

(19)



(11)

EP 2 977 193 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

27.01.2016 Bulletin 2016/04

(51) Int Cl.:

B30B 1/32 (2006.01)

B30B 15/02 (2006.01)

B30B 15/04 (2006.01)

(21) Application number: **14382285.6**

(22) Date of filing: **23.07.2014**

(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**

Designated Extension States:

BA ME

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(54) **Shop hydraulic press**

(57) The present invention relates to a shop hydraulic press of the type used to manipulate parts which has improved operating characteristics and basically comprises a chassis, a front panel (1) and a back panel (2), a workbench (3) to receive the part intended to be manipulated, a hydraulic cylinder (4) for applying compressive force on said part, means for indicating the position

and horizontal movement of the hydraulic cylinder (4), and means for holding the assembly of the hydraulic cylinder (4) such that access to said cylinder is possible without needing to remove the front panel (1) and back panel (2) from the chassis of the press during maintenance or repair tasks.

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Description

Object of the Invention

[0001] The present invention relates to a hydraulic press comprised in the field of machine tools and, specifically, in the field of hydraulic presses for tasks of manipulating parts used in machine shops.

[0002] More specifically, the main purpose of the hydraulic press object of the invention is to favor the task of manipulating parts, i.e., the tasks for which the press is designed, while at the same time aiding in the maintenance tasks characteristic of such machines.

Background of the Invention

[0003] The hydraulic press is known today as a basic tool and is therefore widely used in different industrial sectors for tasks of manipulating parts by means of applying press forces or loads. These tasks include operations for bending or straightening parts, inserting or extracting one part with respect to another, attaching or separating the parts and introducing or extracting shaft bearings, etc.

[0004] Such presses usually consists of a hydraulic cylinder mounted on the upper area or bridge and is partially covered and housed therein by at least one front panel and another back panel, such that it emerges at least partially from the lower portion, however, to act on the part placed on the workbench located right below the working plunger of said cylinder.

[0005] To operate said cylinders, presses usually have a closed hydraulic circuit in which a hydraulic pump absorbs mechanical energy from a power source and converts it into hydraulic energy. The hydraulic energy generated by the hydraulic pump is transferred to a hydraulic fluid, usually a type of oil suitable for this use. In turn, said hydraulic fluid transmits the hydraulic energy in the form of flow and pressure through the different components of the hydraulic circuit to an actuator or hydraulic cylinder. The hydraulic cylinder again converts the hydraulic energy into the mechanical energy necessary for performing the desired manipulation work by means of applying compressive force on a part.

[0006] To aid the operator's work, some of these presses further allow the manual movement or sliding of the hydraulic cylinder, so they are provided with means for transverse or horizontal movement, from one side of the press to the other, whereby the operator places the plunger of said cylinder in the position that is most favorable for acting on the part.

[0007] However, these presses sometimes suffer from certain drawbacks resulting from the fact that the operator's work is not as accurate as desired, because manually manipulating the horizontal position of the cylinder introduces errors that may lead to imperfections or defects in the manipulated parts, or even to completely defective parts that must be disposed of.

[0008] On the other hand, another significant drawback of such presses is the high degree of maintenance they require, these operations being very common because of the wear caused by friction during the enormous stresses to which they are subjected in compression operations. Said maintenance tasks are furthermore particularly necessary in the hydraulic cylinder, which requires constant operations for cleaning it, replacing it, repairing it, etc., which entail having the press shut down for some time, which obviously has a negative effect on its performance.

[0009] In the case of the presses mentioned above in which the hydraulic cylinder is horizontally movable, the means used must on one hand allow said movement to be made by the operator in a manner that is easy or comfortable, and on the other hand said means must assure that the assembly is appropriately secured. Specifically, systems which on one hand allow the horizontal movement of the cylinder to enable working the parts in different positions, and on the other hand allow withstanding the compressive force and the reactive force in response to said compression, are designed. These systems therefore need to prevent vertical movement of the assembly, but at the same time allow and even favor horizontal movement, which allows the cylinder to work at the right pressure. For that purpose said systems usually have guide rails for transverse movement but these rails at the same time somehow trap the assembly of the cylinder to prevent it from lifting up due to the compressive action, i.e., they prevent its vertical movement when said compression is applied. This is usually done using the steel frame of the press, so both the rails and the anchoring means preventing movement are designed such that they take advantage of the robustness of the chassis of the press, being attached to same.

[0010] Even though this attachment allows preventing said vertical movement and therefore allows withstanding the reactive forces in response to compression, it has the drawback, however, of having to disassemble the press in the event of usual maintenance tasks or in the event of the need to make repairs.

[0011] For this reason, the means normally used usually result in complex structures which do perform said dual function but subsequently prevent being able to quickly disassemble the assembly of the cylinder, a large number of elements having to be removed and a number of operations having to be performed, which can even include partially disassembling the press itself, which entails the problems of losing productivity of the aforementioned machine.

Description of the Invention

[0012] The shop hydraulic press of the present invention solves the problems of the state of the art discussed above because, on one hand, it allows reducing part processing errors as it gives the operator means for accurately placing the hydraulic cylinder before acting on

the part, on the other hand it allows effectively securing the assembly of the cylinder, which can furthermore be easily accessed and can even be visually inspected without needing to remove it from the press.

[0013] To that end, the hydraulic press of the invention comprises, among other elements, a chassis, a front panel and a back panel, a workbench to receive at least one part intended to be manipulated by means of applying compressive force, and a hydraulic cylinder located above the workbench which is horizontally movable or slidable in an area of the press, i.e., horizontally movable from one side of the press to the other.

[0014] Specifically, the press of the invention comprises means for horizontally moving the hydraulic cylinder which are present both in the actual assembly of the cylinder and in the frame of the press which, as previously stated, and as indicated by its name, allow and guide the horizontal movement or sliding of said hydraulic cylinder so that it can be located on different points of the workbench when the operator is working on it.

[0015] These means for horizontally moving the hydraulic cylinder furthermore cooperate with means for holding the assembly of the hydraulic cylinder which are also present in both the actual hydraulic cylinder and in the frame of the press, such that even though they allow and guide the horizontal movement of the cylinder in the operation for positioning said cylinder, they prevent the assembly of the cylinder from lifting up or experiencing upward vertical movement as a result of the reactive forces in response to said compression during the operation of compressing the part.

[0016] Furthermore, as previously stated, the shop hydraulic press of the present invention allows the operator to accurately place the hydraulic cylinder before acting on the part, which is achieved as a result of comprising means for indicating the position in which the plunger of said cylinder is located, and which are also present both in the actual hydraulic cylinder and in the actual frame of the press.

[0017] To achieve that dual function of, on one hand, guiding the hydraulic cylinder in its horizontal movement and, on the other hand, indicating the position, the hydraulic press of the invention comprises at least two grooves, one of them being a front groove located in the front panel and the other one being a back groove located in the back panel, over which grooves there travels the support to which the hydraulic cylinder is attached, and which is part of both the means for indicating the position and the means for horizontal movement.

[0018] The groove of the back panel is defined between the actual edge of the back panel that has a longitudinal cut and a detachable bar that is secured to the actual panel. The edge of the back panel and the bar form a groove that is dimensionally identical to that of the front panel, such that the support of the cylinder slides between both grooves. The bar forming the back groove is detachable, such that it can be removed or swung out of the way to introduce the cylinder and the means for

supporting it, which obviously makes the operations for mounting the cylinder, and logically for removing and/or inspecting it much easier.

[0019] Finally, the coupling between the support of the hydraulic cylinder and the back groove can be detached such that access to said cylinder for observation or even for maintenance is possible without needing to remove the front panel and back panel from the press.

10 Brief Description of the Drawings

[0020] For the purpose of aiding to better understand the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of said description in which the following is depicted with an illustrative and non-limiting character:

Figure 1 shows a schematic front perspective view of the hydraulic press object of the invention in which part of the frame, the workbench and the hydraulic cylinder, among other parts, can be seen.

Figure 2 shows a schematic rear perspective view of the hydraulic press of Figure 1 in which the front panel has been removed.

Figure 3 shows a view of Figure 2 in which the back panel has also been removed.

Figure 4 shows a perspective view of Figure 1 in which the front panel has been removed.

Figure 5 shows the perspective view of Figure 4 in which an element additional has been removed to more clearly see the assembly of the hydraulic cylinder.

35 Preferred embodiment of the Invention

[0021] In view of the mentioned drawings it can be seen how in a preferred embodiment of the invention, the hydraulic press for tasks of manipulating parts herein proposed comprises a chassis, a front panel (1) and a back panel (2), a workbench (3) to receive the part intended to be manipulated by means of applying compressive force applied through a hydraulic cylinder (4) located above said workbench (3), where said hydraulic cylinder (4) is horizontally movable or slidable from one side of said press to the other.

[0022] As can be seen in the drawings, the front panel (1) and back panel (2) partially enclose the hydraulic cylinder (4), such that it can be seen from the lower portion, leaving the working plunger (5) used to act on the part visible.

[0023] As previously stated, the press of the invention comprises means for horizontally moving the hydraulic cylinder (4), which are present both in the actual hydraulic cylinder (4) and in the frame of the press.

[0024] Specifically, and as can be seen in Figures 3 to 5, the means for horizontal movement present in the actual frame of the press are formed by two horizontal lon-

gitudinal members (6) on which the hydraulic cylinder (4) moves, which two horizontal longitudinal members (6) are secured by their ends to respective transverse partitions (7) demarcating the travel and are in turn attached to the front panel (1) and back panel (2) through elements that allow disassembling them, such as threaded elements, tongue and groove elements, etc.

[0025] As can be seen in said drawings, the structure formed by said horizontal longitudinal members (6) and transverse partitions (7) is rectangular-shaped and defines a compartment along which the hydraulic cylinder (4) can freely slide, being supported on said longitudinal members. Furthermore, according to a possible embodiment of the invention, the length of said horizontal longitudinal members (6) is such that at least between one of the transverse partitions (7) and the side wall of the corresponding press (8) there is a free space where other components characteristic of the press, such as the boiler, the manometer, etc., can be installed.

[0026] On the other hand, to achieve said horizontal movement and guiding of the hydraulic cylinder (4), the hydraulic press further comprises at least two grooves, a front groove (14) and a back groove (16), in the front panel (1) and back panel (2), respectively.

[0027] Said grooves (14, 16) having a longitudinal configuration and horizontal position will therefore be located at the same height on the respective panels (1, 2), so they will face one another and form respective orifices or openings for guiding the hydraulic cylinder (4) as will be explained below.

[0028] These grooves (14, 16) will also be part of the means for indicating the position which will allow the operator to accurately place the plunger (5) of the hydraulic cylinder (4) before acting on the part, according to an embodiment that is also explained below.

[0029] According to the foregoing, and as can also be seen in said drawings, the hydraulic cylinder (4) comprises both means for horizontal movement and means for indicating position cooperating with the corresponding means for movement located in the frame or chassis described above.

[0030] More specifically, the hydraulic cylinder (4) comprises a support (9) that is attached to said hydraulic cylinder (4) by means of welding or any other system that allows an integral and compact attachment. According to the preferred embodiment shown in the drawings, said support (9), which is preferably made of steel or of any other resistant material, is rectangular-shaped and has sides that are larger than the diameter of the hydraulic cylinder (4), such that there are located on said support (9) and on both sides of said hydraulic cylinder (4) adjustable elements (10) to which there are attached respective parts (11) which, like runners, move over the upper edges of the horizontal longitudinal members (6), allowing the guided movement of the hydraulic cylinder (4).

[0031] Furthermore, as can be seen in the embodiment shown in the drawings, the support (9) comprises a front

edge (18) and a back edge (19) which will be at least partially introduced into the grooves (14, 16) of the panels (1, 2), respectively.

[0032] To that end, at least one of the dimensions of the support (9) must be longer than the distance existing between the inner faces of the panels (1, 2) of the press when said panels are duly mounted. In other words, the dimensions of said support (9) will be such that when the assembly of the press is mounted, its front edges (18) and (19) will at least partially be introduced into the grooves (14, 16) of the mentioned panels (1, 2), respectively.

[0033] As regards the means for holding the assembly of the hydraulic cylinder (4) when it is working on the part, such means will be formed by the lower edges of the horizontal longitudinal members (6). Specifically, when said hydraulic cylinder (4) is subjected to the upward vertical force in reaction to the downward vertical compressive force applied on the part by the plunger (5), the edges (18, 19) of the support (9) will abut with the lower edges of the horizontal longitudinal members (6), thereby preventing upward vertical movement of the assembly of the hydraulic cylinder (4), and therefore enabling said compression.

[0034] On the other hand, the front groove (18) will also be part of the means for indicating the position which will allow the operator to accurately place the plunger (5) of the hydraulic cylinder (4) before acting on the part. More specifically, and as can be seen in Figure 1, said means for indicating the position comprise a mark or notch (15) located in the center of the front edge (18) of the support (9), which notch (15) will be visible from the outside through the front groove (14), which may comprise a graduated scale (17) in its immediate surroundings so that the notch (15) can be referenced to a specific value and, therefore, help the operator position it.

[0035] According to one embodiment particularly shown in Figures 2 and 3, the back groove (16) is formed by a bar (13) attached to the lower end (12) of the back panel (2).

[0036] Furthermore, according to said embodiment, said bar (13) is attached to the back panel (2) by detachable means such as threaded elements, bolts, etc., located at its ends, so simply releasing said detachable means from one of the ends allows said bar to swing to either help mounting the cylinder in the press or in the subsequent removal, inspection and/or maintenance, all of which can be done without having to remove the front panel (1) and back panel (2) from the press.

Claims

1. Shop hydraulic press comprising:

- a chassis, a front panel (1) and a back panel (2),
- a workbench (3) to receive the part intended to be manipulated, and

- a horizontally movable hydraulic cylinder (4)
for applying compressive force on said part,

when it is working on the part.

characterized in that it further comprises a front
groove (14) and a back groove (16) in the front panel (1) and back panel (2), respectively, which are located at the same height and facing one another to form openings for guiding hydraulic cylinder (4) and means for indicating its position.

2. Shop hydraulic press according to claim 1, **characterized in that** the hydraulic cylinder (4) is integrally attached to a support (9) comprising a front edge (18) and a back edge (19) which are at least partially introduced into the grooves (14, 16) of the panels (1, 2), respectively.
3. Shop hydraulic press according to any of the preceding claims, **characterized in that** the front groove (14) comprises a graduated scale (17) to aid in positioning the operative hydraulic cylinder (4).
4. Shop hydraulic press according to claim 3, **characterized in that** the front edge (18) of the support (9) comprises a notch (15) visible from the outside through the front groove (14).
5. Shop hydraulic press according to any of claims 1 or 2, **characterized in that** the back groove (16) is formed by a bar (13) attached to the lower end (12) of the back panel (2).
6. Shop hydraulic press according to claim 5, **characterized in that** the bar (13) is attached to the back panel (2) by detachable means located at its ends, such that when said detachable means are released from one of the ends said bar (13) can swing and allow access to the hydraulic cylinder (4).
7. Shop hydraulic press according to claim 2, **characterized in that** it comprises:

- two horizontal longitudinal members (6) secured by their ends to respective transverse partitions (7) demarcating the horizontal travel of the hydraulic cylinder, and which are in turn attached to the front panel (1) and back panel (2); and
- there are located on the support (9) adjustable elements (10) to which there are attached respective parts (11) which, like runners, move over the upper edges of the horizontal longitudinal members (6), allowing the guided movement of the hydraulic cylinder (4);

where the lower edges of the horizontal longitudinal members (6) furthermore constitute the means for holding the assembly of the hydraulic cylinder (4)

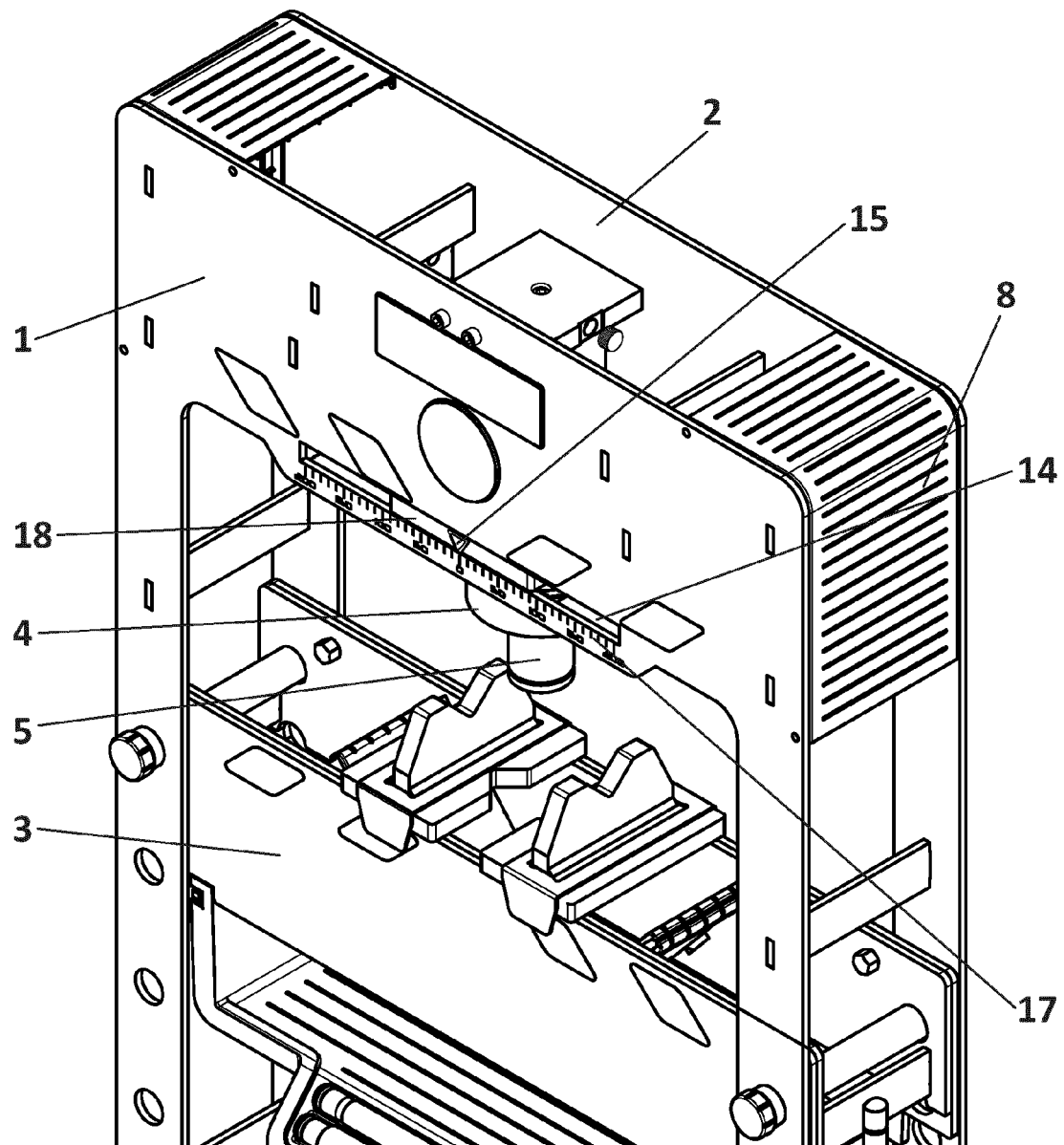


FIG. 1

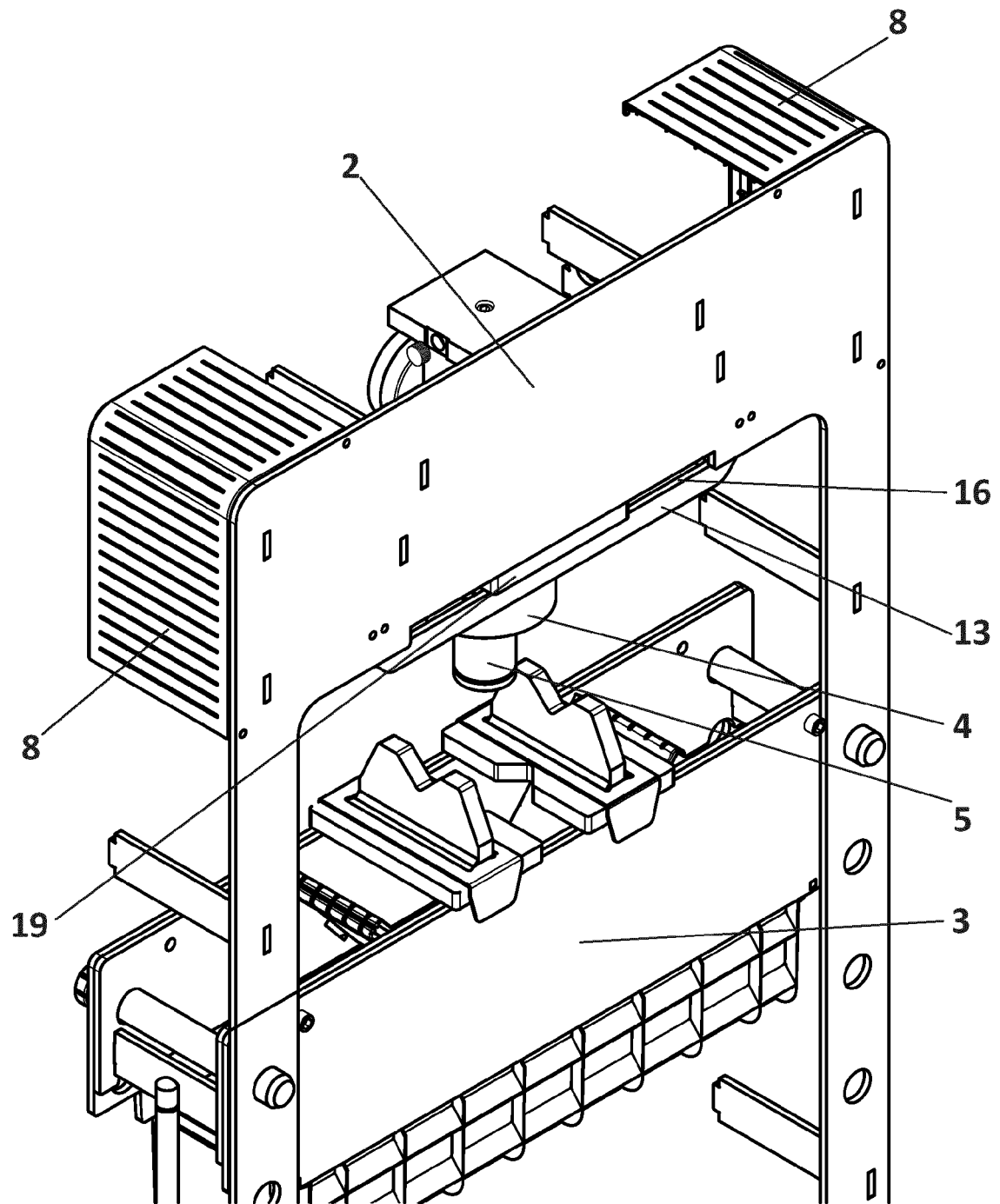


FIG. 2

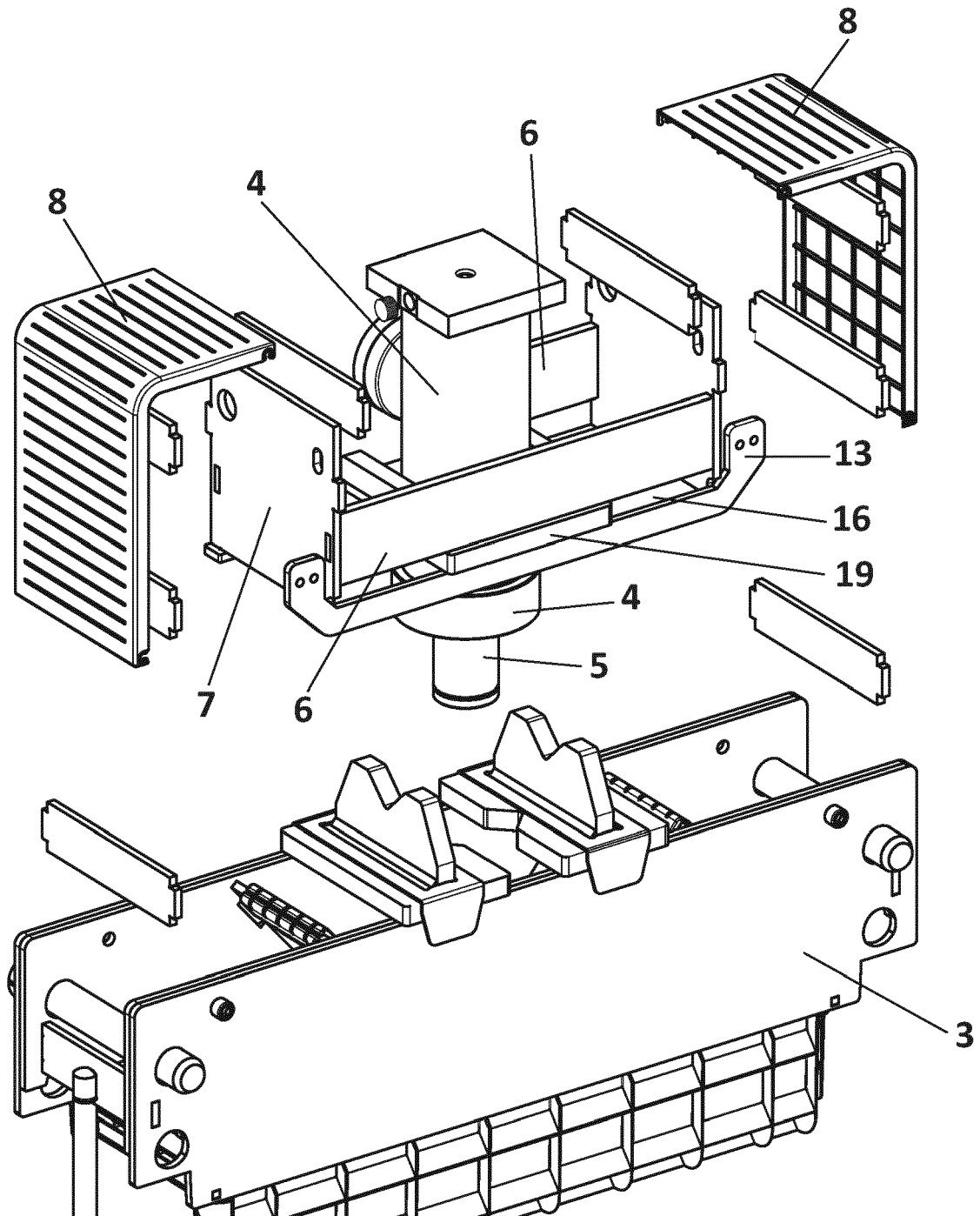


FIG. 3

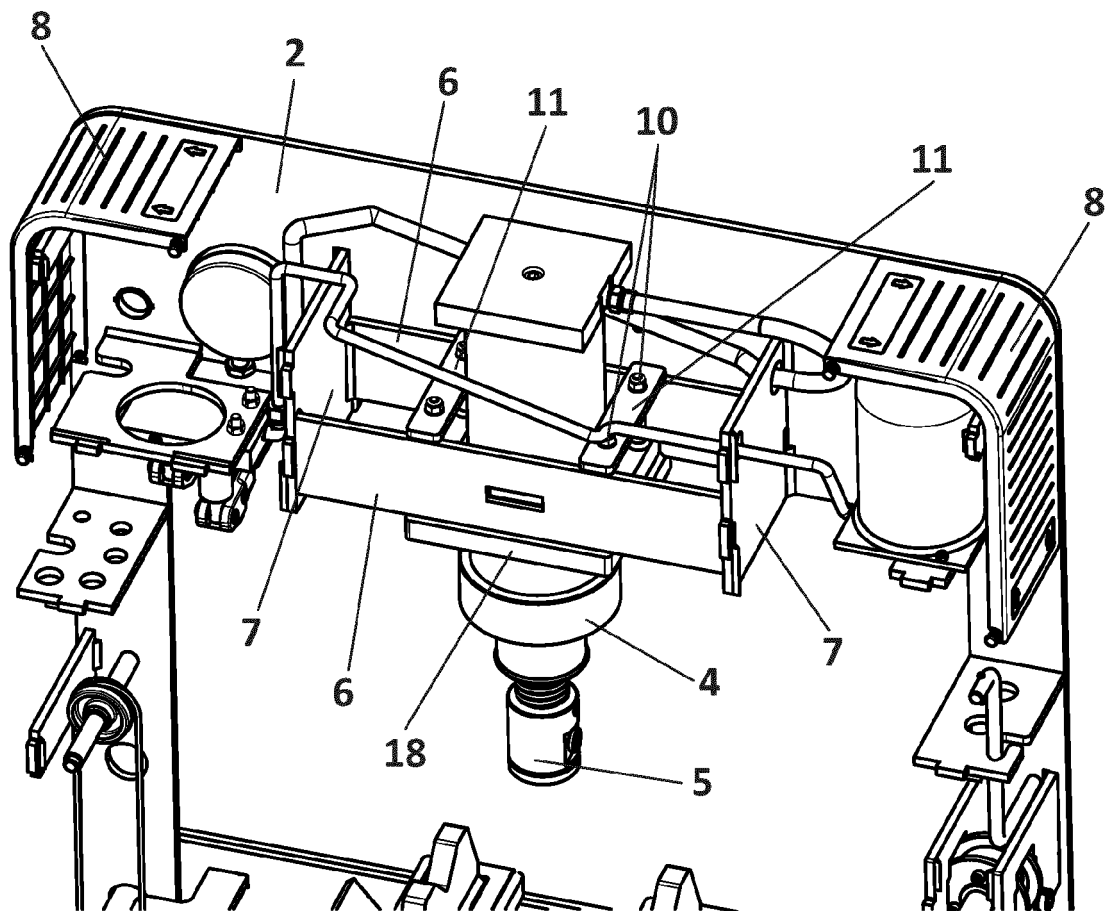


FIG. 4

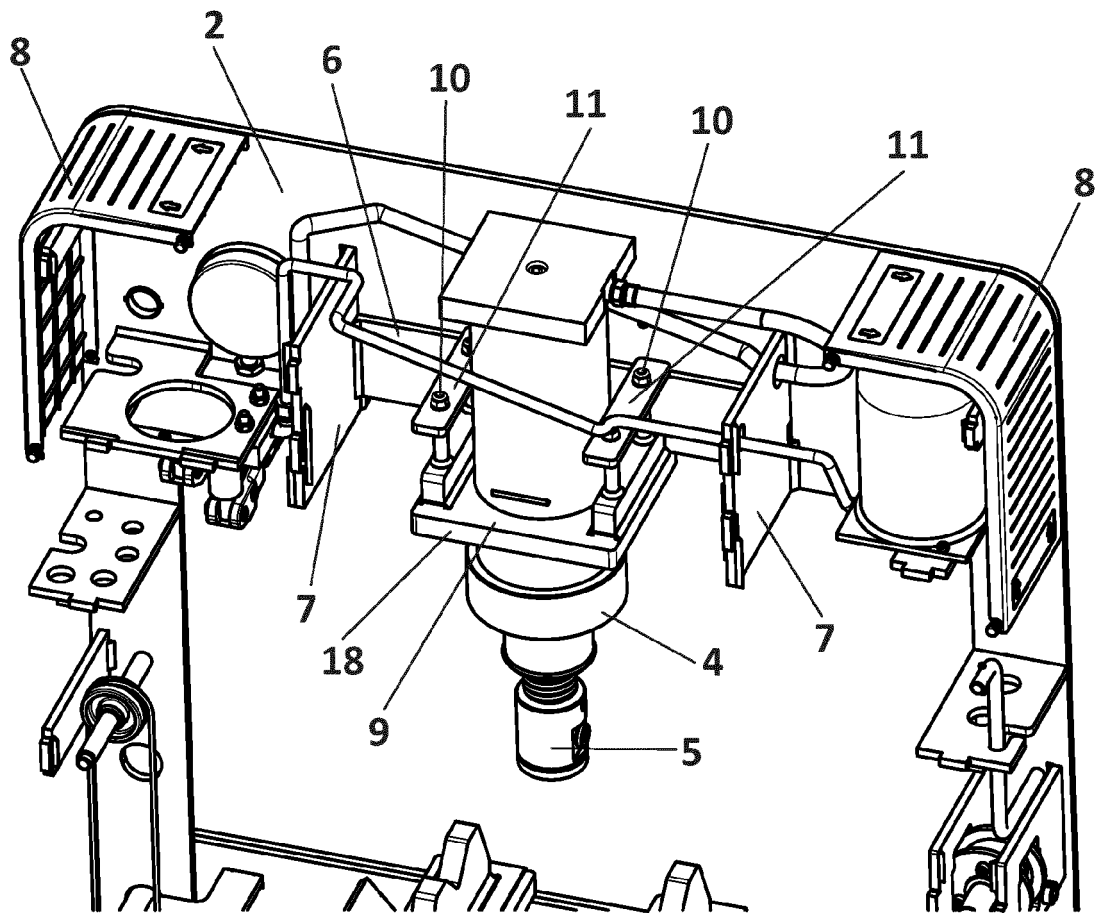


FIG. 5



EUROPEAN SEARCH REPORT

 Application Number
 EP 14 38 2285

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A	US 4 620 352 A (SULEJ JOHN [US]) 4 November 1986 (1986-11-04) * abstract; figures *	1-7	
A	US 2 479 432 A (TILLOTSON JAMES H) 16 August 1949 (1949-08-16) * abstract; figures 1-2 *	1	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
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Place of search		Date of completion of the search	Examiner
The Hague		20 January 2015	Labre, Arnaud
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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