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T. LANDA ET AL

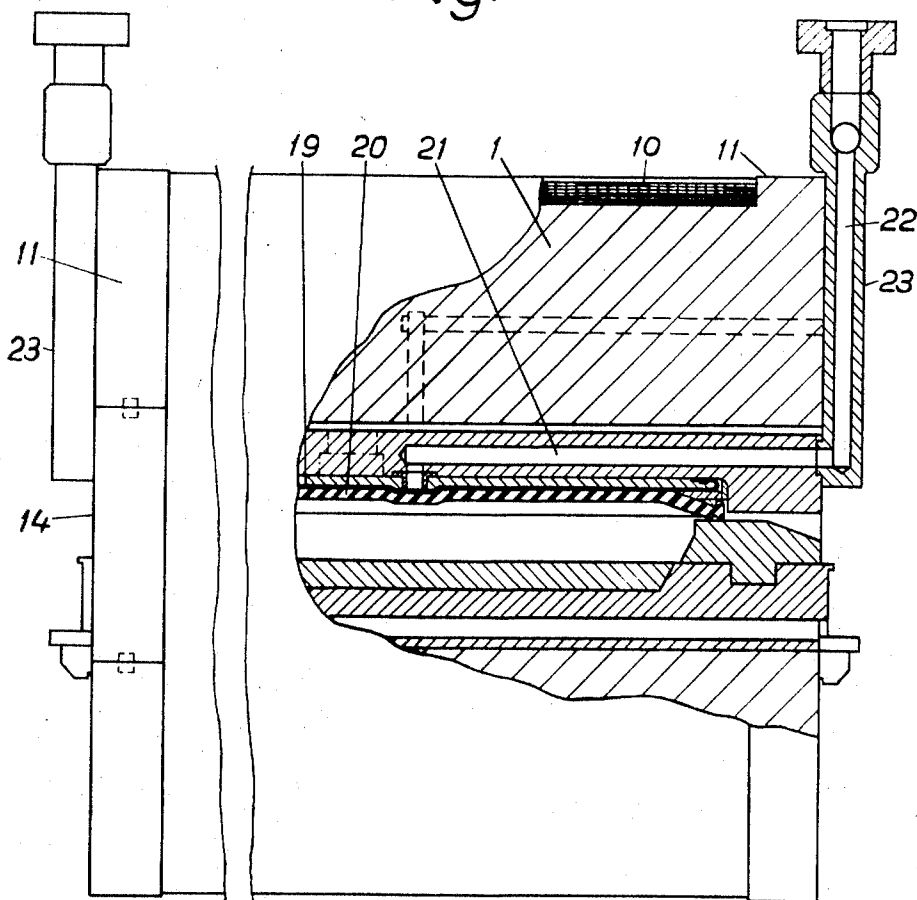
3,527,076

PRESS STAND

Filed April 8, 1968

3 Sheets-Sheet 1

Fig. 1



INVENTOR
TORSTEIN LANDA
STIG JOHNSON

BY

Jennings Bailey

Sept. 8, 1970

T. LANDA ET AL

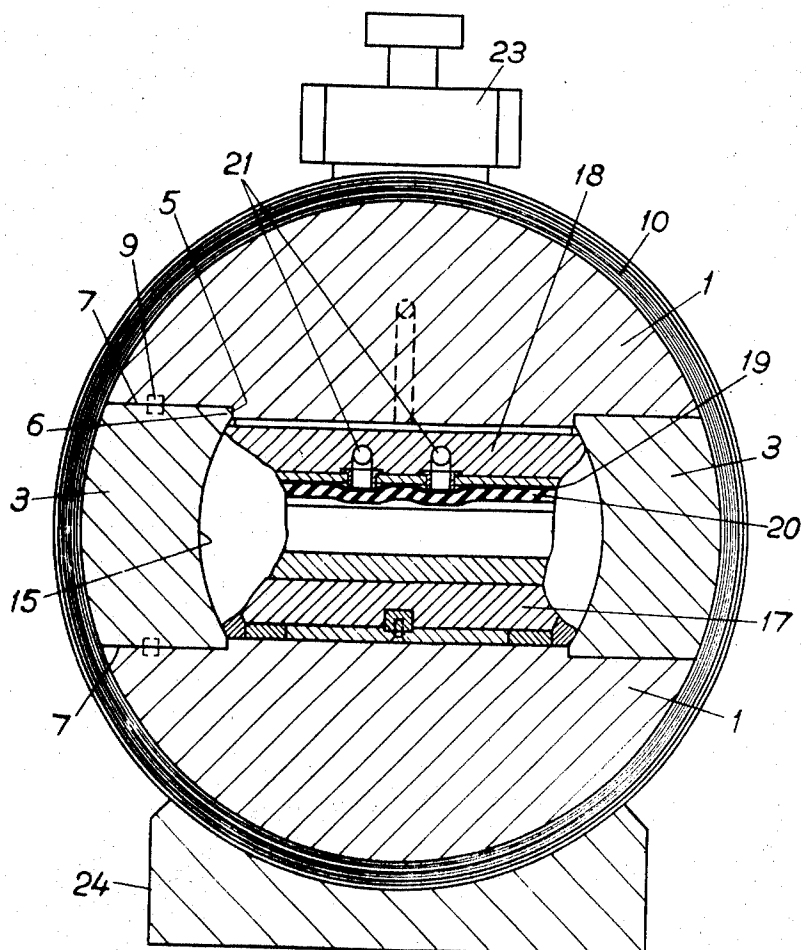
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Fig. 2



INVENTOR.
TORSTEIN LANDA
STIG JOHNSON

BY

James B. Bailey, Jr.

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PRESS STAND

Torstein Landa and Stig Johnsson, Vasteras, Sweden, assignors to Allmänna Svenska Elektriska Aktiebolaget, Vasteras, Sweden, a corporation of Sweden
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8 Claims

ABSTRACT OF THE DISCLOSURE

A press stand having an internal chamber for receiving a forming block and a rubber sheet above the forming block adapted to be pressed against it by hydraulic pressure. The enclosing frame for the press stand is composed of two yokes and two spacers between the yokes. The spacers and yokes both have convexly curved external surfaces upon which are wound a pre-stressed metal wire or strip.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates to a press stand with a very large working surface, particularly for forming very long objects from sheet metal by means of a diaphragm influenced by a pressure medium, which presses the metal against a form block to give the metal the desired shape. Press stands of this type are often used in the aviation industry to shape aeroplane parts.

The prior art

Conventional press stands for this purpose consists of an extremely thick-walled tube or several concentric tubes with relatively small thickness. In the latter case bent pieces of sheet metal have been placed on a previously prepared tube and welded together to form a tube surrounding it.

It has been extremely difficult to obtain satisfactory abutment between the tubes and to provide the outer tubes with such pre-stressing that the material is economically used. Two segments of a cylinder have normally been applied in the tubes so that a working space is obtained with two parallel working surfaces. A tool with a rubber bag is arranged in the operating space. The tool and working piece are usually placed on a trolley which can be pushed into the operating space.

The transmission of force from the circular segments to the surrounding tube is often unfavourable so that stress concentrations arise in the walls which has led to metal fatigue after an impermissibly low number of pressing operations.

SUMMARY OF THE INVENTION

The press stand according to the invention is constructed of two yokes and at least two spacers which keep these yokes at a certain distance from each other so that these elements form the operating space of the press and provide a frame around which a sheath of wire or narrow steel strip can be wound under pre-stress to absorb the pressure forces. The press stand is characterised in that the surfaces of both the yokes and the spacers are at least partly curved. As a rule it is suitable for the yokes and spacers to have the same and constant radius of curvature so that together they form a cylinder. Usually the operating space has a substantially rectangular cross section perpendicular to the longitudinal axis of the press stand.

The yokes are provided with longitudinal guides which

position the spacers in relation to these yokes. The guides also substantially absorb the inwardly directed forces with which the pre-stressed strip sheath influences the spacers due to the fact that they have outwardly curved surfaces. The spacers are normally made longer than the distance between the yokes and stops are arranged in the yoke material itself. However, guides having some other design are also feasible. From the manufacturing point of view it is simplest to provide the spacers with parallel surfaces, but in certain cases it may be suitable from the pressure point of view to have oblique abutment surfaces so that the spacers are substantially wedge-shaped in such a way that the point of the wedge lies on the inside of the spacer somewhere past the centre line of the press stand. The spacer is thus narrowest nearest the operating space. Usually the yoke guides are so positioned and the spacers so shaped that the inner corners of the spacers abut the guides.

In very long press stands it may be suitable both from the manufacturing and the transportation points of view to assemble the press stand from two or more parts at the place where it is to be used.

According to the invention a press stand is obtained in which the pressure forces are absorbed in an extremely advantageous manner. Furthermore, welding is avoided which lowers the strength of the sheath. The stress concentration in the inner part of the load-absorbing sheath can simply be eliminated if the wire or tape in the various layers of the sheath is given suitable tension when it is wound on. If the pre-stressing is chosen so that the tension in all the layers of the sheath is approximately equal when the press is subjected to full load, the construction material will be particularly effectively used. It is also possible to use material with greater strength in wire or tape sheaths than can be used in sheaths constructed from sheet metal or tubes. By means of the invention, therefore, it is possible for press stands having working surfaces of a certain size and a certain pressure to be made smaller than previously and also to manufacture press stands much larger and having greater pressure than was previously thought feasible. When, contrary to known presses having wire-wound sheaths, the spacers are shaped with outwardly curved surfaces, the press stand can absorb forces in two planes perpendicular to each other, which involves considerable advantages for presses of the type in question. Furthermore, the circular shape has great advantages during the manufacture, particular with the great lengths of the press stand which are usual for presses of this type.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is described in more detail with reference to the accompanying drawings. FIG. 1 shows partly in side view and partly a longitudinal section of the press stand. FIG. 2 shows a section through a press stand with circular cross section. FIG. 3 shows an end view of an embodiment having different external radii of curvature for the yokes and the spacers.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the drawings 1 and 2 designate yokes and 3 and 4 spacers. The yokes are designed with stops 5 and the spacers with guide surfaces 6 at their inner corners to fit these stops. The spacers 3 have parallel limiting surfaces 7 while the spacers 4 have oblique limiting surfaces 8 so that the spacers are wedge-shaped. 9 are guide pins which position yokes and spacers in relation to each other, especially during machining of the external surfaces onto which the tape sheath 10 is wound. The steel strip is wound on under tension which, with thick sheaths usually varies from layer to layer. Both the yokes and

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4

spacers are provided with flanges 11, 12 and 13, 14, respectively. The press stand according to FIG. 2 has a circular cross section while the press stand according to FIG. 3 has an oval cross section. The yoke 2 has an external radius R_1 , while the spacers have an external radius $R_2 > R_1$. The spacers 3 have a curved internal surface 15 while the spacers 4 have a flat internal surface 16.

Working pieces to be moulded are placed on form blocks on a carriage 17 which can be inserted into the operating space. In the upper part of the operating space is a holder 18 in which is attached a diaphragm with a sealing layer 19 and an elastomeric pad 20. The pressure medium which influences the diaphragm when forming the sheet metal placed on form blocks on the carriage 17 is introduced into a space above the diaphragm through channels 21 in the holder 18 and the channels 21 in the connection piece 23. The press stand rests on a base 24.

The invention is not limited to the embodiments shown in the drawings. The press stand may, for example, have an elliptical shape. If it is to absorb forces directed in two planes perpendicular to each other, it may be suitable to choose a shape designed to take up the forces in the different planes so that the forces are absorbed in the most favourable manner. If extremely long operating space is required a press stand is assembled from a number of press units as shown in the drawing, which are put together in a suitable manner. Oil need not be supplied through channels in the holder 18. In certain cases it may instead be suitable to provide oil channels in the upper yoke.

We claim:

1. Press stand comprising two yokes and at least two spacers between the yokes defining therewith an operating space and a pre-stressed sheath of elongated metallic material surrounding the yokes and spacers and engaging

outer surfaces thereof, characterized in that the said outer surfaces of both the yokes and the spacers are at least partly convexly curved.

2. Press stand according to claim 1, characterized in that the outer surfaces of the yokes and spacers together form a cylinder.

3. Press stand according to claim 1, characterized in that the operating space has a substantially rectangular cross section in a plane perpendicular to the longitudinal axis of the press.

4. Press stand according to claim 1, characterized in that the yokes are provided with longitudinal guides which hold the spacers in position.

5. Press stand according to claim 1, characterized in that the spacers in a plane perpendicular to the yokes have greater extension than the distance between the yokes.

6. Press stand according to claim 5, characterized in that the surfaces of the spacers abutting the yokes are parallel.

7. Press stand according to claim 5, characterized in that the spacers have a truncated wedge shape and are shortest nearest the operating space.

8. Press stand according to claim 1, characterized in that the inner corners of the spacers abut stops in the yokes.

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RICHARD J. HERBST, Primary Examiner