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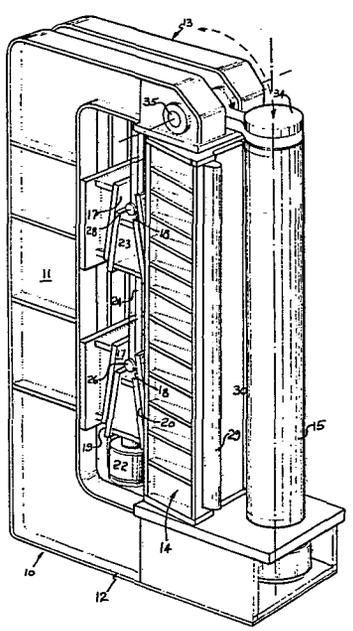
(54) Vertical press.

(57) A vertical press having a main frame (10) of generally C-shaped configuration with a vertical main part (11) and two vertically spaced horizontal arms (12, 13) a mandrel (15) extending between the two arms (12, 13) so as to be supported thereby, a movable member (14) located between the main part (11) and the mandrel (15), and a wedge arrangement (17–24) to move the movable member (14) toward the mandrel (15) in a pressing action.



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"VERTICAL PRESS"

The present invention relates to presses and more particularly but not exclusively to vertical presses to deform metal sheet.

These are illustrated in U.S. Patents No's. 509,265; 936,481; 2,095,331; 1,422,779 and 2,685,322. These presses are unduly complex and do not lend themselves to the easy manufacture of curved metal sheet.

It is an object of the present invention to overcome or substantially ameliorate the above disadvantages.

There is disclosed herein a vertical press comprising a frame of generally C-shaped configuration, having a vertically extending main part and two vertically spaced generally horizontally extending arms; a vertical mandrel supported by and extending between the two arms and spaced from said main part; a movable member extending between said arms and located between said main part and said mandrel, said member being movably supported by said arms so as to be horizontally movable toward said mandrel, and means to move said member in a pressing action toward said mandrel, said means including at least two opposing reaction surfaces, one fixed to said main part, and one to said movable member, and a movable wedge located between said surfaces and adapted to operatively engage same to cause movement thereof upon movement of said wedge to thereby cause said movable member to move toward said mandrel in a pressing action.

A preferred form of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

Figure 1 is a schematic perspective view of a vertical press;

Figure 2A is a schematic side elevation of the top portion of the press of Figure 1;

Figure 2B is a schematic side elevation of the bottom portion of the press of Figure 1; and

Figure 3 is a schematic plan view of a sheet being deformed in the press of Figure 1.

The press depicted includes a main frame 10 of generally C-shaped configuration having a main portion 11

which extends generally vertically and two transverse arms 12 and 13, which extend outwardly from the main portion 11. The arms 12 and 13 provide supports for a movable member 14 which is slidably guided by the transverse arms 12 and 13. Fixed to the extremities of the arms 12 and 13 is a stationary mandrel 15 rotatably supported by the arms 12 and 13 so as to be rotatable about its longitudinal axis by means of a pump and hydraulic motor of which the motor is designated by the numeral 16. Located between the main frame portion 11 and the movable member 14 is an arrangement to move the movable member 14 toward the mandrel 15. This arrangement includes opposing cam faces 17 and 18 which are slidably engaged by faces 19 and 20 of wedges 21 and 23. The wedge 21 is driven upwardly by hydraulic rams 22 while the wedge 23 is moved upwardly by connecting member 24, which extends between the wedges 21 and 23. The hydraulic rams 22 are connected to the wedge 21 by means of a pivotable joint 25 while the member 24 abuts the wedges 21 and 23 by pivotable joints 26. To retract the movable member 14 there is provided hydraulic rams 27 which abut the wedge 23 also by a pivotable joint 28.

Attached to the leading face of the movable member 14 is a former 29 which is adapted to engage a sheet of metal located in the space 30 defined between the former 29 and mandrel 15. The former 29 in combination with the mandrel 15 determines the shape into which the metal sheet will be deformed. For example, if the mandrel 15 is of constant circular cross-section and the former of uniform cross-section then the metal will be deformed so as to form a cylinder. This can be best seen from Figure 3 wherein the mandrel 15 is depicted of a circular cross-section and the former 29 of U-shaped cross-section having leading lugs 31 and 32 depress the metal sheet 33 against the mandrel 15. There could be additionally provided means to retain the sheet 33 against the mandrel 15 when the former 29 is retracted as the mandrel 15 is rotated to locate a further portion of the sheet 33 in a position to be deformed. The member 27 is retracted by a ram not depicted. This not depicted ram is coupled to the hydraulic circuit by an

accumulator.

Preferably, the press is provided with a hydraulic control means which incrementally rotates the mandrel 15 in synchronism with the reciprocating motion of the movable member 14. It should be appreciated that the hydraulic controls could be replaced with electronic controls.

It should further be appreciated that the shape of the mandrel 15 and former 29 may be altered to form objects of different shapes rather than a cylinder, for example conical shapes, and angled shapes such as squares and rectangles.

The above described embodiment may be altered to eliminate the need for rams 27 by having rams 22 double acting. To aid in the replacement of the mandrel 15 the support 34 is pivotally attached to arm 13 by means of pin 35.

Although the press has been shown and described in a vertical position, it can in use be arranged at any convenient angle to the vertical.

Claims

"VERTICAL PRESS"

1. A vertical press comprising a frame of generally C-shaped configuration having a vertically extending main part and two vertically spaced generally horizontally extending arms; a vertical mandrel supported by and extending between the two arms and spaced from said main part; a movable member extending between said arms and located between said main part and said mandrel, said member being movably supported by said arms so as to be horizontally movable toward said mandrel, and means to move said member in a pressing action toward said mandrel, said means including at least two opposing reaction surfaces, one fixed to said main part and one to said movable member, and a movable wedge located between said surface and adapted to engage same to cause movement thereof upon movement of said wedge.

2. The press of claim 1 wherein said surfaces are inclined so that they define an acute angle, and said wedge is located within said angle.

3. The press of claim 2 wherein said wedge surfaces are both inclined to the vertical and said wedge has tapering sides adapted to engage said surface, and said sides are inclined so as to also define said angle.

4. The press of claim 1, 2 or 3 wherein there are two sets of the opposing surfaces with a wedge operatively associated therewith.

5. The press of claim 1, 2 or 3 wherein said mandrel is rotatably supported by said arms so as to be rotatable about a vertical axis.

6. The press of claim 1, 2 or 3 wherein said mandrel is rotatably supported by a top support means, said top support means is adapted to releasably engage said mandrel.

7. The press of claim 6 wherein said top support means is pivotally attached to the upper one of said arms to enable pivoting of said support means to a position releasing said mandrel.

8. A press comprising a frame having a main part and two spaced apart arms one at each end of the main part, a mandrel

supported by and extending between the two arms and spaced from said main part, a movable member extending between said arms and located between said main part and said mandrel, said member being movably supported by said arms so as to be movable toward said mandrel, and means to move said member in a pressing action toward said mandrel, said means including at least two opposing reaction surfaces, one fixed to said main part and one to said movable member, and a movable wedge located between said surfaces and adapted to engage same to cause movement thereof upon movement of said wedge.

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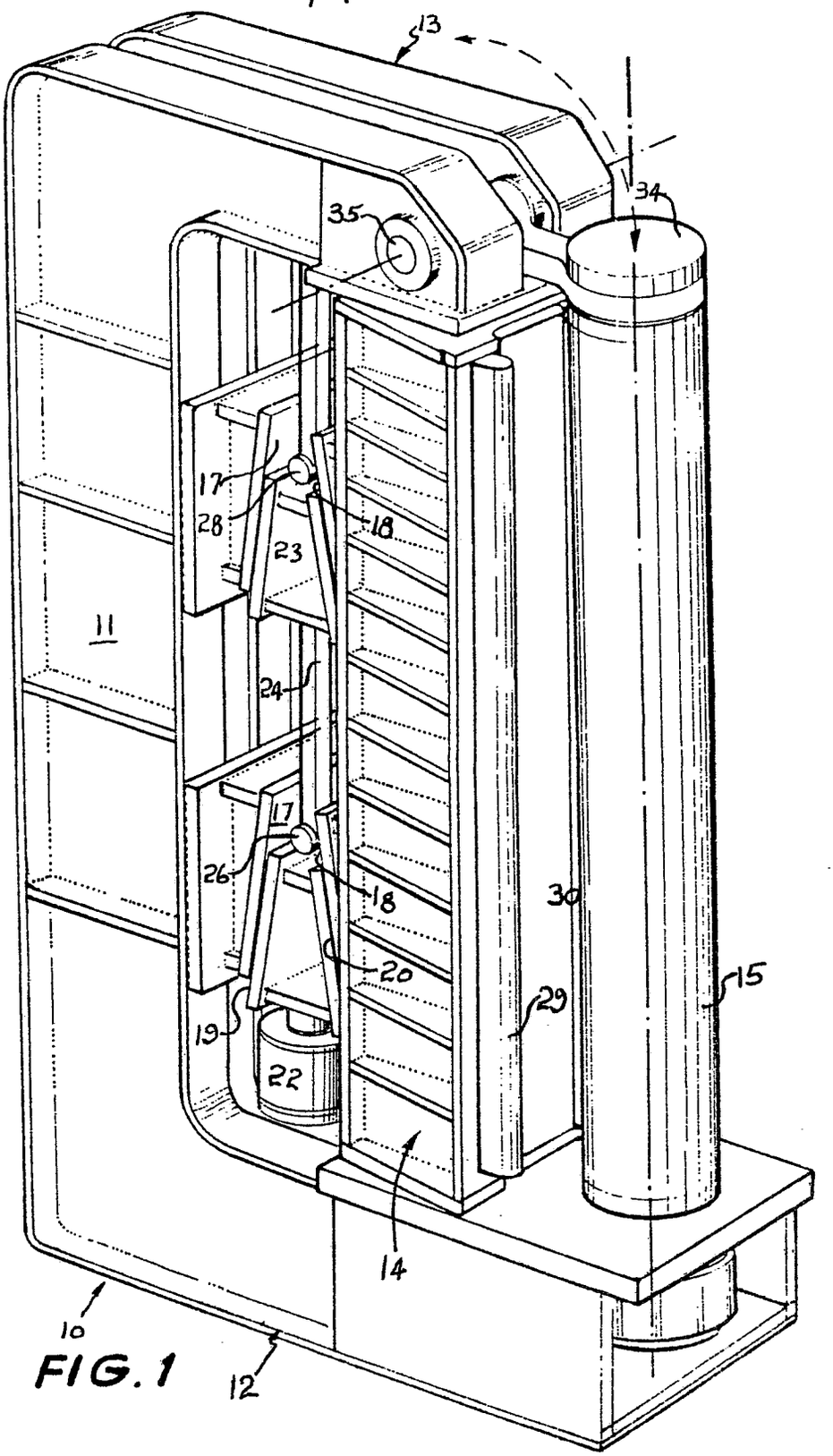

FIG. 1

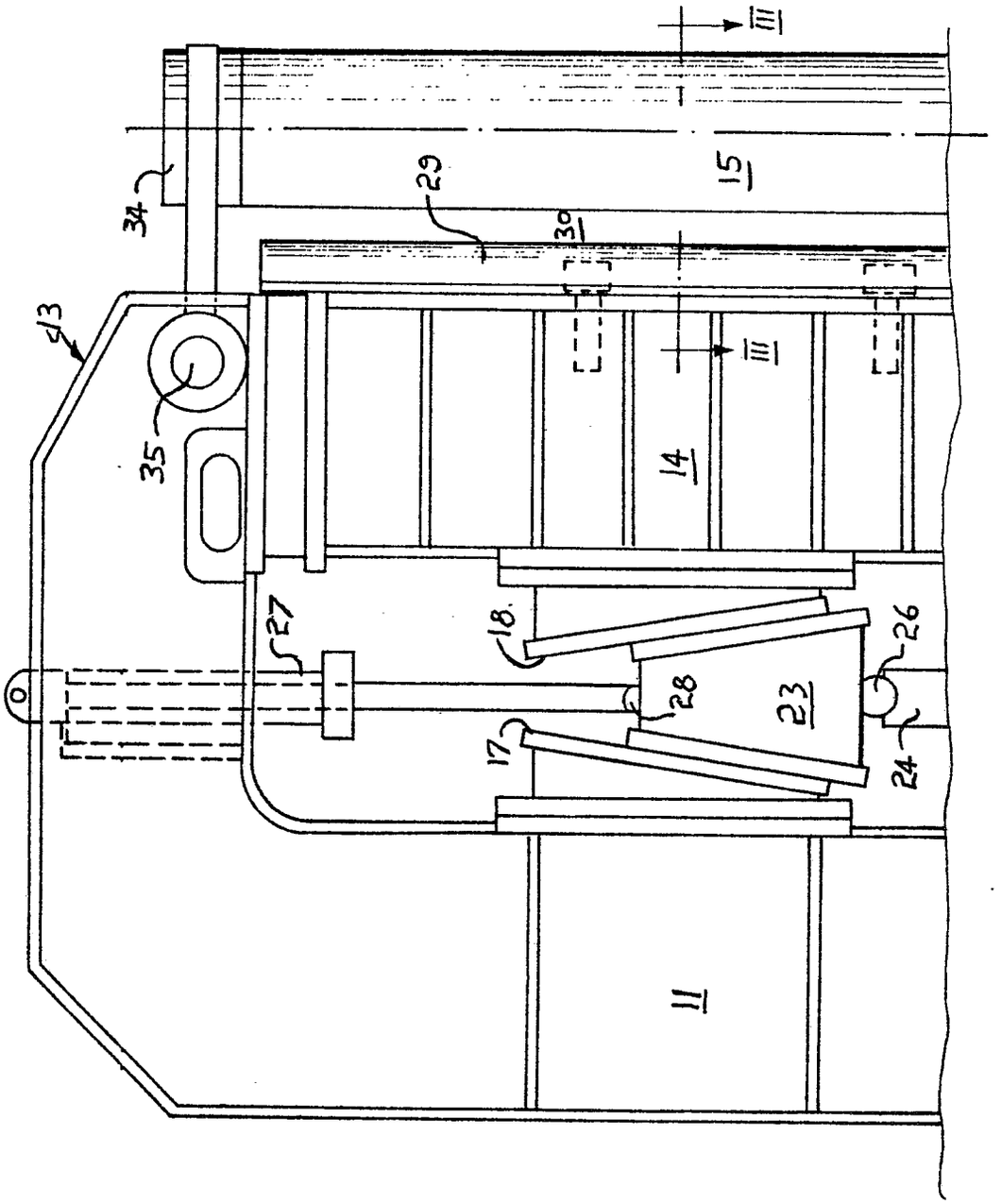

FIG. 2A

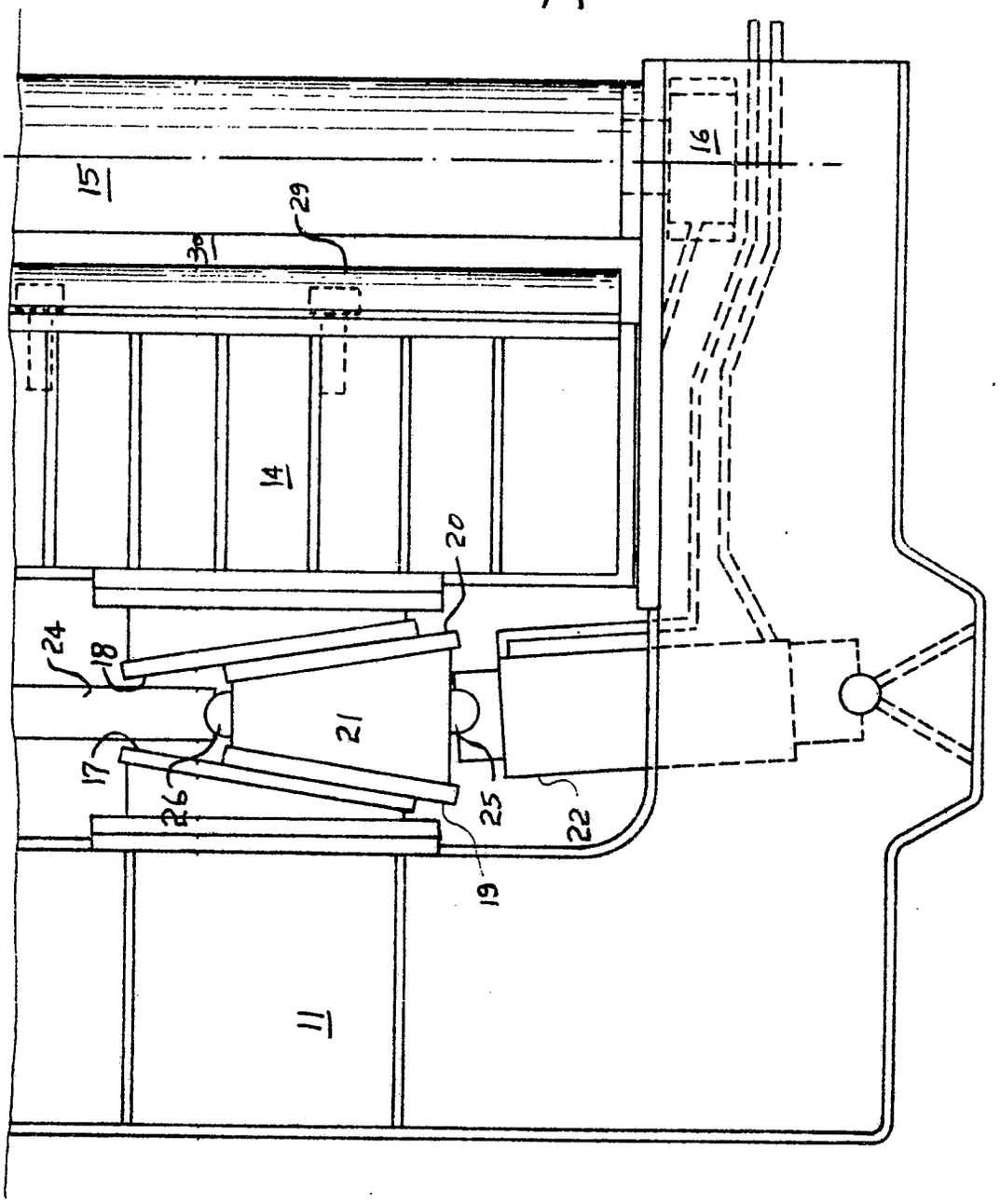

FIG.2B

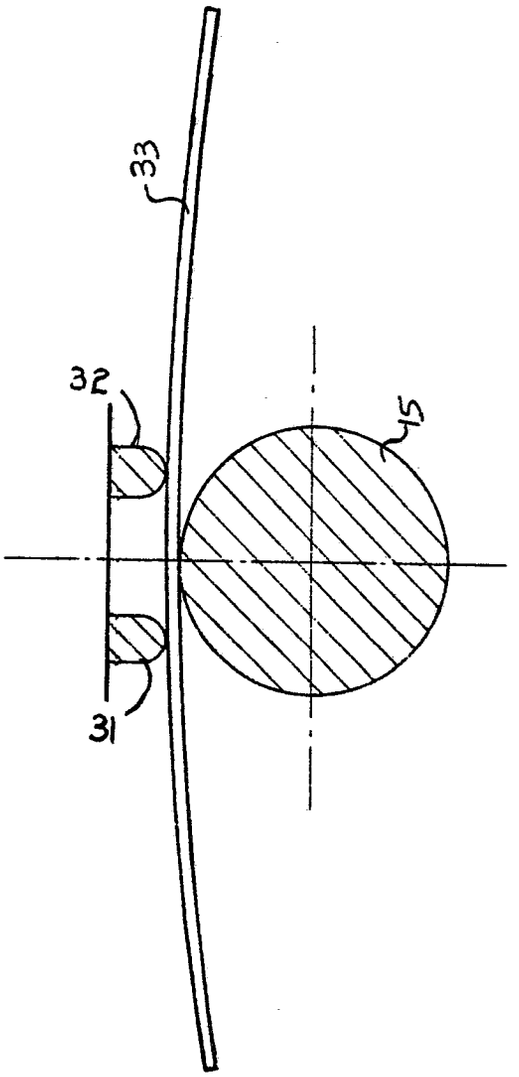

FIG. 3

European Patent Office

EUROPEAN SEARCH REPORT

0044892
Application number
EP 80 30 2581

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	GB - A - 780 165 (J. NEWSOME) * whole document *	1-3,8
	DE - C - 814 097 (O. FUCHS) * whole document *	1-3,8
	FR - A - 1 039 678 (DYNAMIT A.G.) * page 6, right-hand column, lines 20-42; figure 12 *	1-4,8
	US - A - 3 732 770 (G. OTTAVAN) * column 2, lines 1-42; figure 1 *	1,4,8
D	US - A - 936 481 (T.C. SCHELD) * claim 2; figure *	1,5,8
A	US - A - 3 630 060 (J.G. FLEMING) * column 3, line 39 to column 4, line 11; figures 5-7 *	1,8

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

B 30 B 1/40
B 21 D 5/01

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

B 30 B
B 21 D
B 26 D

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20-03-1981	BOLLEN

EPO Form 1503.1 06.78