Continuous action board press wherein the board material to be pressed is fed into a press gap between two moving surfaces, at least one of which is provided by an endless belt loaded with the aid of a pressure chamber to be urged against the board material to be pressed and thus against the opposite press surface. The endless belt consists of a material attracted by a magnet and, adjacent the end of the pressure chamber, at least one magnet is placed, which gives rise in the belt to a force opposite in direction to that produced by the pressure medium.

11 Claims, 4 Drawing Figures
CONTINUOUS ACTION BOARD PRESS

FIELD OF THE INVENTION

The present invention relates to a continuous action board press wherein the board material to be pressed is fed into a press gap between two moving surfaces, at least one of which is provided by an endless belt, which is loaded with the aid of a pressure chamber to be urged against the board material to be pressed, and thus against the opposite press surface.

BACKGROUND

A board press is understood herein to mean a press that may be used for pressing boards, such as plywood, chip and fibre and other boards for laminating various kinds of boards, for providing all kinds of boards with facing costs, etc. In all these instances, the boards have to be subjected to pressure. The boards may come in the shape of a long web, or as shorter pieces, which are consecutively fed into the press.

In order that the treatment of the boards to be manufactured or converted might be handy and convenient, the trend has been to adopt continuous action presses instead of presses operating according to batch charge principles. This implies that the board material to be pressed is fed into the press gap between two moving surfaces. These moving surfaces may be, for instance, endless belts which have been loaded by means of a pressure chamber in a direction towards the board material to be pressed (German OS No. 1,628,986). However, the press known in the prior art has the drawback that the pressure in the pressure chamber cannot be very high, because the change of pressure at the wall of the pressure chamber would be a discontinuous jump. This, in its turn, would impose a great strain on the endless belt, appreciably reducing its service life. Discontinuous pressure variations are also unfavorable in view of the quality of the pressed board material.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a continuous action board press wherein the discontinuous pressure variations are eliminated.

The invention is characterized in that an endless belt consists of a material attracted by a magnet and that, adjacent the associated end of the pressure chamber, at least one magnet is placed, which gives rise in the belt to a force opposite in direction to that produced by the pressure medium. The magnet is then arranged to be supported and braced, for instance, by a press frame in the same manner as the pressure chamber.

As a result, the endless belt remains in contact with the supporting surface constituting the edge of the pressure chamber, with a reaction pressure in the board material substantially lower than the pressure in the pressure chamber.

Arrangements can also be made that the attractive force produced by the magnet and the force generated by the pressure chamber and acting upon the belt are nearly equal at the edge of the pressure chamber. It follows that, at the edge of the pressure chamber, a minimal counterpressure produced by the board material suffices to seal the pressure chamber. Since then the external forces acting on the belt are in equilibrium, the belt is subjected to minimal strain, and there is little friction between the pressure chamber wall and the belt. Arrangements can furthermore be made that the attractive force of the magnet exceeds the force due to the pressure in the pressure chamber. Sealing of the edge of the pressure chamber is then accomplished even if there were no counterpressure from the board material at all. It should be noted that this situation may obtain if there are non-uniformities in the board material.

According to a particularly advantageous embodiment, a plurality of magnets is provided adjacent the end of the pressure chamber, their attractive force with reference to the belt increasing in the direction toward the end of the pressure chamber. The pressure prevailing in the press gap may then be arranged to vary completely, as desired, as a function of the distance from the edge of the pressure chamber.

The variation of the magnets' attraction of the endless belt may be arranged, according to another particularly advantageous embodiment, in that between the magnet and the endless belt an insulation is interposed, by the aid of which the attraction of the belt exercised by the magnet can be adjusted as desired. The insulation may consist of an air gap or an insulating piece.

According to a third particularly advantageous embodiment, the attraction of the belt by consecutive magnets is made variable by interposing, between the magnets and the belt, insulating pieces made of materials having different magnetic properties.

According to a fourth embodiment, one pole of a magnet is disposed close to the leading end of the pressure chamber and the other pole of the same magnet is arranged close to its trailing end. According to a fifth embodiment, both press surfaces are belts attracted by magnets, one and the same magnet acting upon one press belt with one pole and upon the other press belt with its opposite pole. According to still another embodiment, the magnets are electromagnets. In this case the attractive force of the magnets is adjustable such as, for instance, by changing current intensity.

BRIEF DESCRIPTION OF THE DRAWING

The invention is described below with reference to the attached drawings, wherein:

FIG. 1 is a diagrammatic view of a press according to the invention in longitudinal vertical section, with an accompanying illustration of the forces and pressures present in the press during the pressing phase;

FIG. 2 corresponds to FIG. 1 and shows another embodiment.

FIG. 3 shows, in transverse vertical section, a third embodiment; and

FIG. 4 corresponds to FIG. 1 and shows a fourth embodiment.

DETAILED DESCRIPTION

In the press shown in FIG. 1, the board material 1 is fed into a press gap constituted by two endless belts 2 and 3. The press surfaces formed by the endless belts 2 and 3 is loaded in a direction towards the board material by the aid of pressure chambers 4. Adjacent the ends of the pressure chambers, consecutive magnets 5 have been placed, which attract the endless belt, thereby reducing the pressure prevailing in the press gap. Between the magnets 5 and endless belt 2, insulating pieces 7 are interposed, by the aid of which the attraction of the belt by the magnets is adjusted to increase towards the trailing end 6 of the pressure cham-
In the drawing, the height of the insulating pieces has been exaggerated. In the lower part of FIG. 1, under the drawing showing the press, the forces caused by the pressure chamber 4 and magnets 5 acting on the endless belt 2 are shown. The line 10 represents the endless belt 2. Over this line, the load imposed by the pressure chamber 4 has been indicated and, below it, the opposed forces produced by the magnets 5 are shown. By combining these forces, the graph representing the pressure which prevails in the press gap is obtained. This resultant magnetism is shown at the bottom of FIG. 1.

In the embodiment of FIG. 2, the same magnets 5 act on the same press belt 2 at both ends of the pressure chamber 4. In that of FIG. 3, the magnets 5 act simultaneously on both press surfaces 2 and 3 at the same point of the press gap.

In the embodiment of FIG. 4, the pressure chamber 4 is divided into three separate zones for attainment of a higher pressure. The magnets 5 are placed adjacent the walls of these zones so as to reduce the pressure acting on the board material to be pressed, in each instance on that side of the wall where the pressure is higher.

It is obvious to one skilled in the art that various embodiments of the invention may vary within the scope of the patent claims presented below. For instance, the magnets may be either permanent magnets or electromagnets. Electromagnets are here understood to be any kind of magnetic devices actuable with the aid of electric current such as, for instance, coils without conventional iron cores. In this case, the adjustment of the magnetic attractive force may be effected, for instance, by adjusting the intensity of current.

The magnetic attractive force also may be produced conversely in that the endless belt itself acts as a magnet. The magnets depicted in the figures may then be replaced simply by bodies towards which the belt is drawn under effect of magnetic forces. The magnetizing of the belt may be arranged, for instance, by making the belt pass through a magnetizing device at a given point along its path.

Such arrangements may also be made that the endless belt and the bodies fitted close to the belt are both magnets. If then the dissimilar poles of the magnets are opposite each other, the magnets attract each other and the force acting on the press belt from the pressure chamber can be adjusted in the manner described. If, on the other hand, similar poles of the magnets are face to face, the magnets repel each other.

By the aid of magnets, the point of contact between the lateral pressure chamber walls and the press belt may also be sealed in a highly advantageous manner. The arrangements may even be such that these side walls in themselves act as magnets. The favorable feature of this arrangement is that the compressive force between the belt and wall is low, yet affording efficient sealing. It should be observed that, as a result of low contact pressure, the friction will also be minimal.

We claim:
1. A continuous action board press comprising means defining a press gap between two moving surfaces and including at least one endless belt providing at least one of said surfaces, board material fed into said press gap, a pressure chamber loading said belt to urge the same against the board material to be pressed and thus towards the opposite press surface, the endless belt including a material adapted for being attracted by a magnet, said pressure chamber including leading and trailing ends relative to the direction of feed of the board material, and adjacent at least one end of the pressure chamber, and at least one magnet which gives rise in the belt to a force opposite in direction to that produced by a pressure medium in said pressure chamber.

2. A board press according to claim 1, wherein adjacent an end of the pressure chamber a plurality of consecutively arranged magnets are arranged, said magnets having an attractive force acting on the belt which force increases towards the said one end of the pressure chamber.

3. A board press according to claim 1, comprising between the magnet and the endless belt, an insulation means by which the attractive force of the magnet acting on the belt can be adjusted as desired.

4. A board press according to claim 3, wherein the insulation means provides an air gap.

5. A board press according to claim 3, wherein the insulation means includes an insulating body.

6. A board press according to claim 2, wherein the magnets are so arranged that the attractive force exerted on the belt by the magnets is variable, comprising between the magnets and belt, insulating bodies of materials having different magnetic properties.

7. A board press according to claim 1, wherein said magnet includes one pole disposed close to the leading end of the pressure chamber and an opposite pole close to the trailing end.

8. A board press according to claim 1 wherein the first said means includes an endless belt facing the first said belt.

9. A board press according to claim 8 wherein said magnet acts on both said belts.

10. A board press according to claim 1, wherein the magnet is an electromagnet.

11. A board press according to claim 10, wherein the attractive force of the magnet is adjusted by changing the intensity of current fed to the coil.