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P. CHRUBASIK

3,410,202

PRESS

Original Filed Aug. 20, 1965

3 Sheets-Sheet 1

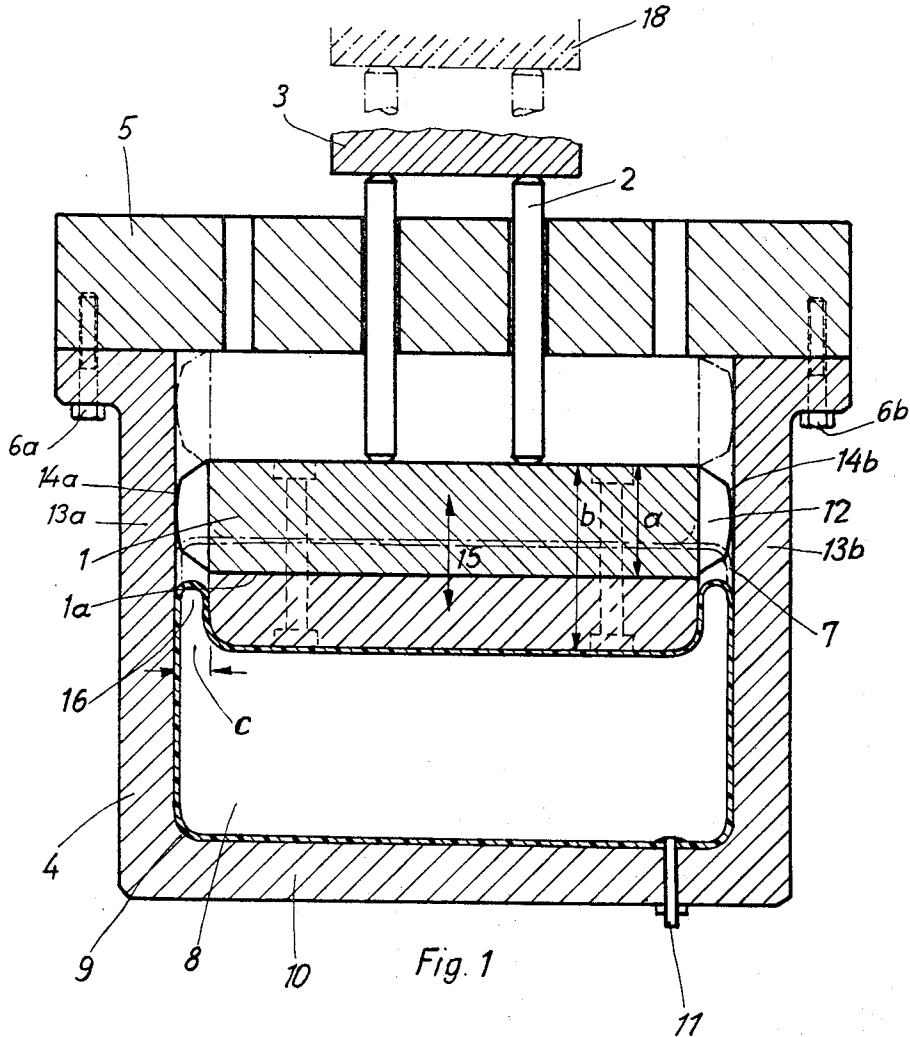


Fig. 1

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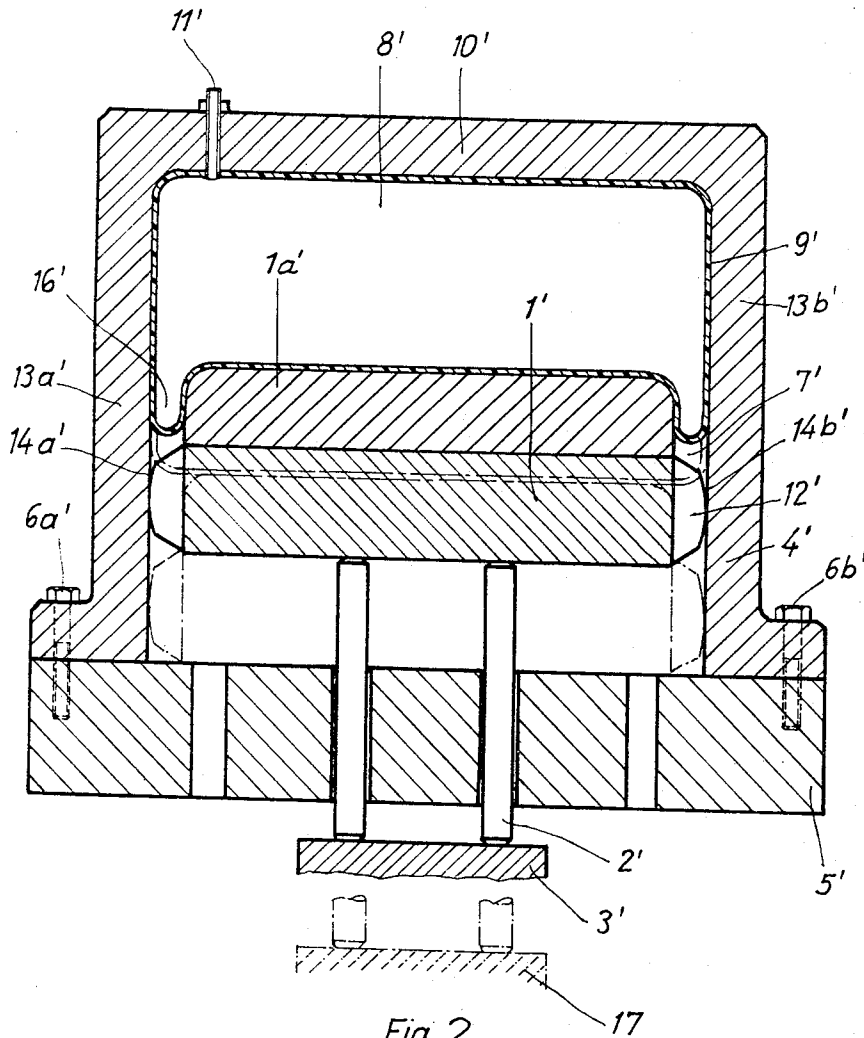


Fig. 2

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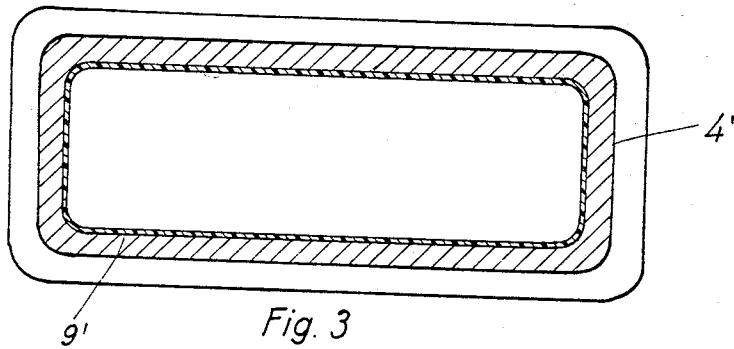


Fig. 3

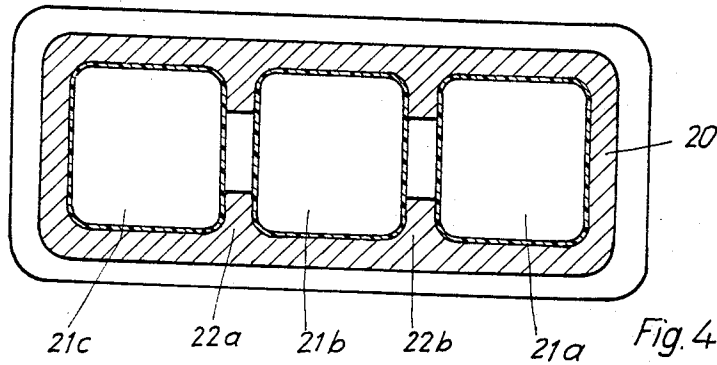


Fig. 4

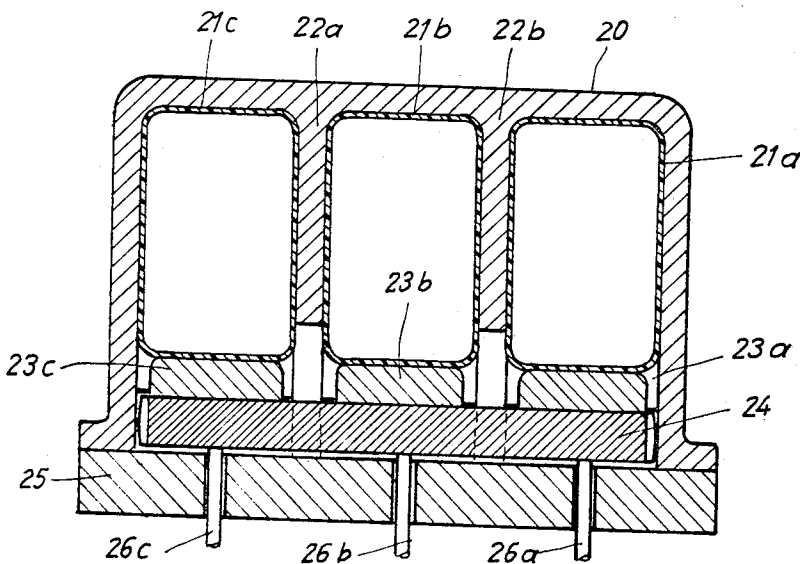


Fig. 5

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3,410,202
PRESS

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Continuation of application Ser. No. 481,272, Aug. 20, 1965. This application Aug. 21, 1967, Ser. No. 662,183
Claims priority, application Germany, Aug. 20, 1964, L 48,578
8 Claims. (Cl. 100—264)

ABSTRACT OF THE DISCLOSURE

In a press having press rams movable vertically towards and away from each other, the rams are formed as hollow parts in which pressure pad plates are movably mounted. A sack of resilient material filled with air under pressure is arranged between the pressure pad plate and one wall of the chamber. The sack engages a pressure transmitting member connected to the pressure pad plate which is spaced around its periphery from the inner wall of the hollow part so that the sack can enter the space between such wall and the pressure transmitting member.

This application is a continuation of Ser. No. 481,272 filed Aug. 20, 1965, and now abandoned.

The invention relates to a press and more particularly to a press wherein to the press ram and/or the under-part of the press a pressure medium chamber is associated from within which a pressure pad plate is influenced which is connected to the corresponding tool part by means of bolts or the like, said pressure medium chamber being accommodated within the press ram or the under-part of the press.

It is an object of the invention to provide a device of the general character described which is simple and inexpensive in manufacture.

Another object of the invention consists in to provide a device of the above said type wherein the volume of the parts of the press here in question required from the point of view of statics is used to its full extent so that it can be employed for the displacement of an air cushion.

Yet another object of the invention consists in to provide a press of the aforementioned kind with which, as compared with already known arrangements, further mechanical parts can be omitted because there are not required any longer several working cylinders.

It is a further object of the invention to provide a press of the character described with which a high pad pressure can be obtained even with small pressures in the pressure sack due to the fact that there is no dependence on the diameter of cylinders which must be arranged side by side, but now there are available rectangular surfaces.

These and other objects, features, and advantages of the present invention will become further apparent from the following detailed description thereof.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a sectional schematic side view of the under-part according to the invention of a new press,

FIG. 2 is a sectional schematic side view of a press ram according to the invention of a new press,

FIG. 3 is a schematic plan view on a reduced scale of the arrangement according to FIG. 2.

FIG. 4 is a schematic plan view of a modified embodiment of the invention, and

FIG. 5 is a partly sectional side elevation of the invention according to FIG. 4.

The press according to the invention comprises a press

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ram constructed as a hollow cylinder and adapted to carry on its underside a die and another hollow cylindric part, namely the under-part of the press opposite the said press ram and adapted to carry on its upper side a die complementary to the said die of the said press ram and serving to co-operate therewith. There are also provided drive means—for example, hydraulically or pneumatically operated cylinder-piston aggregates—for driving said ram or said under-part or both parts to perform a relative movement in vertical direction with respect to the other part, whereby for guiding said parts during their movement there are provided columns or standards or like vertically extending guide means. The pressure ram or the under-part or both parts contain also a pressure pad plate guided within the associated hollow part for up and down movement, said pressure pad plate acting yieldingly upon the respective die or work piece through the medium of movably guided bolts. There is also provided a pressure medium chamber accommodated within the associated hollow part.

In FIG. 1, to the under-part 4 of the press there is associated the press ram shown in FIGURE 2 situated above the said under-part and guided for vertical up-and-down movement as in usual presses by vertical columns or standards. For driving the press ram there are provided cylinder-piston-aggregates operated by pressurized fluid. The press ram shown in FIG. 2 is also vertically movable up and down by the action of a hydraulically or pneumatically operated cylinder-piston-aggregate, for example, by having the piston of this aggregate connected with the press ram. The under-part of the press is situated below the press ram and this latter is thereby moved towards the under-part and away therefrom.

In the arrangement according to FIG. 1, 1 designates the pressure pad plate which co-operates with the blank-holder 3 of a draw die by means of the bolts 2. The pressure pad plate is fixedly connected to the pressure transmitting member 1a, for instance, by screws. The under-part of the press is shown at 4, on top it is closed and covered by the plate 5 which is connected to the press by means of the screws 6a, 6b. As with already known comparable arrangements, the pressure pad plate is resiliently arranged in the hollow space 7 of the under-part of the press 4 in order to act resiliently and elastically on the tool parts chucked or clamped in the press, for example, when a work piece is held during the deformation stroke. The elastic and resilient guidance of the pressure pad plate is effected by providing a pressure medium chamber 8 from the interior of which the pressure pad plate is influenced. The purpose of the pressure pad contained within the chamber 8 and constituted by the pressure medium consists in to determine the elastic and resilient co-operation between the pressure pad plate and the chucked and clamped tool parts. With known comparable arrangements the pressure medium chamber is contained in a cylinder wherein a piston is guided and to which a pressure compensating chamber is associated or allotted. As with arrangements according to the invention, this pressure compensating chamber may be provided for simplicity's sake in the upper or lower part of the press itself.

According to the invention, with the new arrangement the pressure medium chamber is enclosed by a pressure sack 9 consisting of resiliently yielding elastic material, for instance, of artificial material, preferably of the artificial material known in the trade as "nylon," or of rubber, said pressure sack being accommodated within the hollow space 7 of the under-part of the press. This sack 9 constituting the pressure medium chamber can be filled with air or a non-inflammable gas or gas mixture or eventually even with a fluid, whereby the pressure medium is conveniently subjected to a pressure of maximally 7 to 8

atmospheres. In case a less compressible fluid is used, the pressure sack must be connected eventually with a supply container by means of a conduit controlled by valves and eventually containing also a pressure regulator by adding a pressure-generator, for instance, a pump, a pressure accumulator such as an air vessel or the like. The arrangement is thereby such that the pressure sack 9 containing the pressure medium chamber is completely and wholly accommodated within the hollow space 7 of the under-part of the press which contains also the pressure pad plate and the pressure transmitting member and serves for its guidance. This pressure sack 9 fills that part of the hollow space between the pressure pad plate 1 and the closure wall 10 of the hollow space. On the side opposite from the pressure pad plate 1 the pressure sack 8 is provided with a filling and/or a control device 11 which may be designed, for instance, like a valve. The pressure pad plate has a guide bead 12 along its periphery. This guide bead can be continuous and uninterrupted and thereby run around about the pressure pad plate along its periphery or it can be discontinuous and interrupted by being constituted of several sections lying along the periphery side by side or end to end. On its side facing the side walls 13a, 13b the guide bead is slightly rounded off as indicated at 14a, 14b so that the pressure pad plate can easily slide up and down according to arrow 15 within the hollow space. The guide bead has a height a which is about the half of the height b of the pressure pad plate and of the pressure transmitting member taken together. Moreover, there is provided such a distance c between the peripheral portion of the pressure pad plate carrying the guide bead and the walls of the hollow chamber serving to guide it that upon loading and exerting a force upon the pressure sack a bead-like projection 16 forms on the sack which serves to guide the pressure pad plate and which penetrates into the space between the pressure pad plate and the walls of the hollow chamber. The advanced position of the tool part or blank holder 3 is indicated in dotted lines at 18. Therefore, with the arrangement according to the invention, the hitherto used cylinders and pistons can be omitted. By this way the pressure pad plate needs absolutely no attendance or service since lubrication is no longer required in the case no more cylinders and pistons are required.

With the arrangement according to FIG. 2, the pressure sack 9' containing the pressure medium chamber 8' is accommodated within the hollow space 7' of the slide or the press ram 4' which contains the pressure pad plate 1' and the pressure transmitting member 1a', said plate acting on the upper part of the tool 3' through the bolts 2', the advanced position of the tool being shown at 17 in dotted lines. In this case, too, the pressure sack 9' is accommodated between the pressure pad plate 1' and the closure wall 10' of the press ram, the side walls 13a', 13b' of which are connected to the plate 5' by means of the screws 6a', 6b'. The pressure pad plate has also a bead 12' which may be continuous or discontinuous and may be rounded off in the manner already described (see 14a', 14b'), in order that the pressure pad plate can easily slide within the hollow space. The pressure sack 9' of the arrangement according to FIG. 2 is also provided with a filling and control device 11' designed, for instance, valve-like. The arrangement is such that in this case, too, the bead-like projection 16' forming on the sack upon loading of, and acting by pressure upon the pressure sack can penetrate between the pressure pad plate and the walls of the hollow chamber. Another important advantage of the invention can be realized particularly from FIG. 3, namely that the efficient area is considerably greater when using the pressure sack 9' than in known arrangements with cylinders so that even with small pressures a high pad pressure can be obtained.

The filling and/or control devices serve to connect the interior of the pressure sack to a pressure medium source.

These devices can be designed as valves, as already described.

If required in special cases, it is possible to accommodate several pressure sacks in adjacent and side by side arrangement within the hollow space of the press ram or of the under-part of the press, whereby each pressure sack contains a pressure medium chamber. So, for example, it is possible to provide three of these pressure sacks so as to bear against one another. This happens, for instance, when the tool is small with respect to the tool plate. Such an arrangement is shown, for instance, in FIGS. 4 and 5. In this case, three pressure sacks 21a, 21b, 21c are accommodated within the press ram 20, said sacks being arranged in the compartments constituted by the partition walls 22a, 22b. A pressure transmitting member 23a, 23b, 23c is associated to each pressure sack, the pressure pad plate 24, however, is common to all three pressure transmitting members. The tool plate is shown at 25; 26a, 26b, 26c are the bolts which act on the tool.

In case several adjacently arranged pressure sacks are provided in connection with a sole press, for instance, several pressure sacks each of which influences, respectively, a pressure pad plate associated to it only, or several pressure sacks acting on a common pressure pad plate (as shown in the arrangement according to FIGS. 4 and 5), it is possible to connect the pressure sacks separately to a source of pressure medium through the medium of a control organ designed, for example, as a multiple way valve or tap and to connect them, thereby, as required commonly, in groups, or individually to the said pressure medium source.

Although my invention has been illustrated and described with reference to the preferred embodiments thereof I wish to have it understood that it is in no way limited to the details of such embodiments, but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed my invention, what I claim is:

1. A press comprising in combination; a press ram part adapted to carry on one side a die; a cooperating part arranged opposite the said press ram part and adapted to carry on its side facing the press ram part a die complementary to the said die of said press ram part; one of said parts being constructed as a hollow cylindrical part; the said parts being arranged to perform relative movements towards, or away from, one another in vertical direction; guide means for guiding at least one of the parts for relative movement in vertical direction; a pressure pad plate guided within said hollow part for up and down movement; bolt means for movably connecting said pressure pad plate with one of said dies; a pressure medium chamber contained within said hollow part; a pressure sack of resiliently yielding elastic material enclosing said pressure medium chamber; said pressure sack being accommodated within a hollow space in said hollow part.

2. The press set forth in claim 1, in which the hollow part is the cooperating part.

3. The press set forth in claim 1, in which the pressure pad plate has a pressure transmitting member carried thereby.

4. The press set forth in claim 1, wherein a pressure transmitting member is carried by the pressure pad plate on the side of the pressure sack and a space is provided between the periphery of the pressure transmitting member and the wall of the hollow space whereby between the pressure transmitting member and the wall of the hollow space a bead-like projection formed on the pressure sack upon loading of the pressure sack can penetrate.

5. The press set forth in claim 1, wherein within the hollow space part there are accommodated a plurality of pressure sacks lying side by side and each containing a pressure medium chamber.

6. The press set forth in claim 5, wherein the pressure

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sacks are each accommodated in a compartment of the hollow part; with each pressure sack there being associated a pressure transmitting member; whereas with all the pressure sacks and pressure transmitting members a sole common pressure pad plate is associated.

7. The press set forth in claim 1, in which the bolts are slidably guided in one of the parts.

8. A press comprising in combination; a press ram part adapted to carry on one side a die; a cooperating part arranged opposite the said press ram part and adapted to carry on its side facing the press ram part a die complementary to the said die of said press ram part; one of said parts being constructed as a hollow cylindrical part; the said parts being arranged to perform relative movements towards, or away from, one another in vertical direction; guide means for guiding at least one of the parts for relative movement in vertical direction; a pressure pad plate guided within said hollow part for up and down movement; a pressure medium chamber contained within said hollow part; a pressure sack of resiliently yielding elastic material enclosing said pressure medium chamber;

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said pressure sack being accommodated within a hollow space in said hollow part; a pressure transmitting member carried by the pressure pad plate on the side of said pressure sack; a space being provided between the pressure transmitting member and the wall of the hollow space, whereby between the pressure transmitting member and the wall of the hollow space a bead-like projection formed on the pressure sack on loading of the pressure sack can penetrate.

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