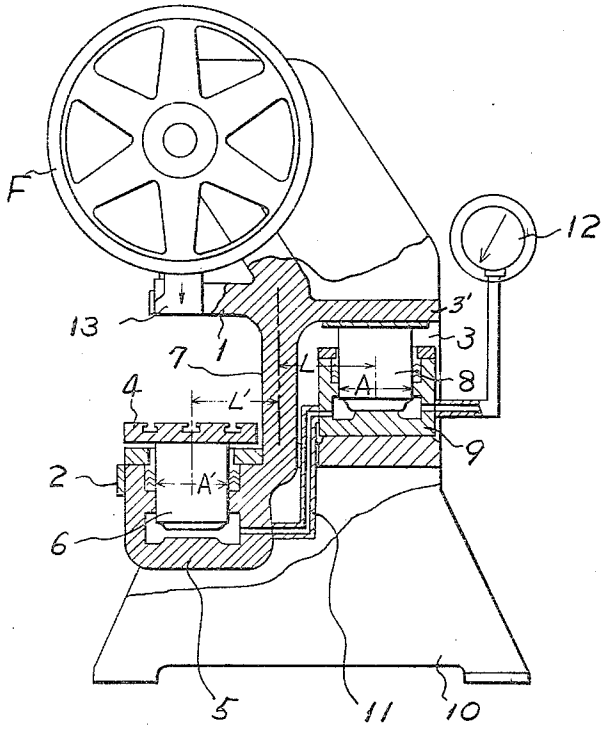
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OPEN-SIDED PRESS

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OPEN-SIDED PRESS

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This invention relates to open-sided presses, and more particularly to an open-sided press to be driven mechanically.

In a conventional mechanically driven open-sided press of this kind, during its operation the upper and lower frames of the press bend outwardly to result in their outward deflections, while the web frame of the press bends inwardly, i.e., toward the open side of the press to induce its inward deflection. Consequently, the center lines of the male and female metallic molds secured to the upper and lower frames of the press, respectively, do not align, so that press working becomes inexact and life of any metallic mold becomes short. In order to manufacture a conventional press of this kind with minimum deflection, weight of the material necessary for increasing its rigidity becomes excessive, resulting in an increase in manufacturing cost.

It is, therefore, the primary object of this invention to provide an open-sided press having a construction in which harmful deflections as mentioned above are avoided and a high accuracy in operation is obtained.

Another object of the invention is to provide an open-sided press in which weight of raw material and production cost as well as installation cost can be diminished remarkably.

A further object of the invention is to provide an open-sided press having a construction in which the pressing capacity of the press during operation can be measured easily by an oil pressure gauge.

Yet another object of the invention is to provide an open-sided press in which a somewhat extension of pressure maintaining time for increase in yield and beautiful appearance of products can be obtained.

For an understanding of the principles of the invention, reference is made to the following description of a typical embodiment thereof as illustrated in the accompanying drawing, in which a side view, partly in section, of the embodiment is shown.

Referring to the drawing, the press includes a top section or upper frame portion **1** of the body proper of an open-sided press includes therein having a well known mechanical press mechanism which is shown in the drawing representatively only by a flywheel F. The upper frame portion **1** and a lower frame section or lower portion **2** are interconnected together integrally by a back section or the web back frame portion **3**. A floating lower table **4** is secured to a pressure-generating ram or piston **6** which can slide air- and oil-tightly in a reaction cylinder **5** formed in the lower frame portion **2**.

In the web frame portion **3** an auxiliary cylinder **9** is arranged integrally with the lower leg of the frame portion **3** situated on one side of its tension plate **7**, on whose other side the aforementioned reaction cylinder **5** is located. An auxiliary ram or piston **8** to be pressed against the upper leg **3'** of the frame portion **3** is inserted into and can slide air- and oil-tightly in the cylinder **9**. The cylinder **9** communicates with the reaction cylinder **5** through an oil conduit **11** which may be embedded or bored in the machine base **10**. Consequently, the both cylinders **5** and **9** are subjected always to one and the same pressure of oil which is indicated by an oil pressure gauge **12** communicating with the cylinder **9**. A ram head **13** to be equipped with a male metallic mold (not shown) can reciprocate vertically by means of the aforementioned press mechanism to cooperate with the floating table **4** to be equipped with a female metallic mold (not shown) to be engaged with the male metallic mold mentioned above.

When the press works as usual, its working pressure is imparted to the lower table **4** which strives to lower the ram **6** downwards. As this ram, however, is supported by the oil in the cylinder **5**, this oil is then pressed to transmit its pressure through the conduit **10** to the cylinder **9**, the auxiliary ram **8** in which is then moved upwards, with the result that the upper and lower legs of the web frame portion **3** bend upwardly and downwardly, respectively.

When the product AL of the effective area A of the ram **8** and the distance L from the center line of said ram **8** to the vertical center plane of the tension plate **7** is adequately larger than that A'L' of the effective area A' of the ram **6** and the distance L' from the center line of said ram **6** to the vertical center plane of the tension plate **7**, the aforementioned harmful deflections will not exist. Namely, in this case, the upper and lower frame portions **1** and **2** bend upwards and downwards, respectively, i.e., outwards, while the web frame portion **3** expands vertically by the cylinder **9** as well as by the ram **8**, whereby the tension plate **7** extends vertically as well as bends inwards, i.e., toward the ram **8**, with the result that deflections due to bendings of the upper and lower frame portions **1** and **2** are offset by deflection due to bending of the tension plate **7**, resulting in alinement of the center lines of the male and female metallic molds used in this case. One can know always easily by the oil pressure gauge **12** the working pressure of oil during operation of the press.

When a conventional mechanical open-sided press is equipped with the aforementioned means according to this invention, one can perform a press working of high accuracy and high efficiency while knowing always the pressure of oil during working.

While a specific embodiment of the invention has been shown and described in detail to illustrate the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A press including a C-frame with base and head sections integrally united with a back section, a reciprocating ram mounted in said head section, means to reciprocate said ram, a yieldable fluid supported lower table mounted in a cylinder in said base section, a fluid operated piston mounted in a cylinder in said back section, a common source of fluid for said table and said piston, one end of said piston being in contact with a portion of the back section of said frame, a conduit connecting the fluid supported table and said piston, said table being normally biased upwardly by said fluid and being adapted to yield when pressure is applied thereto by said ram so as to force some of the fluid beneath said table through said conduit to said piston whereby the force exerted on the frame in one direction by said ram is counterbalanced by the force applied through said piston to said portion of the back section of said frame in an opposite direction so as to avoid harmful deflections in the press frame, and a fluid pressure gage in said conduit for indicating the pressure therein.

2. A press comprising a substantially C-shaped frame including an upper frame portion, a lower frame portion located below said upper frame portion and a back frame portion disposed between said upper and lower portions, a first cylinder defined in said lower frame portion, a first piston movable in said first cylinder and supported on fluid therein, a table on the top of said first piston, a ram mounted for substantially vertical reciprocation in said upper frame portion to act on a work-piece positioned

on said table and to transmit a downward force on the table and said first piston, a second cylinder mounted on said frame adjacent said back frame portion, a second piston supported on fluid in said second cylinder and bearing upwardly against said back frame portion, and a conduit connecting said first and second cylinders together and transmitting an upward force against said back portion upon receipt of a downward force on said table.

3. A press including a C-frame with base and head sections integrally united with a back section, a reciprocating ram mounted in said head section, means to reciprocate said ram, a yieldable fluid supported lower table mounted in a cylinder in said base section, a fluid operated piston mounted in a cylinder in said back section, a common source of fluid for said table and said piston, one end of said piston being in contact with a portion of the back section of said frame, a conduit connecting the fluid supported table and said piston, said table being normally biased upwardly by said fluid and being adapted to yield when pressure is applied thereto by said ram so as to force some of the fluid beneath said table through said conduit to said piston whereby the force exerted on the frame in one direction by said ram is counterbalanced by the force applied through said piston to said portion of the back section of said frame in an opposite direction so as to avoid harmful deflections in the press frame.

4. A press comprising a substantially C-shaped frame including an upper frame portion, a lower frame portion located below said upper frame portion and a back frame portion disposed between said upper and lower portions,

a first cylinder defined in said lower frame portion, a first piston movable in said first cylinder and supported on fluid therein, a table on the top of said first piston, a ram mounted for substantially vertical reciprocation in said upper frame portion to act on a workpiece positioned on said table and to transmit a downward force on the table and said first piston, a second cylinder mounted on said frame adjacent said back frame portion, a second piston supported on fluid in said second cylinder and bearing upwardly against said back frame portion, a conduit connecting said first and second cylinders together and transmitting an upward force against said back portion upon receipt of a downward force on said table, said back frame portion including a substantially vertical tension plate extending between said upper frame portion and said lower frame portion, and a rearwardly extending frame member extending rearwardly and substantially horizontally from said tension plate, said second piston bearing upwardly against said rearwardly extending frame member.

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