

[54] **PRESS WITH A PRE-STRESSED PRESS STAND**

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[51] Int. Cl..... **B21j 13/04**

[58] Field of Search 72/455, 453; 100/214, 295

[56] **References Cited**

UNITED STATES PATENTS

3,527,076	9/1970	Landa	72/63
3,064,558	11/1962	Von Platen	100/214
3,687,066	8/1972	Von Platen	100/214

3,717,024	2/1973	Davison	100/214
2,905,032	9/1959	Fuchs	100/295

FOREIGN PATENTS OR APPLICATIONS

949,813	2/1964	Great Britain	100/214
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Primary Examiner—Charles W. Lanham

Assistant Examiner—Gene P. Crosby

[57]

ABSTRACT

A press for containing forming blocks and pressure cells between which a sheet metal member is subjected to forming pressure includes upper and lower yoke members and spacers held together by a pre-stressed sheath with compression plates arranged next to the yokes to form the operating space between them. The ends of the faces of the compression plates facing the yokes are bevelled so that the pressure exerted on the portions of the yokes adjacent the ends of the compression plates is reduced or completely eliminated.

2 Claims, 3 Drawing Figures

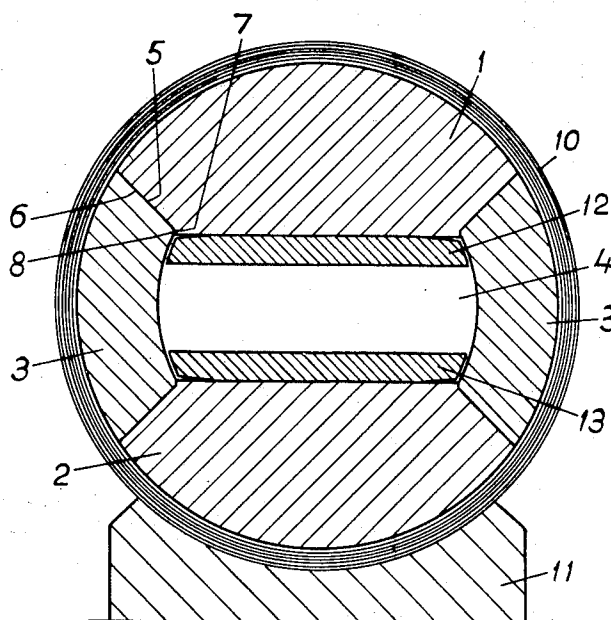


Fig. 1

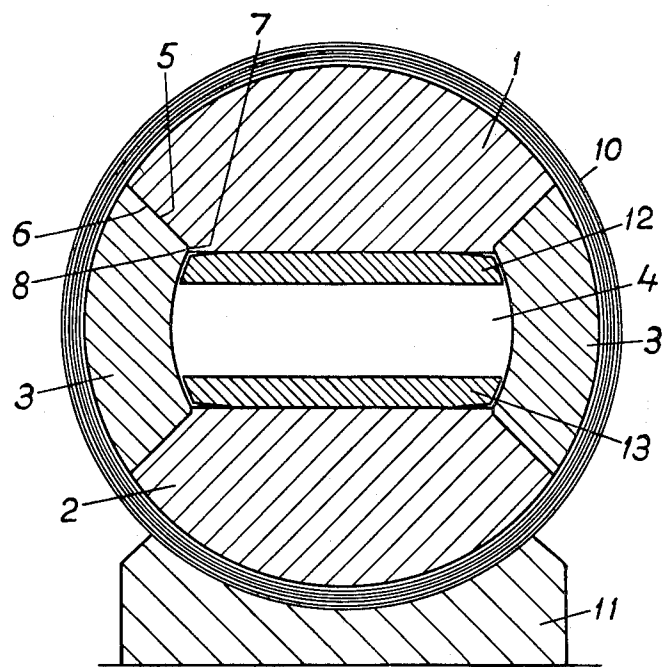


Fig. 2

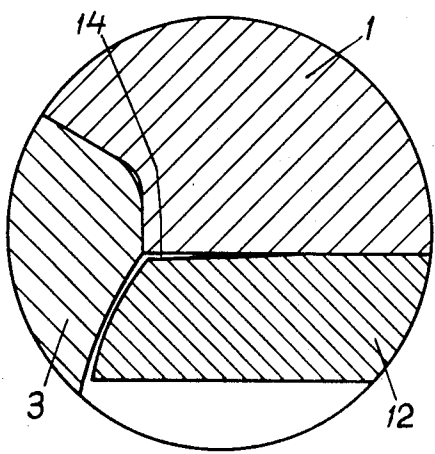
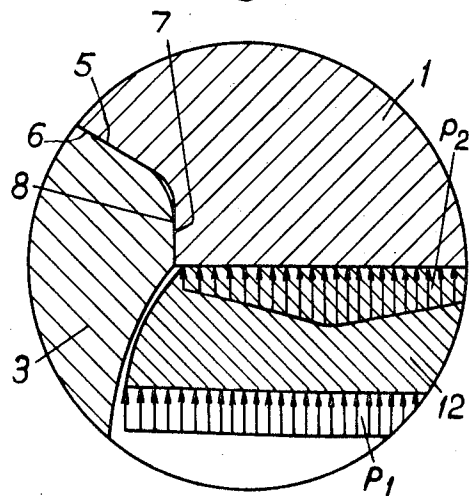


Fig. 3



PRESS WITH A PRE-STRESSED PRESS STAND

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a press with a press stand composed of two yokes and pillars or spacers arranged between said yokes and a sheath of prestressed wire or strip material absorbing the pressure forces. It relates especially to presses with a tubular press stand of the kind more closely described in U.S. Pat. No. 3,527,076, and which is especially intended for forming large sheet-metal parts in the aviation industry. The forming in this press is achieved by pressing a disc of elastic material with great force against a sheet-metal member lying on a forming block by means of an expandible pressure cell and a pressure medium. The press is often very large, having operating spaces with a length of 5,000 mm, a width of 1,500 mm and a height of 700 mm.

2. The Prior Art

The operating space is formed of the yokes and the intermediary spacers. One or more forming blocks are arranged on a lower steel plate which can be pushed into the operating space, and the forming elastic disc and pressure generating means are suspended in an upper steel plate which is suspended in the operating space immediately below the upper yoke.

The yokes and the spacers are formed as a rule with substantially radially directed abutment surfaces. In addition to this, they are provided with generally vertical guide surfaces nearest the corners of the operating space, said guide surfaces positioning the yokes and spacers exactly in relation to each other. The part of the yokes and, to a certain extent, of the spacers situated nearest the corners of the operating space is most critical from the strength point of view. The stresses are unfavourable especially at the transition between the radial contact surfaces of the yokes and the vertical guide surfaces. At each working cycle the pressure force causes a stress variation with great stress amplitude which gradually gives rise to fatigue failure.

SUMMARY OF THE INVENTION

The object of the invention is to reduce the stress amplitude and in this way increase the fatigue strength in the press. It has been found that the number of working cycles can be considerably increased before fatigue failure by means of the invention. Examinations show that the number can increase between 3 and 10 times.

According to the invention the inner surfaces of the yokes or the sides of said steel plates which are facing the yokes are formed with a bevel nearest the sides of the operating space so that abutment between yokes and plates is not obtained at all or is not obtained until the evenly spread load acting on the plates has deformed the plates nearest the sides of the operating space. In this way, the surfaces of the yokes will be unloaded nearest the side walls of the operating space or less specific compressive load will be obtained on these surfaces than on the rest of the surfaces and less stress is this obtained in the corner parts of the yokes. The reduction of the stress amplitude is especially valuable since it is the reduction of this stress amplitude that increases the fatigue strength.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be further described with reference to the accompanying figures.

FIG. 1 shows a section through a press.

FIG. 2 shows the corner part of the operating space of FIG. 1 on a larger scale.

FIG. 3 shows the pressure distribution on the surface of the yoke when the load is even against a pressure distributing disc or plate and the surface of the yoke.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the figures, 1 and 2 designate an upper and a lower yoke and 3 are spacers which keep the yokes at a fixed distance from each other and which together with these spaces form a substantially rectangular operating space 4. The yokes and the spacers are made with substantially radially directed abutment surfaces 5 and 6 and with vertical guide surfaces 7 and 8 to position the yokes and the spacers exactly in relation to each other. The yokes 1 and 2 and the spacers 3 are kept together by a sheath 10 of prestressed strip material. This sheath 10 also absorbs the pressure forces. By suitably choosing the inclination of the surfaces 5 and 6, an inwardly directed force can be obtained which results in an abutment force between the guide surfaces 7 and 8 and thus achieves the exact positioning between the yokes and the spacers. The whole press stand rests on a base 11. In the press is an upper compression plate 12 and a lower compression plate 13 which transmit pressure forces from units, not shown. In presses of this kind, forming blocks are used which rest on the lower compression plate 13. This plate with tools and workpieces may be capable of being pushed into the operating space, or tools and workpieces may be supported by a unit which can be pushed into the operating space and which rests on the plate 13 during the pressing. As pressure generating means a pressure cell attached in the compression plate 12 may be used, said pressure cell having a diaphragm or a bag-shaped container and a thick disc of elastic material transmitting the pressure force to the workpiece and pressing it against the forming block in such a way that it adopts the shape of the block. The pressure force will be substantially evenly distributed against the compression plates 12 and 13. The specific pressure force P_1 will be evenly distributed, as shown in FIG. 3. The compression plates 12 and 13 are formed with a bevel 14 at their sides facing the spacers 3, and in the example shown said bevel successively diminishes evenly from the side. However, the bevel may have another shape or the yokes may be provided with a corresponding bevel and the sides of the compression plates, facing the yokes be completely plane. Because of the stiffness of the compression plates the parts of the yokes located nearest the spacers will then become unloaded. The specific pressure force P_2 acting against the yokes 1 and 2 is varied along the width of the yokes, as shown in FIG. 3. The P_2 -variation along the width of the yoke is dependent on the shape and width of the bevel 14 and the thickness of the compression plates.

I claim:

1. Press comprising a tubular press stand with a substantially circular cross-section, said press stand containing upper and lower yoke members and two spacers which together form the sides of an operating space

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having a substantially rectangular cross section, a sheath of prestressed wire or strip material surrounding the yokes and the spacers to keep them together and to absorb pressure forces, an upper compression plate member for supporting power generating press means 5 and a compression plate member for supporting forming blocks and workpieces, the surface of some of the members at the areas of abutment between the yoke members and the supporting members abutting the yokes being bevelled nearest the sides of the operating 10

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space, whereby the surfaces of the yoke members are at least less loaded nearest the sides of the operating space than elsewhere, the size of the bevel decreasing successively away from the side of the compression plate.

2. Press according to claim 1, in which the width of the bevel is about 10 percent of the width of the compression plate.

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