

Dec. 29, 1970

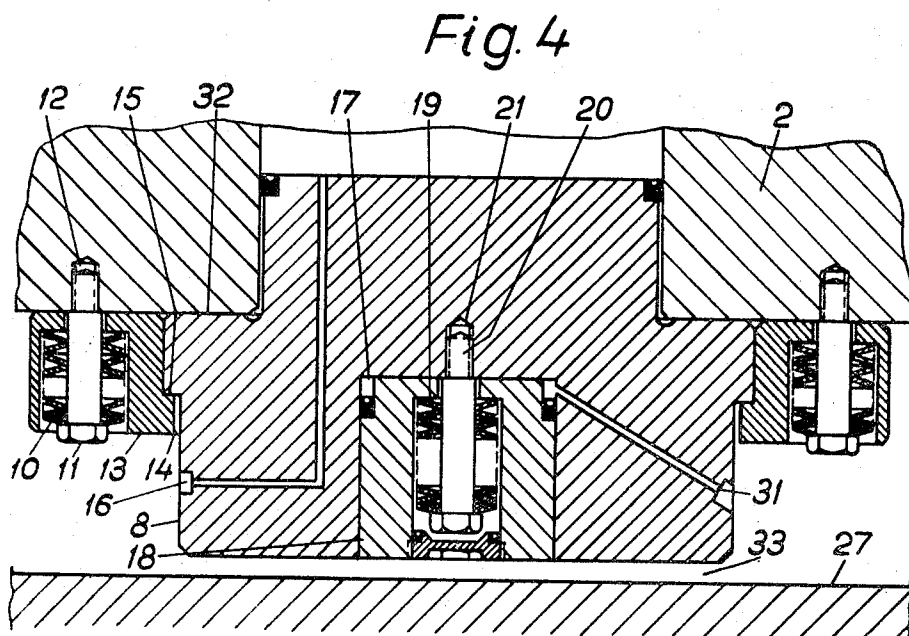
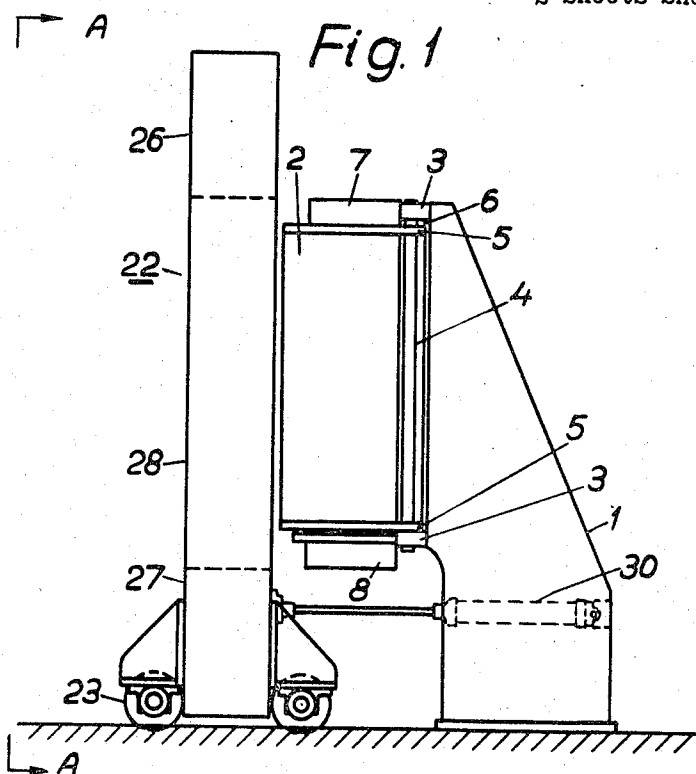
T. LANDA

3,550,199

PRESS FOR TREATING PRODUCTS UNDER HIGH PRESSURE

Filed Dec. 5, 1968

2 Sheets-Sheet 1



INVENTOR.
TORSTEIN LANDA

BY

J. Bailey

Dec. 29, 1970

T. LANDA

3,550,199

PRESS FOR TREATING PRODUCTS UNDER HIGH PRESSURE

Filed Dec. 5, 1968

2 Sheets-Sheet 2

Fig. 2

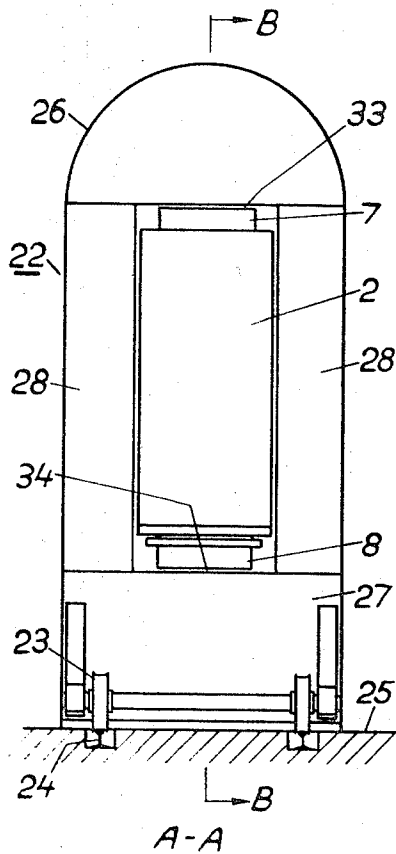
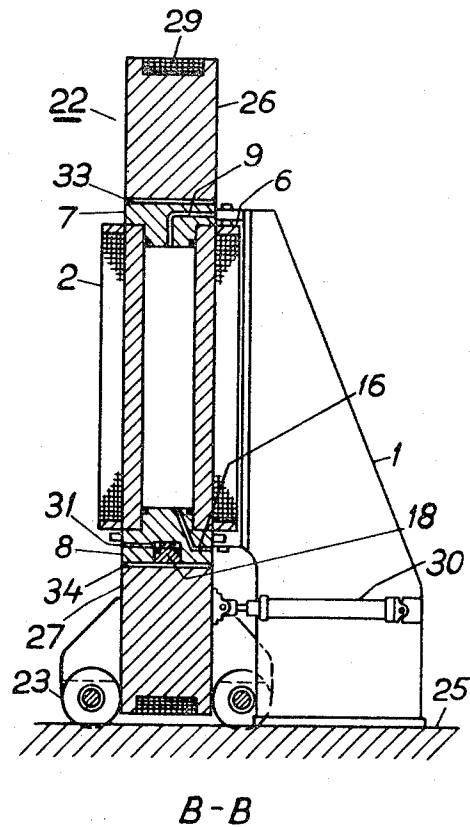


Fig. 3



INVENTOR.
TORSTEIN LANDA

BY

Jennings Bailey

1

2

3,550,199

PRESS FOR TREATING PRODUCTS UNDER HIGH PRESSURE

Torstein Landa, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden, a corporation of Sweden

Filed Dec. 5, 1968, Ser. No. 781,543

Claims priority, application Sweden, Dec. 11, 1967, 16,941/67

Int. Cl. B29c 3/00; B30b 11/00; B29g 1/00

U.S. Cl. 18—5

10 Claims

ABSTRACT OF THE DISCLOSURE

A press stand has upper and lower yokes between which a high pressure cylinder with removable end closures can be inserted when supported by a movable stand. The space between the yokes is slightly greater than the length of the cylinder when the end closures are fully inserted.

BACKGROUND OF THE INVENTION

(1) Field of the invention

The present invention relates to a press with a preferably vertically arranged high pressure chamber having a high pressure cylinder, end closures projecting into this cylinder and a press stand to take up the axial forces exerted on the end closures by a medium under high pressure. Presses of the type mentioned are used, among other things, for isostatic compression of powder bodies, resistance elements, and the like at pressures in the region of 1000–10,000 bar. The cylinder is supplied outside the press stand with components to be treated, and then inserted in the press stand and supplied with pressure medium. It is then removed after treatment and emptied outside the press stand.

(2) The prior art

With presses of this type the high pressure chamber with completely inserted closures must have a shorter length than the daylight opening of the press so that the clearance necessary for insertion and withdrawal of the chamber is obtained between the end closures and the press. When the pressure in the chamber is increased, the end closures are first forced out until they come into contact with support surfaces in the press stand and then move only as far as the support surface yields under the load. Due to the friction between closures and cylinder the pressure chamber is still held between the support surfaces of the press stand with a considerable force even when the pressure is removed. This complicates removal of the pressure chamber. The end closures must therefore be returned to their innermost positions in the cylinder so that the clearance between the end closures and support surfaces which is suitable for handling is again obtained.

SUMMARY OF THE INVENTION

With presses used hitherto this return necessary for removal from the press stand has caused considerable problems. However, these are eliminated by means of the invention in a manner which enables rapid return and thus shortens the time required for operating a cycle. The invention makes it possible at low cost to increase considerably the production in extremely expensive production equipment.

According to the invention, the pressure chamber is axially displaceably suspended and at least one operating cylinder having an operating piston is placed below the high pressure cylinder. This operating piston lifts the lower

end closure and the high pressure cylinder in relation to the press stand when the operating cylinder is supplied with pressure medium so that the end closures are returned to their innermost positions in the cylinder. The lower end closure is resiliently suspended in the cylinder and is suitably supported by a number of spring units suspended in the lower end surface of the cylinder. In one embodiment the spring units are completely or partly inset in a ring which supports the end closures. The spring units are usually made up of a number of plate springs. The operating cylinder may consist of a cylindrical bore in the end closure. The piston in the operating cylinder may be supported by spring units suspended in the end closure and may even comprise return springs for the return of the piston. This spring unit is also made up of plate springs. In one embodiment the high pressure cylinder is provided with lugs at its ends, in which are bushings or other guide means which can slide along a guide on a stand. The invention is extremely useful for press means of the type containing a cylinder suspended on a stationary press stand and a press stand arranged movably on a track so that it can be moved between an operating position in which the centre lines of the press stand and the cylinder substantially coincide and a position in which the cylinder is completely outside the press stand.

BRIEF DESCRIPTION OF THE DRAWINGS

With the help of the accompanying drawings the press means according to the invention is now described more fully. FIG. 1 shows a side view of a high pressure chamber supported by a stationary stand and a movable press stand in a position right outside the high pressure cylinder. FIG. 2 shows an end view and FIG. 3 a section taken along B—B according to FIG. 2 and in a position of the press stand when the high pressure chamber is in the opening of the press stand. FIG. 4 shows a section through the lower part of the cylinder and the lower end closure.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the drawings 1 designates a stand supporting a high pressure cylinder 2. On the stand are two lugs 3 in which rods 4 are inserted. The cylinder 2 is provided with two lugs 5 having journalling surfaces fitting the rods 4. The distance between the outer surfaces of the lugs 5 is less than the distance between the inner surfaces of the lugs 3. This means that the cylinder is axially displaceable the same distance as the difference in distance between said surfaces. The cylinder normally rests on the lower lug 3 so that a gap 6 is formed between the upper lugs 3 and 5. The cylinder 2 is sealed by an upper end closure 7 and a lower end closure 8 which projects a certain distance into the cylinder. The upper end closure is provided with a ventilation channel 9. The lower end closure is resiliently suspended in the cylinder 2 by means of a number of spring units 10, each constructed of a number of plate springs, bolts 11 which are screwed into threaded holes 12 in the lower flange or end surface of the cylinder 2, and a support ring 13 having a flange 14 abutting a flange 15 on the lower end closure 8. Through the channel 16 in the end closure the cylinder is in communication with a pressure medium source not shown in the figures. The prestressing of the spring units should at least correspond to the weight of the end closure plus the weight of the hydraulic medium and other contents of the cylinder when this is not under pressure. There is also a bore 17 in the end closure, in which is arranged an operating piston 18 with a return spring 19 consisting of a number of plate springs. The return spring is attached in the end closure by a bolt 20 which is screwed into the threaded hole 21. Pressure medium to operate the piston 18 is supplied through the channel 31. The press means comprises a displaceable press stand 22 supported by the wheels 23 run-

ning on rails 24 set into the floor 25. The press stand is of the type consisting of an upper yoke 26, a lower yoke 27, a pair of spacers 28 held together by a prestressed tape sheath 29. The press stand is displaced between the positions shown in FIGS. 1 and 3 by means of an operating cylinder 30. The opening of the press is somewhat higher than the distance between the end surfaces of the end closures when completely inserted. The cylinder is fixed at such a height that the clearances 33 and 34 between the yoke of the press stand and the end closures of the cylinder are approximately equal.

The press operates in the following manner: The cylinder 2 is supplied with material, upper end closures are inserted and the press stand is displaced from the position shown in FIG. 1 to that shown in FIG. 3. The cylinder is filled with pressure medium through the channel 16 and emptied through the channel 9 and a valve means, not shown. When the cylinder is filled the valve is closed and the pressure increased to the desired level. The end closures 7 and 8 are thus pressed outwards towards the yokes 26 and 27 which take up the pressure forces operating on the end closures. When the pressure is increased the stand is deformed so that the end closures are displaced even further outwards. When the pressure is removed the stand returns to its original height and the end closures are returned a short distance into the cylinder. The friction between seals and cylinder is, however, so great that considerable force is required to push in the end closures so that even after complete removal of pressure the yokes engage the end closures with a considerable force which makes removal of the press stand to the position shown in FIG. 1 more difficult or impossible. The clearance between the end closures and the yokes must therefore be re-established before the press stand is moved. This is effected with the help of the operating piston 18 built in to the lower end closure. When pressure medium is supplied through the channel 31 to the bore 17 in the lower end closure 8 the piston is pressed against the lower yoke 27 and thus first lifts the lower end closure until it has reached its innermost position, that is until its stop 32 comes into contact with the end surface of the cylinder 2. Upon continued supply of pressure medium, the piston 18 simultaneously lifts the lower end closure 8 and the cylinder so that the upper end closure 7 which is in contact with the upper yoke 26 is pressed into the cylinder until it reaches its innermost position. The supply of pressure medium is then stopped and the bore 17 is placed through the channel 31 in communication with the collecting tank for pressure medium. The spring unit 19 returns the piston 18 to the position shown in FIG. 4 in relation to the lower end closure. During the first part of the return movement the whole cylinder moves downwards until the movement is stopped by the lower lug 5 on the cylinder meeting the lower lug 3 in the press stand. When the piston has been completely returned to its inner position there are again gaps 33 and 34 between the yokes and the end closures. The press stand can now be returned to the position shown in FIG. 1, the upper end closures are removed, the components taken out of the cylinder, after which this can be supplied with fresh material and the operating cycle is repeated.

The invention is not limited to the embodiment shown. Several variations and modifications are feasible within the scope of the following claims. The operating cylinder for pressing in the end closures may, for example, be placed in the lower yoke of the press stand,

I claim:

1. Press for treating products under high pressure, comprising a high pressure chamber comprising a vertical high pressure cylinder having end closures projecting into the cylinder, a press stand having a daylight opening somewhat larger than the length of the high pressure chamber when the end closures are fully inserted, which stand surrounds the high pressure chamber during the compression operation and takes up the axial forces which a pressure medium in the pressure chamber exerts on the end closures, and means for supporting the pressure chamber in a position in which gaps are formed between the press stand and the end closures of the chamber when these end closures are inserted to their innermost positions in the cylinder, in which said supporting means includes means allowing the high pressure cylinder to be axially displaced and the press comprises at least one operating cylinder located under the high pressure cylinder and having an operating piston which lifts the lower end closure and the high pressure cylinder in relation to the press stand when pressure medium is supplied to the operating cylinder, so that the end closures regain their innermost positions.

2. Press according to claim 1, in which the operating cylinder and its operating piston are arranged inside the lower end closure.

3. Pressure means according to claim 2, in which the piston is supported by a spring unit suspended in the end closures.

4. Pressure means according to claim 3, in which the spring unit includes a return spring.

5. Pressure means according to claim 3, in which the spring unit is built up of plate springs.

6. Pressure means according to claim 1, in which said supporting means comprises lugs at the ends of the cylinder vertically displaceable along a guide means on a movable stand.

7. Pressure means according to claim 1, in which the lower end closure is resiliently suspended in the cylinder.

8. Pressure means according to claim 7, in which the end closure is supported by a number of spring units which are suspended in the lower end surface of the cylinder.

9. Pressure means according to claim 8, in which the spring units are at least partially inset in a ring which supports the end closures.

10. Pressure means according to claim 7, in which the spring units are built up of plate springs.

References Cited

UNITED STATES PATENTS

2,115,246	4/1938	Bainbridge	18—16(M)
2,125,068	7/1938	Dempsey	18 High pressure digest
2,519,770	8/1950	Kramer	18 High pressure digest
2,544,414	3/1951	Bridgman et al.	18—17(M)
3,103,698	9/1963	Wollett	18—5(M)
3,123,862	3/1964	Leveg, Jr.	18—16(M)
3,460,202	8/1969	Graf et al.	18—16(M)
3,481,000	12/1969	Barfuss	18—16(F)

J. SPENCER OVERHOLSER, Primary Examiner

R. L. SPICER, Assistant Examiner

U.S. Cl. X.R.

100—269; 18—16