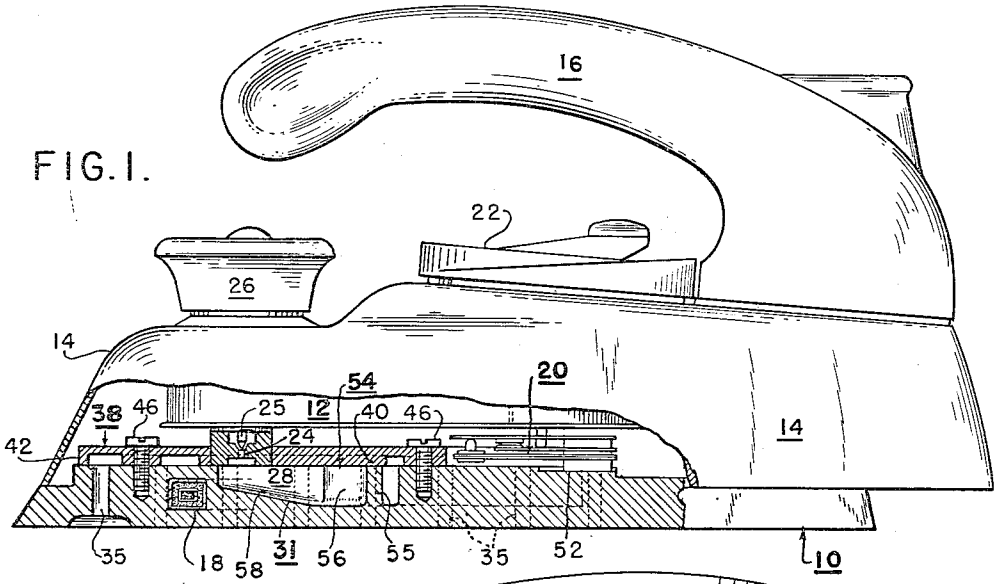
Dec. 18, 1956 B. F. PARR 2,774,156

STEAM IRON BASE

Filed July 3, 1953 2 Sheets-Sheet 1

FIG. 1.



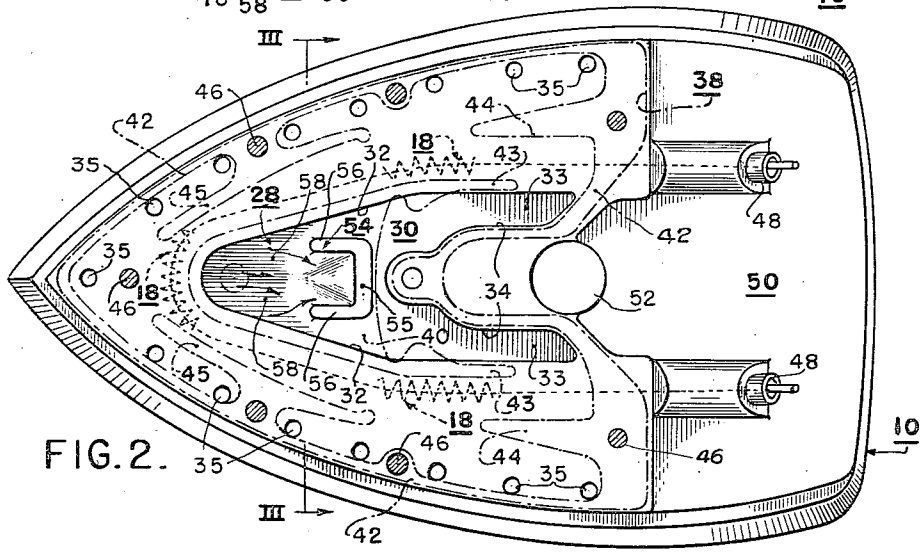


FIG. 2.

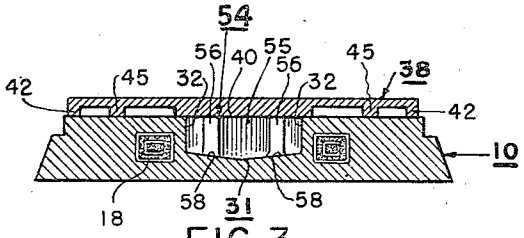


FIG. 3

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Dec. 18, 1956 B. F. PARR 2,774,156

STEAM IRON BASE

Filed July 3, 1953 2 Sheets-Sheet 2

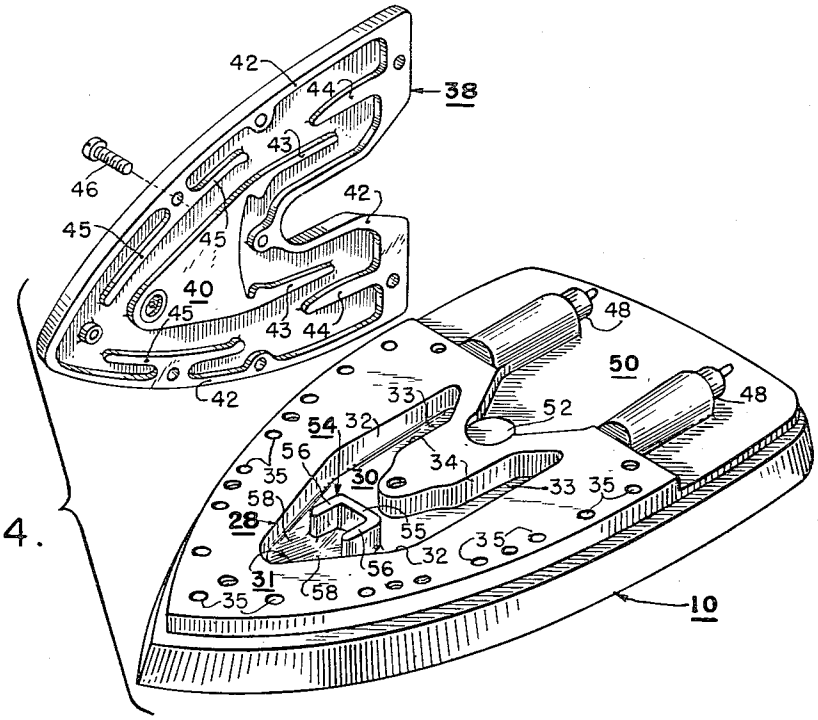


FIG. 4.

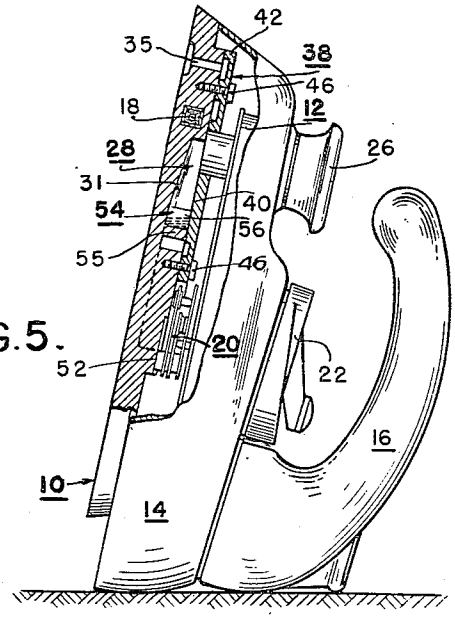


FIG. 5.

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2,774,156

STEAM IRON BASE

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Application July 3, 1953, Serial No. 365,949

4 Claims. (Cl. 38—77)

This invention relates to electrically heated steam irons of the flash type and has for an object to provide an improved iron of this kind.

In a steaming iron of the type set forth, water is delivered from a reservoir to a steam generating chamber formed in the heated soleplate, by means of an orifice and under control of an adjustable valve stem. The soleplate is electrically heated under control of a thermostat and progressively increases and decreases in temperature following respective periods of energization and deenergization of the heater. The water passed to the steam generating chamber is vaporized and the vapor then flows through heated passages in the soleplate to spaced portions thereof for discharge. It has been found that vaporization is readily effected in the steaming chamber when the temperature of the soleplate is relatively high or in the upper portion of its operating range but that, during periods when the soleplate temperature is lower or in the lower portion of its operating range, vaporization may be retarded. Accordingly, water particles may be carried with the steam moving through the heated passages to the points of discharge. During a pressing operation, these water particles are blown on the fabric being treated and may cause staining of the fabric.

Also, in steam irons of the above type, the water valve may be disposed in the forward portion of the iron so that, when the iron is upended, it is not necessary to shut off the water flow to the steam generating chamber, since the orifice will assume a position which is above the water level in the reservoir. However, during the upending operation, some water may flow into the steam generating chamber and then gravitate to the rearwardly disposed heated passages, where it is rapidly converted to steam and violently ejected from the soleplate by what is generally known as a "puffing action." This phenomenon is also undesirable, since there is the danger of scalding the operator and also the unexpected hissing sound may cause alarm on the part of the operator.

It is, therefore, a further object of the invention to prevent the passage of water from the steam generating chamber to the discharge passages of the iron and, therefore, preclude the staining of the fabrics being treated.

A still further object is to provide an improved steam iron in which the "puffing action" upon upending the iron is considerably reduced or eliminated entirely.

In accordance with the foregoing objects, I provide a barrier forming a cup-shaped trap in the steam generating chamber for trapping liquid which would otherwise flow to the steam passages together with the steam generated in the steam generating chamber.

The trap is disposed rearwardly of the valve orifice and is preferably U-shaped with side walls extending upwardly to the cover plate for the soleplate. The trap is preferably made integral with the bottom wall of the steam generating chamber so that it is constantly at the same temperature as the bottom wall of the steam generating chamber. Also, it is spaced from the side walls

of the steam generating chamber, so that it is not heated by direct action of the heating element but is heated by heat conducted to it by the bottom wall of the steam generating chamber. The last mentioned wall is concave and sloped downwardly in rearward direction, so that water which has not been vaporized flows into the confines of the trap.

As mentioned previously, the temperature of the soleplate and of the steam generating chamber fluctuates between a high value and a low value because of the intermittent energization of the heating element by the thermostat. With the above arrangement, during the low temperature period of the steam generating chamber, water which is unvaporized will flow from the steam generating chamber into the trap, where it is stored until it is evaporated during the next high temperature period of the steam generating chamber. Also, when the iron is upended, water flows into the confines of the trap and is collected therein. This water is prevented from flowing into the passages where it would be violently converted into steam and ejected through the soleplate. Should the iron be upended during the high temperature period of the steam generating chamber, the water collected in the confines of the trap is gradually converted into steam without the usual "puffing" action. Should the iron be upended during the low temperature period of the steam generating chamber, water collected in the trap is retained therein until the next high temperature period of the steam generating chamber.

The above and other objects are effected by the invention as will be apparent from the following description taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a side elevation of a flash type steam iron having my invention incorporated therein, some of the parts of the iron being shown in vertical section to illustrate the invention;

Fig. 2 is a plan of the soleplate, the cover plate and the passages formed therein being shown in dot-and-dash lines.

Fig. 3 is a vertical section taken on line III—III of Fig. 2;

Fig. 4 is a perspective of the soleplate and its cover plate, the cover plate having been rotated to show the passages formed therein; and

Fig. 5 is a side elevation substantially similar to that shown in Fig. 1, but on a smaller scale and with the iron in upended position.

Referring to the drawings in detail, especially Fig. 1, I show a steam iron of the flash type having a soleplate **10**, which may be an aluminum casting, a water reservoir **12** disposed above the soleplate, a shell **14** enclosing the reservoir and extending downwardly to the soleplate and a manipulating handle **16**, preferably attached to the rear portion of the shell **14**.

A heating element **18**, preferably of the sheathed type, is embedded in or otherwise attached to the soleplate **10** and is controlled by the thermostat **20**. The thermostat **20** may be of any desired type, adjustable by a knob **22** which is rotatable to select the mean temperature at which the soleplate is to be maintained.

An adjustable valve, having an orifice **24** which is adapted to be opened and shut by a valve stem **25** connected to a rotatable knob **26**, is attached to the reservoir **12** for delivering water from the reservoir to a steam generating chamber **28** formed in the soleplate **10**.

Referring to Figs. 2 and 4, the steam generating chamber **28** is provided in the forward portion of a large, centrally disposed recess **30** formed in the soleplate **10** and is arranged so that water flowing through the valve orifice **24** will impinge on the bottom wall **31** thereof. The recess **30** has a pair of oppositely disposed side walls

32 converging at the front of the recess and extending rearwardly therefrom to partly define a pair of recess portions 33 communicating with the steam generating chamber. The recess portions 33 are further defined by a pair of inner walls 34 converging at a point disposed rearwardly of the steam generating chamber 28.

The soleplate is further provided with a series of outlet ports 35 spaced along its periphery for discharging steam to the bottom surface of the soleplate. A cover plate 38, provided with a central depending flat portion 40 and a downwardly extending peripheral flange 42, is attached to the upper surface of the soleplate to close the upper openings of the U-shaped recess 30 and the steam outlet ports 35 from the atmosphere. The plate 38 is further provided with a number of depending fins 43, 44 and 45 which cooperate with the upper surface of the soleplate to provide passages connecting the steam generating chamber 28 to the ports 35. The cover plate 38 is attached to the soleplate in vapor tight relation by means of screws 46. Thus, the steam generating chamber 28 is connected to the ports 35 by passages extending from the rear recess portions 33 upwardly and then along the upper surface of the soleplate and around the fins 43, 44 and 45 to the ports 35.

The heating element 18 is generally U-shaped (as indicated in Fig. 2) and extends around the side walls 32 of the recess 30 in the soleplate with its terminal portions 48 extending to the rear or heel portion 50 of the soleplate. Thus, it will be seen that the steam generating chamber 28 and the rearwardly extending recess portions 33 are disposed in the bight of the heating element and are highly heated by the heating element. The thermostat 20 is mounted adjacent the rear of and between the recess portions 33 upon a spot face portion 52, so that it is responsive primarily to the temperature of the central portion of the soleplate.

In accordance with my invention, I provide a generally U-shaped trap or barrier 54 which is disposed in the rear portion of the steam generating chamber 28, that is, rearwardly of the valve orifice 24. The trap 54 is preferably integral with the bottom wall 31 of the steam generating chamber 28 but is spaced from the side walls 32 and walls 34 and is provided with a rear wall 55 and oppositely disposed side walls 56 extending upwardly into abutment with the lower face of the central portion 40 of the cover plate, thereby forming with the bottom wall 31 of the steam generating chamber and the central portion 40, a cup which is open at the front end.

The bottom wall 31 is inclined downwardly in rearward direction (see Fig. 1) and is concave transversely of the longitudinal axis of the soleplate (see Fig. 3), so that it presents surfaces 58 sloping toward the confines of the trap 54 from all directions. Thus, water flowing into the steam generating chamber through the valve orifice 24 is directed into the confines of the trap 54.

Operation (Figs. 1 to 4)

When the steam iron is to be operated for steam ironing, water is introduced into the reservoir 12 (by means not shown) and the thermostat knob 22 is rotated to the selected temperature setting. The heating element 18 is thereupon energized and, within a short time, heats the soleplate 10 and the steam generating chamber 28 to the selected temperature. The valve knob 26 is then rotated to the open position, raising the valve stem 25 and allowing water from the reservoir 12 to flow through the orifice 24 into the steam generating chamber 28. Upon impingement with the bottom wall 31 of the steam generating chamber, the water is rapidly heated and flashed into steam. The steam flows rearwardly through the recess portions 33, upwardly and outwardly along the passages defined by the upper surfaces of the soleplate 10 and the fins 43, 44 and 45 in the cover plate 38, and then downwardly through the steam outlet ports 35 to

the textile being ironed. Should any water not be immediately vaporized, it flows down the sloping walls 58 of the steam generating chamber toward the confines of the trap 54, where it is retained until complete evaporation takes place.

During the course of ironing, the heating element 18 is energized until the temperature of the soleplate adjacent the thermostat 20 attains the temperature for which the thermostat has been set. When the selected temperature is attained, the thermostat acts to deenergize the heating element 18. Since water is dripping constantly into the steam generating chamber 28, the bottom wall 31 of the steam generating chamber cools rapidly, since it is giving up heat to the water being transformed into steam, while the rearwardly extending recess portions 33, not being subjected to the same heat losses, fall in temperature more slowly. Thus, the temperature of the steam generating chamber varies between a high value and a low value. During the low temperature period of the steam generating chamber bottom wall, the water coming into contact with the bottom wall may not be completely transformed into steam. The water which is not transformed into steam flows down the sloping walls 58 of the steam generating chamber and is directed into the confines of the trap 54. Thus, even though water may not be fully vaporized during the low temperature period of the bottom wall, it is prevented from flowing rearwardly to the relatively much hotter surfaces of the recess portions 33, where it would otherwise be violently flashed into steam and blown out with some water particles entrained therein. The water caught in the confines of the trap 54 is slowly vaporized during the low temperature period of the bottom wall of the steam generating chamber.

When the temperature of the soleplate adjacent the thermostat 20 falls below the temperature for which the thermostat is set, the thermostat acts to reinitiate energization of the heating element. The bottom wall 31 of the steam generating chamber is thus reheated to the temperature at which steam generation is rapidly attained and any residual water contained within the trap 54 is then vaporized, together with the water dripping through the orifice 24, and passes out through the steam outlet ports 35, in the manner previously described.

Since the trap 54 is spaced from the side walls 32 of the steam generating chamber and the walls 34 and since it is in contact with the bottom wall 31 of the steam generating chamber, the trap closely follows the temperature of the bottom wall 31. Hence when the bottom wall 31 is cooled, the trap 54 is also cooled to substantially the same temperature as that of the bottom wall 31, so that the water flowing into the trap is not suddenly and furiously evaporated, as would be the case if the trap 54 were in contact with the side walls of the steam generating chamber or the walls of the recess portions and were to receive heat directly from the heating element 18.

Operation (Fig. 5)

During the course of an ironing operation, it is desirable to upend the iron, that is to rotate the iron about the rear end thereof to the position shown in Fig. 5, where the soleplate is disposed in a generally vertical plane and out of contact with the textile. During the upending operation, that is, during movement of the iron from the horizontal position shown in Fig. 1 to the vertical position shown in Fig. 5, water will flow through the orifice until the orifice is elevated to a level above that of the water contained in the reservoir 12, as known in the art, at which time further flow is interrupted. Such water, which flows into the steam generating chamber during the upending operation, will flow downwardly, by means of gravity and as directed by the sloping bottom walls 58 of the steam generating chamber, into the cup formed by the trap 54

together with the bottom wall **31** of the steam generating chamber and the lower face **40** of the cover plate **38**. The water collected in the trap **54**, as indicated at Fig. 5, is prevented from spilling out by the side walls **56** of the trap.

Should the iron be upended during the time in which the bottom wall **31** is at a high temperature, the water caught in the trap **54** is vaporized in the same manner that it is vaporized in the steam generating chamber and is emitted through the outlet ports **35** at normal velocity. Hence, the attendant "puffing action" is absent or at least considerably diminished.

Should the iron be upended when the bottom wall **31** is relatively cool, the water collected in the trap **54** is retained therein and is slowly vaporized until the steam generating chamber is again heated by the heating element, which heating may occur when the iron is again lowered to the horizontal position shown in Fig. 1, at which time, any water remaining in the trap is evaporated in the usual manner and is ejected through the outlet ports **35** onto the textile being ironed.

It will now be seen that I have provided an improved flash type steam iron wherein the discharge of water from the passages of the soleplate during a pressing operation and "puffing action" during upended periods are substantially eliminated at relatively low cost. In this connection, it will be noted that the barrier **54** may be cast integrally with the soleplate **10** and the top surface of the walls **55** and **56** of the barrier **54** are machine finished with the finishing of the upper face of the soleplate **10**.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. A steam iron of the flash type comprising a soleplate having front and rear portions and provided with a bottom pressing surface, a steam generating chamber disposed in said soleplate and provided with a side wall, said soleplate having a passage extending from the rear portion of said steam generating chamber and communicating with said bottom pressing surface, a cover plate disposed in vapor-tight relation to said soleplate and overlying said steam generating chamber and said passage, an electric heating element having a portion disposed adjacent said steam generating chamber side wall and a portion disposed adjacent said passage, means for admitting water to said steam generating chamber through said cover plate, and a trap disposed in said steam generating chamber rearwardly of said water admitting means, said steam generating chamber having a bottom surface sloping downwardly in the direction toward said trap and serving to direct unvaporized water into the confines of said trap, said trap being in spaced relation to the side wall of said steam generating chamber and having a U-shaped wall extending upwardly from said bottom surface to said cover plate, said trap wall, together with the bottom surfaces of said steam generating chamber and of said cover plate, forming a cup having an opening facing said water admitting means, and said trap serving to obstruct flow of said water to said passage.

2. A steam iron of the flash type comprising a soleplate having front and rear portions and provided with a bottom pressing surface, a steam generating chamber disposed in said soleplate and provided with a side wall, said soleplate having a passage extending rearwardly from said steam generating chamber and communicating with said bottom pressing surface, a cover plate disposed in vapor-tight relation to said soleplate and overlying said steam generating chamber and said passage, an electric heating element having a portion disposed adjacent said steam generating chamber side wall and a portion disposed adjacent said passage, means for admitting water to said steam generating chamber through said cover plate, a thermostat for controlling the energization of said heating element, said thermostat being disposed in good heat transfer relation to a portion of said soleplate remote from said steam generating chamber, and a barrier disposed in said steam generating chamber rearwardly of said water admitting means, said steam generating chamber having a bottom surface sloping downwardly in the direction toward said barrier, said barrier being in spaced relation to the side wall of said steam generating chamber and having a U-shaped wall extending upwardly from said bottom surface to said cover plate, said barrier wall, together with the bottom surface of said steam generating chamber and of said cover plate, forming a cup having an opening facing said water admitting means, the bottom surface of said steam generating chamber serving to direct unvaporized water into the confines of said barrier through said opening and said barrier serving to obstruct flow of said water to said passage.

3. A steam iron of the flash type having a soleplate provided with a front portion and a rear portion and having a bottom pressing surface, a handle connected to said soleplate for manipulating the iron and for upending said iron to a position in which said front part of the soleplate is disposed uppermost and said bottom pressing surface is disposed substantially vertically, a steam generating chamber disposed in said soleplate and provided with a side wall and a bottom wall, said soleplate having a passage extending from the rear portion of said steam generating chamber and communicating with said bottom pressing surface, a cover plate disposed in vapor-tight relation to said soleplate and overlying said steam generating chamber and said passage, a sheathed electric heating element of generally U-shape attached to said soleplate and extending from said front portion of said soleplate to the rear portion of said soleplate with its bight facing rearwardly, said heating element extending around the side wall of said steam generating chamber and said passage, means for admitting water to the steam generating chamber through said cover plate, a thermostat for controlling the energization of said heating element, means for mounting said thermostat in good heat transfer relation to a portion of said soleplate disposed within the bight of said heating element remote from said steam generating chamber, and a barrier disposed in said steam generating chamber rearwardly of said water admitting means, said steam generating chamber having a bottom surface with portions sloping downwardly towards each other and rearwardly toward said barrier for directing unvaporized water into the confines of said barrier, said barrier being in spaced relation to the side wall of said steam generating chamber and having a wall extending upwardly from said bottom surface to said cover plate, said barrier wall having a rear portion and side portions, which portions together with the bottom surfaces of said steam generating chamber and said cover plate form a cup opening toward said water admitting means, said barrier serving to obstruct flow of water to said passage when said steam iron is in the upended position, as well as in a horizontal position.

4. In a flash type steam iron, the combination of a soleplate structure having a bottom pressing surface, a water reservoir superimposed upon the soleplate structure, a handle for manipulating the soleplate structure over the material being pressed, said soleplate structure being recessed to form a steam generating chamber within a forward portion thereof and a passage extending rearwardly from the chamber to the pressing surface for the discharge of steam from the chamber to the material being pressed, means controlling the delivery of water from the reservoir to a portion of said steam generating chamber, a heater for the soleplate and disposed in intimate heat transfer relationship with said passage,

and means defining an open front, cup shaped trap within the soleplate structure and disposed intermediate said portion of the steam generating chamber and said passage for intercepting liquid particles passing from the chamber toward said passage, said trap being spaced from the heater and out of intimate heat transfer relationship therewith and said trap defining an open top receptacle for containing water when the iron is upended.

References Cited in the file of this patent

UNITED STATES PATENTS

2,025,092	Cooper	Dec. 24, 1935
2,231,275	Marvin	Feb. 11, 1941
2,384,839	Kistner	Sept. 18, 1945
2,561,382	Kistner	July 24, 1951
2,588,747	Morton	Mar. 11, 1952
2,700,236	Marvin et al.	Jan. 25, 1955