June 16, 1925. 1,542,576

F. PFLEUMER

PROCESS AND DEVICE FOR MAKING FORM PIECES OF WOOD

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Fig. 1.

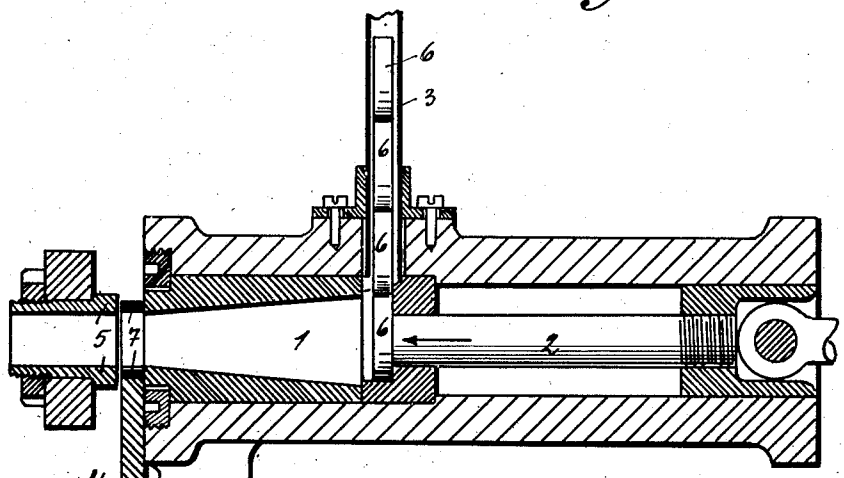
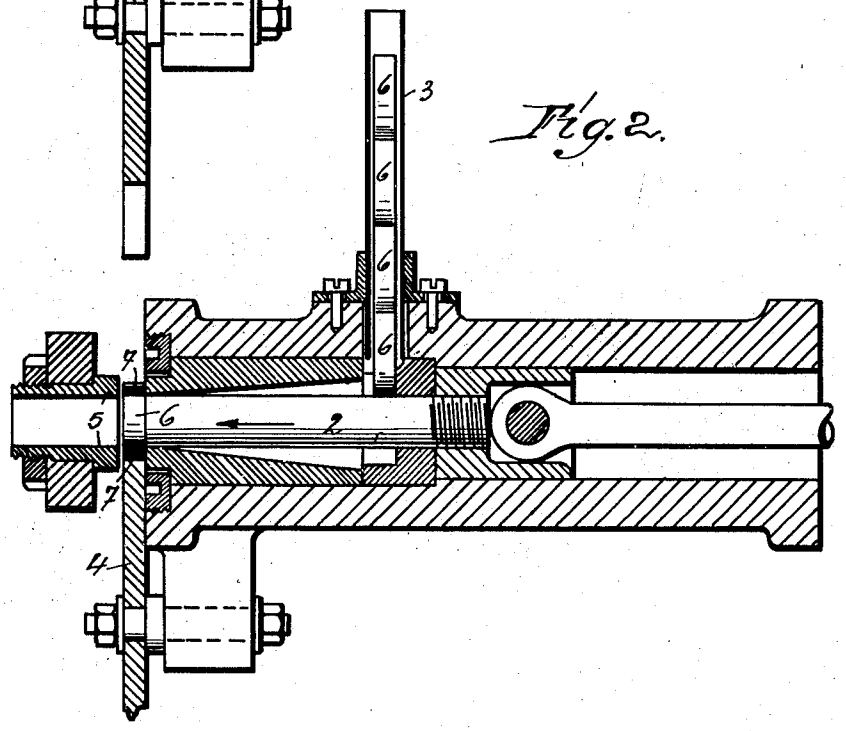


Fig. 2.



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Fig. 3.

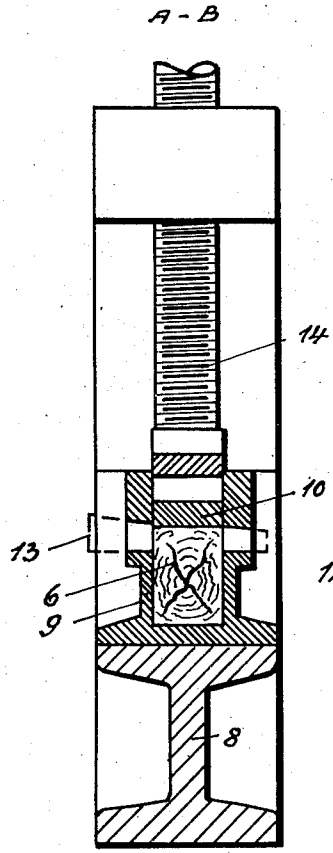
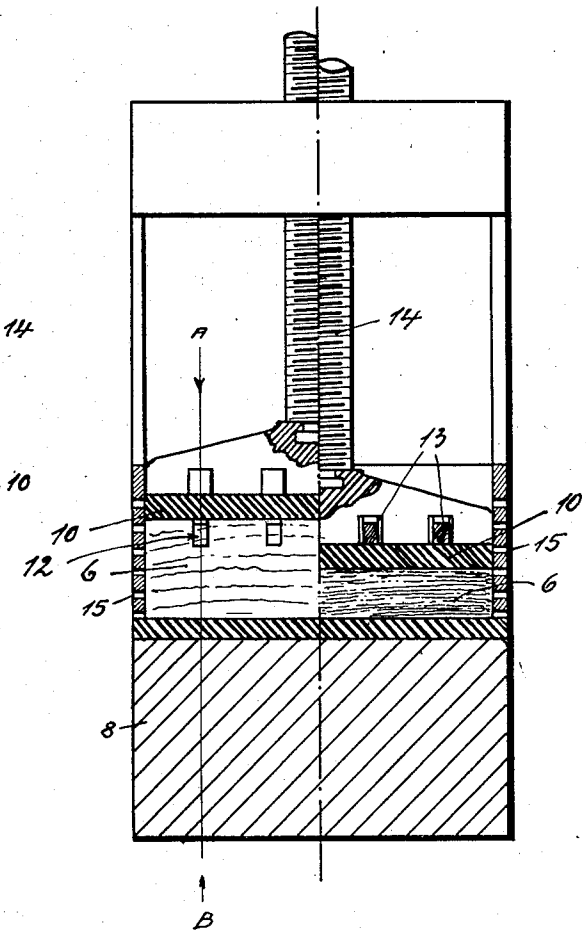


Fig. 4.



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Patented June 16, 1925.

1,542,576

UNITED STATES PATENT OFFICE.

FRITZ PFLEUMER, OF DRESDEN-A, GERMANY, ASSIGNOR TO NAAMLOOZE VENNOOTSCHAP "AGO" MAATSCHAPPIJ TOT HET VERWERKEN, VEREDELEN EN DROGEN VAN HOUT, OF TER APEL (GRON.), THE NETHERLANDS.

PROCESS AND DEVICE FOR MAKING FORM PIECES OF WOOD.

Application filed March 8, 1923. Serial No. 623,771.

To all whom it may concern:

Be it known that I, FRITZ PFLEUMER, a citizen of the Austrian Republic, residing at Dresden-A., Germany, Bodenbacherstrasse 44, have invented certain new and useful Improvements in Processes and Devices for Making Form Pieces of Wood, of which the following is a specification.

Processes for producing dense masses of wood are already known. The wood is used in these processes while utilizing the natural cohesion of its structure and cut in blocks, plates, etc., which are compressed; this process produces a material which possesses high powers of mechanical resistance but requires special measures for dyeing, impregnating, drying and pressing. In this manner a wood substance is obtained whose pore spaces disappear through pressing of a specific gravity of 1.3–1.45.

These processes result in the following technical difficulties:

1. During the drying period: This is usually done before the pressing takes place, especially for processes which require the shutting up of the wood for the purpose of obtaining the greatest possible compactness, as the water contents of the wood can not be pressed out during the pressing process. But drying before pressing has the disadvantage that the wood loses its elasticity and flexibility.

Furthermore, artificially dried woods keep on drying after pressing and prove that all of the water contained in the fibre cannot be removed by heating. Another factor is the high cost of uniform drying of the wood.

2. During impregnating: After the pores of the wood have been opened by a special process like boiling, steaming, etc., the solution of dyestuffs or impregnating substance is forced into the wood through hydraulic pressure and the wood is then dried. This process has the disadvantage of oversaturating the wood structure with dyestuff, i. e., there remains far more dyestuff in the structure than is really precipitated in the fibre for the purpose of dyeing. This leads to the additional disadvantage that during the subsequent pressing the fibre does not stick together any more and swells in water. Besides, dyestuffs are expensive, and this process is therefore not economical.

The object of the present invention is a process which eliminates all of these disadvantages by employing the pressing, impregnating and drying process in a manner which differs from the usual processes as to time and quantity and uses a device which is specially adapted to this process. The process is characterized by the fact that the wood which does not need to be dry for pressing is mechanically pressed, mechanically held and in this condition either impregnated or chemically transformed through moist heat and the contents of moisture removed by drying or simultaneously impregnated.

The undried or slightly dried or steamed wood is dyed in the solution as usual, with or without hydraulic pressure according to the quality of the wood and either cold or while heating or boiling or subjected to an impregnating process with hardening substances.

The dyed (impregnated) wood is then compressed while still wet and cold or heated. This results in a twofold advantage: The wood is still sufficiently soft in its damp or steamed condition that pressing is possible without any high pressure and without any subsequent fibre tension and furthermore it is possible to press out and regain the natural moisture of the wood and the excess of dyestuff solution or impregnating substance. There is only enough dyestuff or impregnating substance left as needed for natural dyeing or hardening of the fibre.

If no dyeing is desired and naturally colored wood used, the process changes only in regard to the quantity of the impregnating substances used. In this case green or air-dried wood can be employed out of which the sugar containing sap is pressed. This sap can be utilized in case of wood with large contents of sugar, like birch, maple, etc.

The mechanical pressing is carried out by means of a device as shown in Figures 1 and 2 of the drawing.

Fig. 1 is a sectional view of the device with the stamp pulled back, and Fig. 2 a sectional view of the same device with the stamp pushed forward. Fig. 3 is a cross section and Fig. 4 a longitudinal section of a metallic form.

The wood to be pressed, e. g., round plates 6, is led by means of a feeding device 3 towards the entrance of the pressing form 1 and pressed by stamp 2 into the pressing form and through it in the direction of the arrow. The wood to be pressed is cut in such a manner that its direction of fiber coincides with the axis of the pressing form and the stamp 2 presses one of the end grains. The pressure taking place through the pressing form vertically in the direction of the fibre finds little resistance owing to the peculiar construction of the vessels and compression and removal of the excess fluid is possible at very slight pressure. On the other end of the pressing form 1 metal rings 7 are fed forward by a feed disc 4 into which the wood to be pressed is forced, Fig. 2, so that the wood is completely tight and unable to expand or change its form so long as it is surrounded by the rings. 5 is a tube, into which enter the pieces of wood, if they are not led away by the feed disc 4. In this tube the various form pieces of wood accumulate, while its wall prevents their expansion. Tube 5 serves therefore as resistance in radial direction.

As the wood has the tendency to expand again immediately after pressing it must be forced into a firm holder in order to produce a permanent form by compression. The wood is immovably held by means of rings or other holders and accessible only at the end grains; it can therefore be subjected to all processes of hardening, impregnating and drying without losing its form before these processes are finished.

The cross section of the pressing form can be of any shape, round, oval, square, rectangular or of any other shape, according to the kind of wood and the purpose for which the pressed pieces are to be used. To these cross sections the forms on the narrowed outlet correspond.

Pressing can be accomplished also outside of this device. Other devices, as for instance mechanical or hydraulic presses can be used which exert direct pressure in the direction of the fibre. If these presses are employed, it is necessary that the pressed wood pieces are immediately pressed into the rigid cover when in the final position.

The pressing process is followed by giving the final form which can be done by drying or by means of chemical processes for hardening and stiffening the fibre. In many cases impregnation by means of a water repelling substance will be required. The common characteristic of all these processes as applied to the present process is that they are carried out on pressed pieces of wood which are immovably held in the rings.

Hardening is accomplished in moist and hot air or steam. The wood swells, probably while undergoing chemical transformations, into a homogenous whole which is capable of great resistance in regard to further swelling and waterproofing will be unnecessary. If hardening is carried out without any rings, no hardening takes place but the pieces of wood expand again to their original size before pressing and even beyond that which proves that the mechanical hold during pressing is an absolute requisite of the process.

If the hardening has sufficiently progressed, the remainder of the moisture is removed through subsequent drying. The use of holders permits drying without any danger of cracking or contraction. After drying the pressed pieces of wood have been somewhat contracted by losing their last bit of moisture and can be taken out of the rings without any difficulty or drop out automatically.

The process permits in a simple and cheap manner by using a very simple, automatic pressing machine the wholesale manufacture of a large number of bone-like articles. The process is specially adapted for the manufacture of such articles as buttons, electrical articles, etc.

Pressing can also be done in metallic forms. A process of this kind is shown in Figs. 3 and 4. Fig. 3 shows the device in cross section while Fig. 4 shows a longitudinal section. 8 are supports on which have been placed the cast-iron boxes 9. The pieces to be pressed 6 are put into the boxes from above. The boxes are then closed on top by means of the presser plate 10. On the latter pressure is exerted by any pressing device like 14; the box 9 has openings 12 through which the wedges 13 are put to hold down the wood in pressed condition. (Fig. 4 to the right.) The sides of the box which lie close to the end grain of the wood are equipped with openings 15 through which the moisture can escape. If the wood is held down by means of the wedges 13, the pressure from above can be released and the box taken from the support 8 to be subjected to further processes.

Having now described my invention and how the same may be performed what I claim and desire to secure through Letters Patent is:—

A process and device for the manufacture of pressed pieces of wood which is pressed in dry or moist air by means of pressing forms and pressing stamps and immediately after

compression forced into tubes to prevent expansion; the said process and device being characterized by the fact that the wood, in form of short pieces, is pressed into rings and the individual pieces of wood within the rings are treated from the outside (through the end grains) with hot air or steam for the purpose of hardening them, and that the said pieces of wood are not removed from the rings until they have become perfectly dry and hard.

In testimony whereof I have affixed my signature in presence of two witnesses.

FRITZ PFLEUMER.

Witnesses:
D. A. ULVER,
FRED W. WINKLER.