March 17, 1959 H. JACOBSON 2,877,577

POLYTETRAFLUOROETHYLENE PRESSING ACCESSORY

Filed Oct. 29, 1954

Fig. 1.

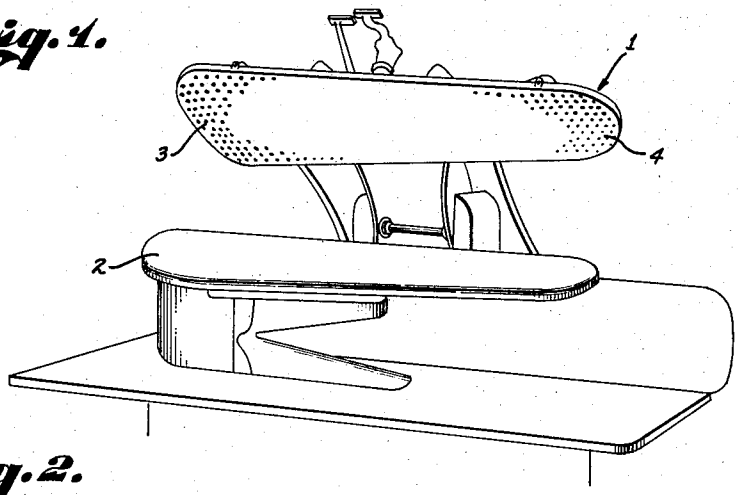



Fig. 2.

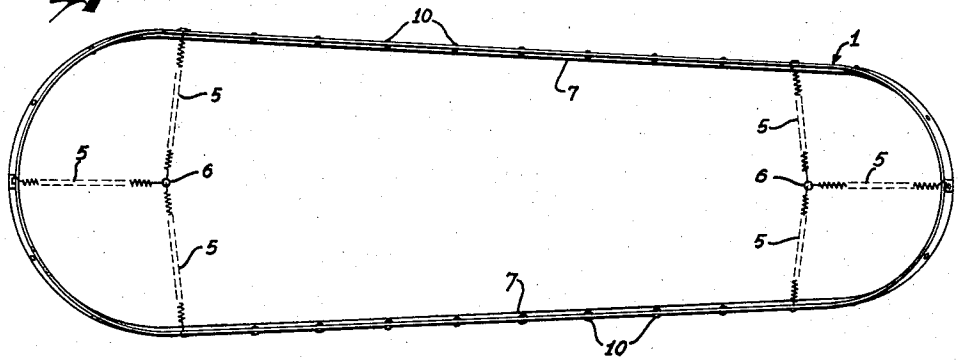



Fig. 3.

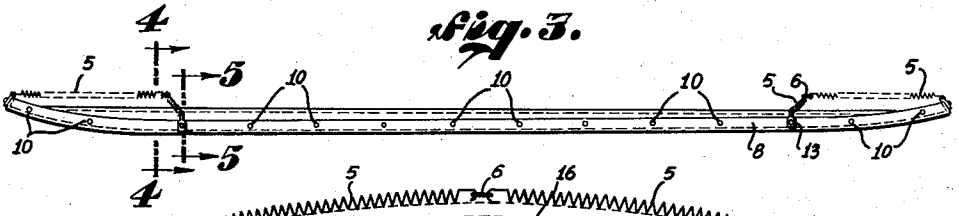



Fig. 4.

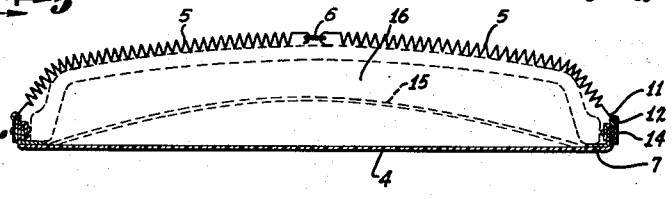
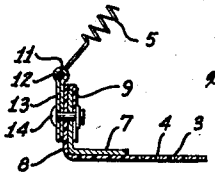



Fig. 5.




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# POLYTETRAFLUOROETHYLENE PRESSING ACCESSORY

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4 Claims. (Cl. 38—66)

This invention relates to a press plate for attaching to the head of garment steaming and pressing machines.

In press plates used for steaming and pressing garments the perforated portion covering the bottom face of the pressing head is usually made of metal, for example, a perforated aluminum sheet, which has many known disadvantages.

In accordance with my invention I have discovered that a surprisingly improved press plate results when this perforated face or pressing surface is made of a sheet of polytetrafluoroethylene resin or plastic, particularly, for example, that polytetrafluoroethylene resin known and sold under the trademark designation "Teflon."

A press plate having the face or pressing surface made of a perforated sheet of polytetrafluoroethylene plastic, in accordance with my invention, surprisingly, not only is capable of withstanding the temperatures involved in connection with the steaming in conjunction with the pressing operation, but also the resulting surface is not corroded as is the case with a metallic surface and hence stays clean and does not leave products of corrosion on the garment being pressed and does not stain the garment. Moreover, it is an exceedingly important aspect of my invention that the press head, having the polytetrafluoroethylene surface, can effectively press a garment having a hard object such as an ornament or a button thereon without damaging such ornament or button, impairing the garment or the pressing surface. Any deformation to the Teflon material is temporary and soon disappears. The pressed clothes look better and look more like new. Still further, the surface of the fabric of the garment when pressed with the pressing head in accordance with my invention receives a satisfactory press without producing the well-known undesibale shiny surface to the garment. That is, the polytetrafluoroethylene surface is effective to provide the desired press to the fabric without affecting the threads causing a shiny appearance to a portion of the fabric. The pressing head in accordance with my invention will press uniformly over an uneven surface. No second operation is necessary. The press is complete the first time. Thus, the operator can work faster. Less pressure is required to obtain the same and even better pressing results. Undesirable condensation of steam is avoided. The pressing head in accordance with my invention is easy to maintain, will not clog and can be wiped clean easily. Because of low heat radiation from the pressing head the operator can work more comfortably. The head has a longer life.

It is thus an object of my invention to provide a press plate the pressing surface or face of which is made of polytetrafluoroethylene and having new and unexpected properties and advantages.

My invention will be illustrated and exemplified by a description of a specific embodiment thereof taken in conjunction with the accompanying drawings in which:

Fig. 1 shows a garment pressing machine of the type in which the pressing head of my invention is used.



Fig. 2 shows a plan view of the top of the pressing head.

Fig. 3 shows an elevation of the pressing head in Fig. 2.

Fig. 4 shows a sectional view of the line 4—4 of Fig. 3 and

Fig. 5 shows a section on the line 5—5 of Fig. 3.

Fig. 1 shows a steaming and pressing machine of the type commonly used for pressing garments having a pressing head in accordance with my invention shown generally at **1**. As is known in the art, the garment is placed on the lower support **2** and the pressing head **1** is pressed down thereupon with the garment between the steaming and pressing head **1** and the bottom support **2** while steam is supplied through the hollow portion of the pressing head to pass out the perforations **3** in the press plate in accordance with my invention, made of a perforated polytetrafluoroethylene sheet as shown at **4**.

The attachment for the pressing head, shown in Figs. 2 and 3, carrying the Teflon sheet in accordance with my invention is fastened to the usual pressing head by means of springs **5** connected to a post **6** on the back of the pressing head. A set of such springs and posts is shown at each end of the pressing head as most clearly seen in Fig. 2.

In general, this attachment with Teflon sheet **4** has the shape of the pressing head. The periphery of the Teflon sheet extends upwardly over an angular metal liner **7**, and at **8** extends upwardly on one side of the metal liner **7** and is folded downwardly as shown at **9**. It will be understood that the metal liner **7** extends completely around the periphery of the Teflon sheet adapted to fit on the bottom surface of the press head. Also extending around the periphery are a series of rivets **10** by means of which the folds **8** and **9** of the Teflon sheet are affixed to the metal liner **7**.

The springs **5** are attached to the periphery of the Teflon sheet as shown particularly in detail in Fig. 5. End **11** of the spring **5** is adapted to fit in an eye **12** formed of an overlapping piece of metal **13** through the overlapping part of which rivet **14** extends to fasten this overlapping piece of metal to the folds **8** and **9** with metal liner **7** therebetween.

Extending back of the Teflon sheet **4** and within the pressing head is an arcuate perforated metallic member **15** for distributing the steam over the surface of the Teflon sheet. As understood in the art steam is supplied to the pressing head within the hollow space **16**.

In accordance with this specific embodiment the polytetrafluoroethylene resin sheet is made of Teflon plastic one-sixteenth inch thick perforated with 0.020 inch diameter holes uniformly distributed with about 350 per square inch.

"Teflon" is Du Pont's trademark applied to the polymers of tetrafluoroethylene. The resin is made by polymerizing gaseous tetrafluoroethylene to yield a solid, granular polymer. The chemical equation involved in this process may be indicated generally as follows:

$$n\left(\begin{matrix}F & F\\ C=C\\ F & F\end{matrix}\right) \longrightarrow \begin{matrix}F & F & F & F & F\\ -C-&C-&C-&C-&C-\\ F & F & F & F & F\end{matrix}$$

"Teflon" polymer consists of long straight-chain molecules packed closely together. This structure and the chemical bond between carbon and fluorine in the molecule impart exceptional properties of resistance to heat and to chemicals. "Teflon" in thin sections is transparent, but in thicker pieces it is waxy in appearance, and white or gray in color. Average values of some of the physical and chemical properties of "Teflon" are listed in Table I below.

*Table I.—Typical properties of "Teflon"*

[Data given represent standard commercial grades of material and standard methods of testing except where otherwise noted.]

| Property | Value | Method |
|---|---|---|
| Specific gravity | 2.1–2.3 | D793–44T |
| Tensile strength at 77° F., p. s. i. | 1,500–2,500 | [1] D638–44T |
| Elongation at 77° F., percent | 100–200 | D638–44T |
| Flexural strength at 77° F., p. s. i. | 2,000 | [2] D650–42T |
| Stiffness at 77° F., p. s. i. (0.125 in.) | 60,000 | D747–43T |
| Impact strength, Izod, −70, 77, 170° F., ft.-lb./in. | 2.0, 4.0, 6.0 | D256–41T |
| Hardness, "D," Durometer | 55–70 | |
| Compressive strength, p. s. i., at 0.1% deformation | 1,700 | D695–42T |
| Deformation under load at 50° C. under 1,200 p. s. i., percent in 85 hr | 4.8 | D621–43 |
| Heat-distortion temperature, low-load, ° F | 270 | D648(B)44T |
| Specific heat, B. t. u./lb./° F | 0.25 | ([3]) |
| Coefficient of linear expansion per ° F. (77–140° F.) | $5.5\times10^{-5}$ | D696–42T |
| Thermal conductivity, B. t. u./hr./ft.²/° F./in. (0.18 in.) | 1.7 | [4] Arl. P–32 |
| Dielectric strength, short-time, volt/mil (0.080 in.) | 400–500 | [5] D149–40T |
| Surface arc-resistance, seconds | 700 | [6] D495–42 |
| Volume resistivity, ohm-cm | $10^{16}$ | D257–38 |
| Surface resistivity at 100% rel. humidity, megohms | $3.6\times10^{6}$ | D257–38 |
| Dielectric constant at 60, $10^3$, $10^5$, $10^8$ cycles | 2.0–2.05 | D150–40T |
| Power factor at 60, $10^3$, $10^5$, $10^8$ cycles | 0.0005 | D150–40T |
| Water-absorption, percent | 0.00 | [7] D570–42 |
| Static coefficient of friction against polished steel | 0.09–0.12 | ([8]) |
| Vapor pressure, mm. Hg at 25° C | $10^{-6}$ | |
| Outdoor weathering | no detectable change in 3 yrs. | |

[1] Tensile strength in oriented film may be as high as 15,000 p. s. i.
[2] Specimens do not break.
[3] Method of mixtures.
[4] Cenco-Fitch apparatus.
[5] 1000–2000 volts/mil in thicknesses 5 to 12 mils.
[6] Does not track.
[7] Not wet by water unless a surface-active agent is added.
[8] Inclined-plane method.

Outstanding properties are its toughness over a wide range of temperatures, its excellent electrical properties over a wide range of frequencies, its extreme inertness to chemicals, and its resistance to heat. Normally, "Teflon" has a crystalline structure, but when heated above 620° F. it is changed to an amorphous jelly. In the neighborhood of 750° F., it decomposes slowly to yield the gaseous monomer plus small amounts of other gaseous derivatives of fluorine. At temperatures below the transition point, "Teflon" is remarkably stable. The tensile strength of molded bars kept at 570° F. for one month will drop only 10–20%. At 480° F., the loss in tensile strength is negligible over very long intervals. The material suffers no detectable loss in weight from being baked at the transition temperature (620° F.) for many hours. The chemical resistance of "Teflon" is outstanding. It withstands the attack of practically all chemicals except molten alkali metals. It has been boiled in many solvents, including a variety of halogenated hydrocarbons, ketones, esters, and alcohols, without swelling



or any other sign of attack. "Teflon" can be boiled in aqua regia, hydrofluoric acid, sulphuric acid or nitric acid with no change in weight or properties. It is equally resistant to the attack of strong alkalies. Chlorine, bromine or iodine do not react with "Teflon," but fluorine and chlorine trifluoride will react under special conditions. It can be used over the temperature range of −320° F. to 550° F.

The specific embodiments given above are for the purpose of illustrating my invention, and it will be readily understood that my invention includes other modifications within the scope of the following claims.

I claim:

1. A steam pressing device accessory for use in pressing heat sensitive fabrics, said accessory comprising: a perforated sheet of polymerized tetrafluoroethylene to cover the bottom surface of the pressing device; means connected to said sheet for engagement with the pressing device to prevent relative transverse movement of said sheet across the bottom surface of the pressing device; and means to attach said sheet to the pressing device.

2. A steam pressing device accessory for use in pressing heat sensitive fabrics, said accessory comprising: a perforated sheet of polytetrafluoroethylene to cover the bottom surface of the pressing device, said sheet having an upturned flange to fit around the sides of the pressing device to prevent relative transverse movement of said sheet across the bottom surface of the pressing device; and means to attach said sheet to the pressing device.

3. A steam pressing device accessory comprising: a perforated sheet of polymerized tetrafluoroethylene to cover the bottom surface of the pressing device; and means connected to said sheet above the bottom surface thereof to attach said sheet to said pressing device in a substantially fixed position contiguous to the bottom surface of the pressing device.

4. A steam pressing device accessory for use in pressing heat sensitive fabrics, said accessory comprising: a perforated sheet of polytetrafluoroethylene to cover the bottom surface of the pressing device, said sheet having an upturned flange to fit around the sides of the pressing device; metallic means extending about and secured to said upturned flange; and means connected to said metallic means to fix said sheet in a position contiguous to the pressing surface of the device with said flange and metallic means contiguous to the sides of the pressing device.

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