July 16, 1968 W. RITSCHER 3,393,292

PRESSURE PLATE FOR A PRESS

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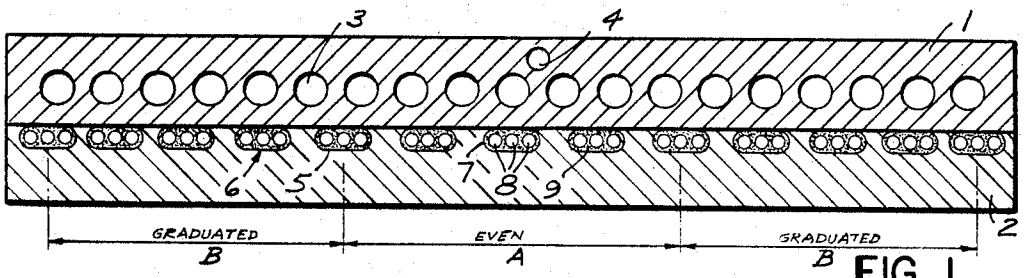

FIG. 1

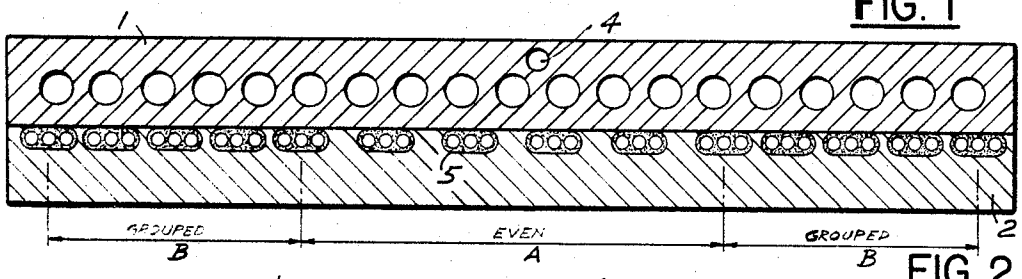

FIG. 2

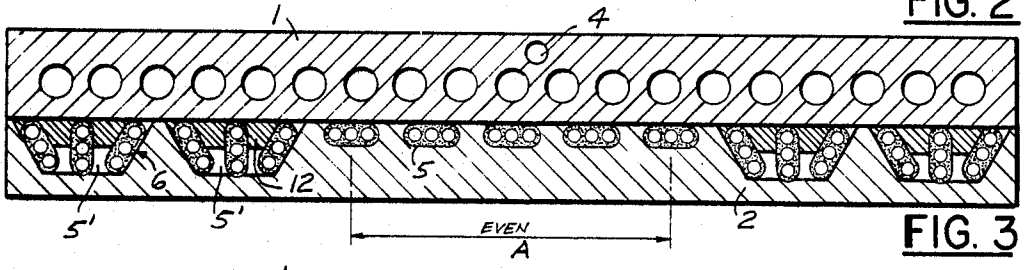

FIG. 3

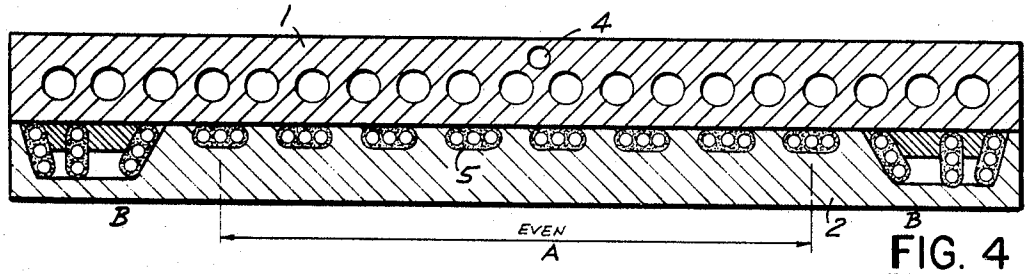

FIG. 4

INVENTOR
WERNER RITSCHER
BY Hane and Nydick
ATTORNEYS

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PRESSURE PLATE FOR A PRESS

Werner Ritscher, Hegnach, Germany, assignor to Werner & Pfleiderer, Stuttgart-Feuerbach, Germany, a company of Germany

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8 Claims. (Cl. 219—245)

ABSTRACT OF THE DISCLOSURE

A rectangular pressure plate for pressing heat-sensitive materials such as polyvinylchloride. The plate includes in one of its face sides a plurality of spaced apart straight recesses extending substantially across the length of the plates in mutually parallel relationship and parallel to the respective edges of the plates. The recesses occupy substantially the surface area of the plate in the crosswise direction thereof, the spacing of the recesses being gradually decreased toward the plate edges parallel to the recesses. Flattened hollow heating rods are inserted in said recesses, and each rod is provided with several electric heating elements inserted therein.

The present invention relates to a plate for a press and more particularly to an electrically heated pressure plate for such press.

It is known to embed into such pressure plates round heating rods containing one electrical resistance element and to control the temperature of the plate by suitable heat sensitive instruments. Three heating rods of this kind are usually combined to a unit and such units are uniformly distributed over the surface area of the plate to be heated. The required power load for heating the rods, or more specifically, the heating elements therein, is divided into a base load and a control load to permit a convenient control of the temperatures of the heating elements.

Due to the grouping of the heating rods into units, the individual units are often rather widely spaced one from another and it has been found that as a result, definite temperature zones are formed between which marked temperature gradients exist. Furthermore, there tends to be a substantial temperature drop at the marginal portions of the plate, due to the increased heat radiation at the rims of the plate.

Many materials such as polyvinylchloride to be pressed by means of pressure plates of the kind above referred to are highly sensitive to a non-uniform temperature of the plate. As a result, high quality products, such as floor coverings, record discs, etc., to be made of such heat sensitive materials cannot be obtained unless the plate has a substantially uniform temperature.

Attempts have been made to reduce the temperature gradients within the plates and the heat radiation from the marginal portions thereof to acceptable levels by providing heat reflectors adjacent to the plates. However, such reflectors were not successful. Furthermore, they impede access to the plates and to articles to be pressed or already pressed.

It is a broad object of the invention to provide a novel and improved pressure plate of the general kind above referred to in which a substantially uniform temperature is maintained throughout.

A more specific object of the invention is to provide a novel and improved pressure plate of the general kind above referred to in which the aforedescribed temperature gradients are reduced to an acceptable level and the heat losses at the marginal portions of the plate are largely compensated by an increased heating of the marginal portions.

Another more specific object of the invention is to provide a novel and improved pressure plate of the general kind above referred to in which a substantially uniform temperature is maintained without impeding free access to the plate and to articles pressed or to be pressed by means of the plate.

Other and further objects, features and advantages will be pointed out hereinafter and set forth in the appended claims constituting part of the application.

In the accompanying drawing, several preferred embodiments of the invention are shown by way of illustration and not by way of limitation.

In the drawing:

FIG. 1 is a sectional view of a pressure plate according to the invention;

FIG. 2 is a similar sectional view of a modification of the pressure plate;

FIG. 3 is a sectional view of still another modification; and

FIG. 4 is a sectional view of a further modification.

Referring first to FIG. 1, this figure shows an upper part 1 and a lower part 2 of the pressure plate. The plate parts are made of metal, preferably of a metal with high heat conductivity, such as copper, bronze or aluminum. The upper part of the plate, the structure of which does not constitute part of the present invention and should be visualized as being conventional, includes a number of ducts or channels 3 for carrying a cooling or heating medium and a duct 4 for insertion of a suitable heat indicating instrument. The instrument itself and the connections thereof should also be visualized as being conventional.

The lower plate part 2 includes in its side facing plate part 1 a plurality of recesses 5. The recesses are subtantially coextensive with the respective length of the plate and are disposed parallel to ducts 3 and the respective side edges of part 2. A heating rod 6 is inserted into each of the recesses, substantially coextensive therewith. Each heating rod is hollow and has a flattened shell 7 of preferably oval cross section in which are fitted three electric heating elements 8. The heating elements may be made of coiled resistance wire and are substantially coextensive with the length of the rods. The resistance wires may be connected to a suitable source of three-phase current. The rods are filled with a suitable hardened heat refractory insulation material 9 which secures the heating elements in mutually fixed positions. As is clearly shown in FIG. 1, there is provided a middle group A of heat rods and two outer groups B. The recesses 5 and the heating rods therein included in the middle group A are uniformly spaced, while the spacing of the recesses and the heating rods therein included in the outer groups B gradually decreases towards the respective edges of plate part 2. As a result, the marginal portions of part 2 are heated more than the mid-portion, thereby compensating for the increased heat radiation at the marginal portions of the plate.

The same result is obtained in the arrangement of FIG. 2. According to this figure, the heating rods in both, the middle group A and the outer groups B, are uniformly spaced but the heating rods included in the outer groups are all more closely spaced than the heating rods included in the middle group.

According to FIG. 3, a middle group A of heating rods is provided and arranged in the same manner as in FIGS. 1 and 2, but the recesses 5' for accommodating the heating rods in the outer groups B are enlarged to accommodate several heating rods. The recesses 5' have preferably the illustrated generally trapezoidal cross section.

Two or more heating rods 6, including elements 8 as previously described, are inserted into each of the recesses 5'. There are shown in FIG. 3, three symmetrically disposed heating rods each defining an angle with the plane of the respective upper side of plate part 2. The rods are secured in recesses 5' by inserts 12 which are preferably made of the same material as plate parts 1 and 2.

As it is evident, the increase of the number of heating rods in the marginal portions of plate part 2 increases the heating of these marginal portions as desired.

FIG. 4 is similar to FIG. 3, except that the middle one of the three rods in recesses 5' is moved closer to the heating rod adjacent to the respective edge of the plate than to the rods forming the middle group of heating rods. As a result, the increased heating of the marginal portions of the plate becomes still more pronounced.

As it is apparent, the distribution and grouping of the heating rods across the surface area of plate part 2 can be conveniently and widely varied to suit the purposes of a specific application.

While the invention has been described in detail with respect to certain now preferred examples and embodiments of the invention, it will be understood by those skilled in the art, after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended, therefore, to cover all such changes and modifications in the appended claims.

What is claimed is:

1. A substantially rectangular pressure plate for a press, said plate having in one of its face sides a plurality of spaced apart straight recesses extending across substantially the length of the plate in one direction thereof parallel to the respective edges of the plate and substantially occupying the surface area of the plate in the crosswise direction thereof, the spacing of the recesses being gradually decreased toward the plate edges parallel to said recesses, and comprising flattened hollow heating rods inserted into said recesses and having a length substantially coextensive therewith, and several electric heating elements fitted into each one of said rods substantially coextensive therewith.

2. A pressure plate according to claim 1, wherein adjacent to the plate edges parallel said recesses an outer group of recesses is spaced closer than the spacing of a group of recesses occupying the mid-portion of the plate and disposed between said outer groups, the spacing of the recesses constituting the outer groups being mutually equal and the spacing of the recesses constituting the middle group of recesses being also mutually equal.

3. A pressure plate according to claim 1, wherein said hollow heating rods have a substantially oval cross section and are filled with a hardened insulation material securing the heating elements in position.

4. A substantially rectangular pressure plate for a press, said plate having in one of its face sides a plurality of spaced apart straight recesses extending across substantially the length of the plate in one direction thereof parallel to the respective edges of the plate and substantially occupying the surface area of the plate in the crosswise direction thereof, and comprising hollow heating rods having a length substantially coextensive with that of said recesses, one of said rods being inserted into each one of a middle group of recesses occupying a mid-portion of the plate and several of said rods being inserted in each one of the outer groups of recesses occupying the marginal portions of the plate adjacent to the edges thereof parallel to the recesses, and several electric heating elements fitted into each of said rods and having a length substantially coextensive therewith.

5. A pressure plate according to claim 4, wherein the single rods inserted into said middle group of recesses have flat surface portions disposed parallel to the plane of the face side of the plate including the recesses, and the several rod inserted into each of said outer groups of recesses have flat surface portions defining angles with the plane of said face side of the plate.

6. A pressure plate according to claim 4, wherein hardened filler material secures said several rods in the respective recesses in predetermined mutual positions.

7. A pressure plate according to claim 4, wherein several rods are inserted in mutually uniform relationship at least in one of the recesses in each of the outer groups of recesses.

8. A pressure plate according to claim 4, wherein more than two rods are inserted into at least one of the recesses in each of said outer groups, at least two of the rods in said one recess being closer to each other on the side of said recess facing the respective edge of the plate than on the remote side of said recess.

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RICHARD M. WOOD, *Primary Examiner.*

C. L. ALBRITTON, *Assistant Examiner.*