Oct. 18, 1960 F. FAHRNI 2,956,307

METHOD FOR PRESSING BOARDS COMPOSED OF PARTICLES

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Fig. 1.

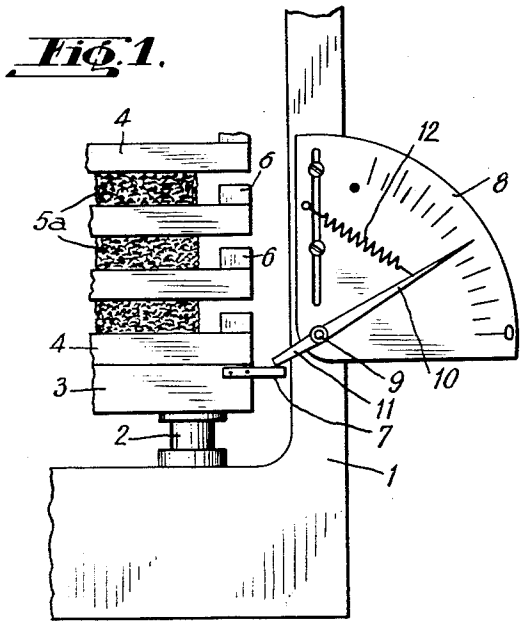
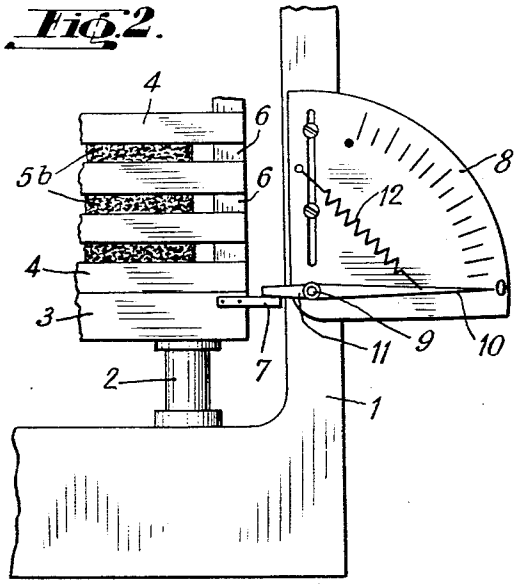


Fig. 2.



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METHOD FOR PRESSING BOARDS COMPOSED OF PARTICLES

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3 Claims. (Cl. 18—47.5)

The object of the present invention is a method for pressing boards composed of particles, such as wood shavings, wood fibres or similar particles, provided with a bonding material, by means of a heated press provided with distance pieces between the plates of the press. The new method is particularly suitable for working with a multi-layer press.

In the methods which have been usual up to the present, a pressure has been applied to the plates of the press which is such that the press is completely closed in a short time. It has been noticed that boards manufactured by this method very often are of uneven thickness, the thickness of the thinner parts being less than the standard thickness determined by the effective clearance given by the distance pieces, mostly constituted by distance strips. It was also observed that in certain cases the thickness of the board, measured over the whole surface of the board was too small. It has now been possible to determine the cause of these curious irregularities. After the press has been closed, the increasing desiccation of the pressed parts causes the same to shrink and it was thus naturally possible that owing to strewing irregularities, which it is practically impossible to avoid entirely, the degree of shrinkage was not the same in every part or that this shrinkage resulted in an underdimensioning of the whole board.

The purpose of the invention is to prevent these differences in thickness of the finished boards, caused by the shrinking of the mass of particles placed in the press. According to the invention this result is achieved by controlling the pressing pressure in such a manner that during the last part of the closing stroke of the press, the closing motion follows at least approximately the shrinkage of the part to be pressed (or of the parts to be pressed in the case of multi-layer presses) placed in the press and resulting from the desiccation of the same.

The idea on which the invention is based is thus that one does not close the press completely at first, but waits until the shrinking process of the mass of particles to be pressed has begun. After this the press is completely closed in accordance with the course of this shrinking process. The adjustment of the closing motion of the press according to the shrinkage of the mass of particles during the last part of the closing stroke results in an even subsidence of the part to be pressed over the whole surface and the aforementioned differences in thickness of the finished board cannot occur, even when the mass of particles to be pressed is not entirely free of strewing faults.

The pressing pressure is preferably regulated in such a manner that at the last 5 minutes after the beginning of the pressing operation the press is closed to within a residual distance of at the most 2.5% of the height of the distance pieces, and that the complete closing of the press is effected in an even manner and occupies a further time interval of at least 3 minutes. If it is desired for instance to manufacture boards having a final thickness of 20 mm., this would mean that a press having ten layers would first be closed up to a residual distance totalling 0.5 mm., which is evenly distributed over the ten layers. In the course of a further time interval, which is not less than 3 minutes, the press is gradually completely closed until the plates of the press are prevented from moving further by the distance pieces.

It is already known to reduce the pressing pressure after a first pressing period. The variation of the pressure was however always chosen in such a manner that the press was already definitively closed during the shrinking process of the mass of particles. It was never intended to adjust the closing motion to the course of the shrinking process. In most cases the pressing pressure was reduced in order to prevent the latter from acting unnecessarily when the plates of the press were already resting on the distance strips.

The press for carrying out the new method is provided with means which are actuated when there is a relative motion between the plates of the press, and which during the last part of the closing motion of the press ascertain the closing distance remaining until the press closes, in order that the indication may be used to control the pressing pressure. These means may, as shown in the embodiment described below, be constituted by an indicating device which can be read off directly or which cooperates with an automatic control device for regulating the pressing pressure. In the latter case it will be advantageous to use, for detecting the residual distance in the incompletely closed press, an electric, hydraulic or pneumatic feeler member, such as those used in other apparatus in which a given magnitude has to be controlled in function of a distance. The control device can be designed in numerous ways. It translates the element of information emitted by the distance feeler and influences in a determined manner the means for generating the pressing pressure, for instance by a corresponding opening or closing of passages for the fluid acting on the pressing piston of the press.

An embodiment of the means actuated when there is a relative motion of the plates, and which, as indicated, emit an element of information for the control of the pressing pressure, are illustrated in the drawing.

Fig. 1 illustrates a partial view of a multi-layer press with an indicating device on which the state of closure of the press can be read off.

Fig. 2 shows a corresponding view for another position of the piston of the press.

The part of the frame of the press visible in the drawing is indicated by the cipher **1**. The press in question is a press with ten layers, of which three are indicated. The press contains accordingly a total of eleven heating plates **4**, which are provided in the usual way with hot water coils and rest on a press table **3**. The press table is carried by several press pistons **2** which can be influenced hydraulically. Distance strips **6** limit the motion of the press in the usual way.

The press is provided in addition with an indicating device comprising a graduation **8**, an indicator **10** mounted on a pivot **9**, an indicator lever arm **11** and a spring **12**. The end of the said lever arm is kept constantly in contact with a stop **7** secured to the press table **3** by the traction of the spring **12**. In the fully closed position of the press (Fig. 2) the indicator **10** points to the zero of the graduation.

The method is carried out, for instance in such a manner that after the parts to be pressed **5***a* have been slipped in a loose or lightly pressed state, the press is closed slowly in the usual manner. As soon as the heating plates **4** have been brought sufficiently close to one another that there remains between the distance strips **6** and the upper heating plates **4**, i.e., per layer, a residual

distance of at most 2.5% of the height of the distance strips (i.e., of 0.5 mm. in the case of boards having a final thickness of 20 mm.), the pressing pressure is regulated in such a manner that the complete closing of the press is effected gradually and within a time interval of for instance 5 minutes. The indicating device keeps the operator exactly informed as to the degree of closure of the press. After the pointer **10** has attained the zero point of the graduation, the pressing pressure can be reduced further, in order that there may be no unnecessary pressure exercised on the distance strips. This can also be effected automatically, with the help of a sensitive end switch combined with the indicating device. It is obvious that according to the density of the parts to be pressed, the temperature of the heating plates and the humidity contained in the particles, the pressure variation will be given such a shape that the closing motion in the last part of the closing stroke of the press corresponds as closely as possible to the shrinking process in the mass of particles. This is achieved when the press is completely closed at the moment when the excess humidity of the particles has evaporated and the shrinking process of the same has come to an end. The completely compressed parts to be pressed *5b* can be seen in Fig. 2.

The sensitivity of the indicating device can be increased at will by the interposition of further lever arms or of multiplacating gears. In order that the operator may tire less quickly, it is recommended to make use, in combination with the graduation, of electric light signals of different colors which indicate when the residual distance between the plates has attained a predetermined value and when the press is completely closed. Easily visible numerical tables arranged in the immediate neighborhood of the indicting device and which give for instance the values of the closing distances in function of the time elapsed, make it easier for the operator to keep to a given course of pressure variation for a given type of board. In the case of a manual control, it is sufficient to observe the indicating device and eventually a timing device. A control of the course of the pressure variation may often be eschewed.

What I claim is:

1. A method for pressing boards composed of particles, such as wood shavings, wood fibres or similar particles provided with a bonding material, by means of a multilayer heated press provided with spacing pieces between the plates of said multi-layer press, by drying, shrinking and bonding said particles, said method comprising in sequence applying a pressing pressure until the thickness of the boards has been reduced to an amount not exceeding 102.5% of the final thickness, subsequently reducing the pressing pressure and then controlling the residual pressing pressure in such a manner that the moment when the excess humidity of the boards has evaporated and the shrinking process of the same comes to an end coincides at least approximately with the moment of the complete closing of the press.

2. A method for pressing boards composed of particles, such as wood shavings, wood fibers or similar particles, provided with a bonding material, by means of a multilayer heated press provided with spacing pieces between the plates of said multi-layer press, by drying, shrinking and bonding said particles, comprising the steps of reducing the pressing pressure shortly before the thickness of the boards in the press reaches the final thickness, and controlling the pressing pressure during the drying and shrinking period of the boards, in such a manner that the moment of the end of the shrinkage coincides at least approximately with the moment of the complete closing of the press whereby to obviate differences in the thickness of the finished boards.

3. The method according to claim 2, comprising applying a pressing pressure by closing the press to within a residual distance of approximately 2.5% of the height of the spacing pieces at the last five minutes after the beginning of the pressing operation, and completing the closing of the press in an even manner during a further time interval of at least three minutes.

References Cited in the file of this patent

UNITED STATES PATENTS

2,037,522	Lundback	Apr. 14, 1936
2,215,244	Linzell	Sept. 17, 1940
2,719,328	Patton et al.	Oct. 4, 1955
2,761,175	Meyerson	Sept. 4, 1956

FOREIGN PATENTS

429,486	Germany	May 29, 1926