cores (15) additionally relative to the base plate (12).

7. A mould according to any one of claims 1 to 6, characterized in that in the base plate (12), there are arranged ejectors (23, 24).

8. A mould according to any one of claims 1 to 7, characterized in that in the covering core (16), there is provided at least one ingate aperture (33) and at least one gas exit aperture (34).

9. Making use of a mould according to any one of claims 1 to 8, characterized in that the mould (11), after having been stacked on the base plate (12), is rotated by 180° around the horizontal axis (26), that a casting container (29) containing melt (32) for one casting operation is positioned from below in such a way that its aperture sealingly rests against the covering core (16), that the mould (11) together with the contacting casting container (29) is again rotated by180° around said horizontal axis (26), with the melt reaching the mould through an ingate (33) in the covering core (16), and that then the casting container (29) is removed upwardly from the mould (11).

10. Using a mould according to claim 9, characterized in that the mould (11) is rotated around a horizontal axis (26) which extends parallel to the longitudinal extension of the mould cavity.

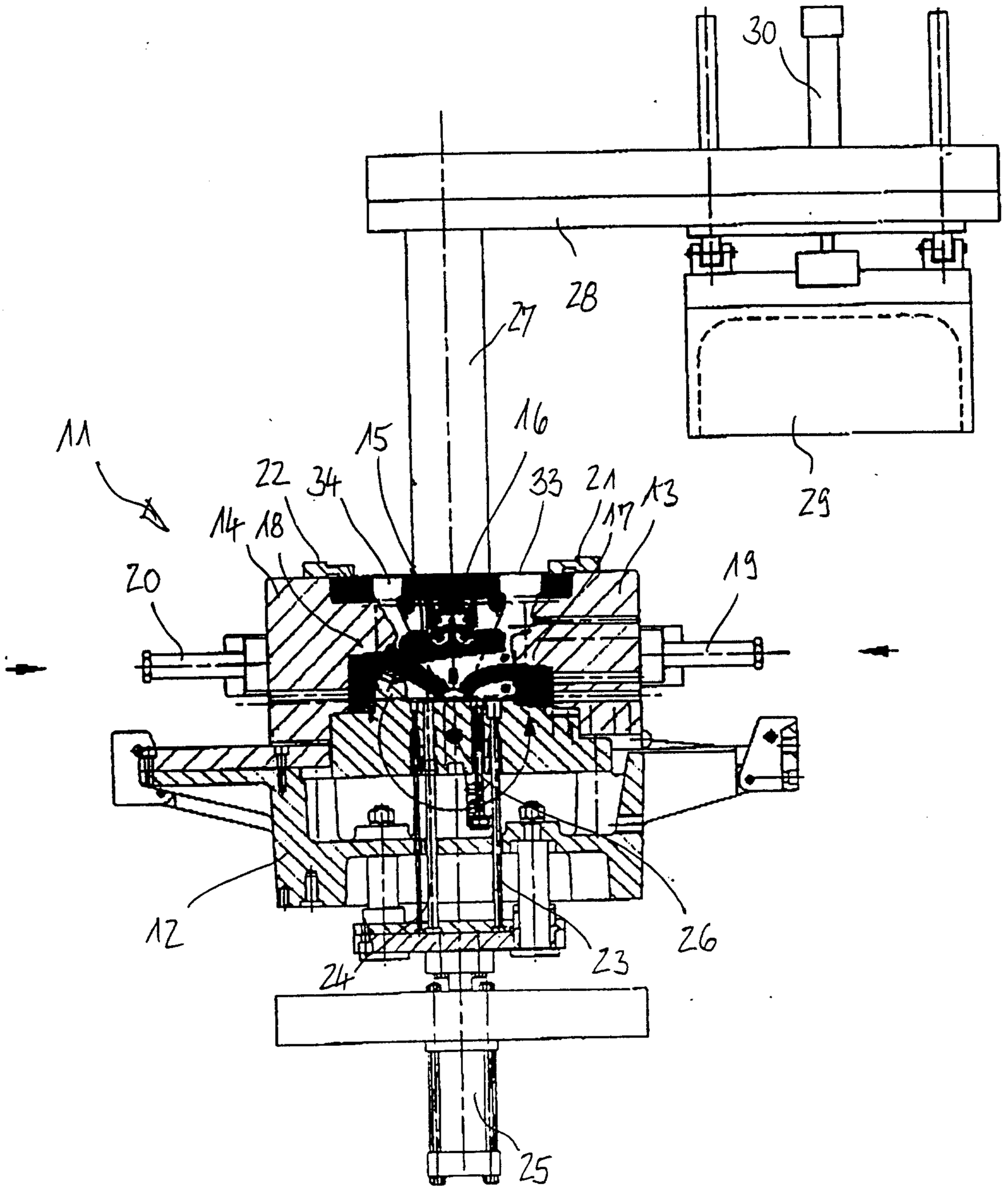


FIG. 1

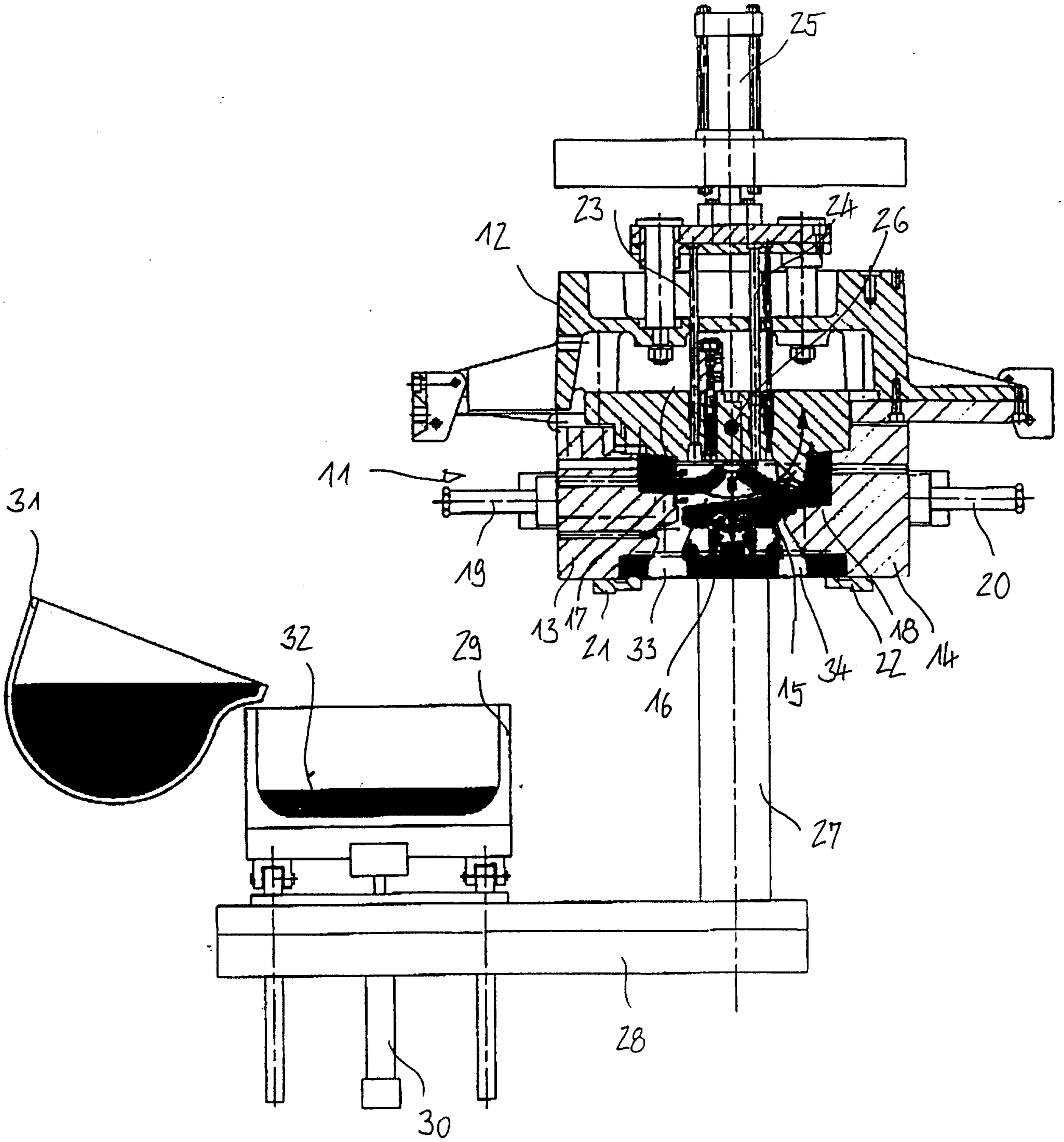
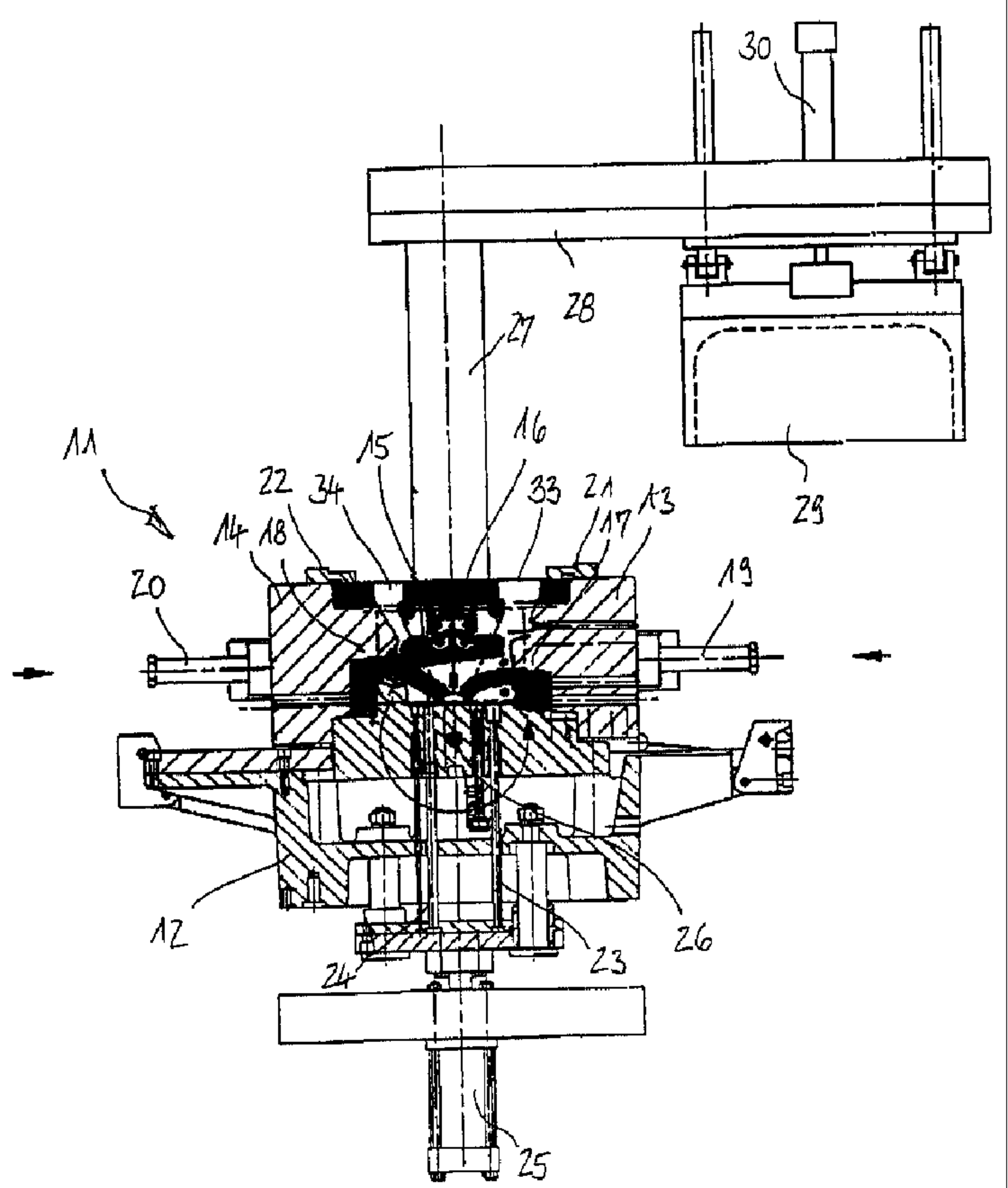


FIG. 2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