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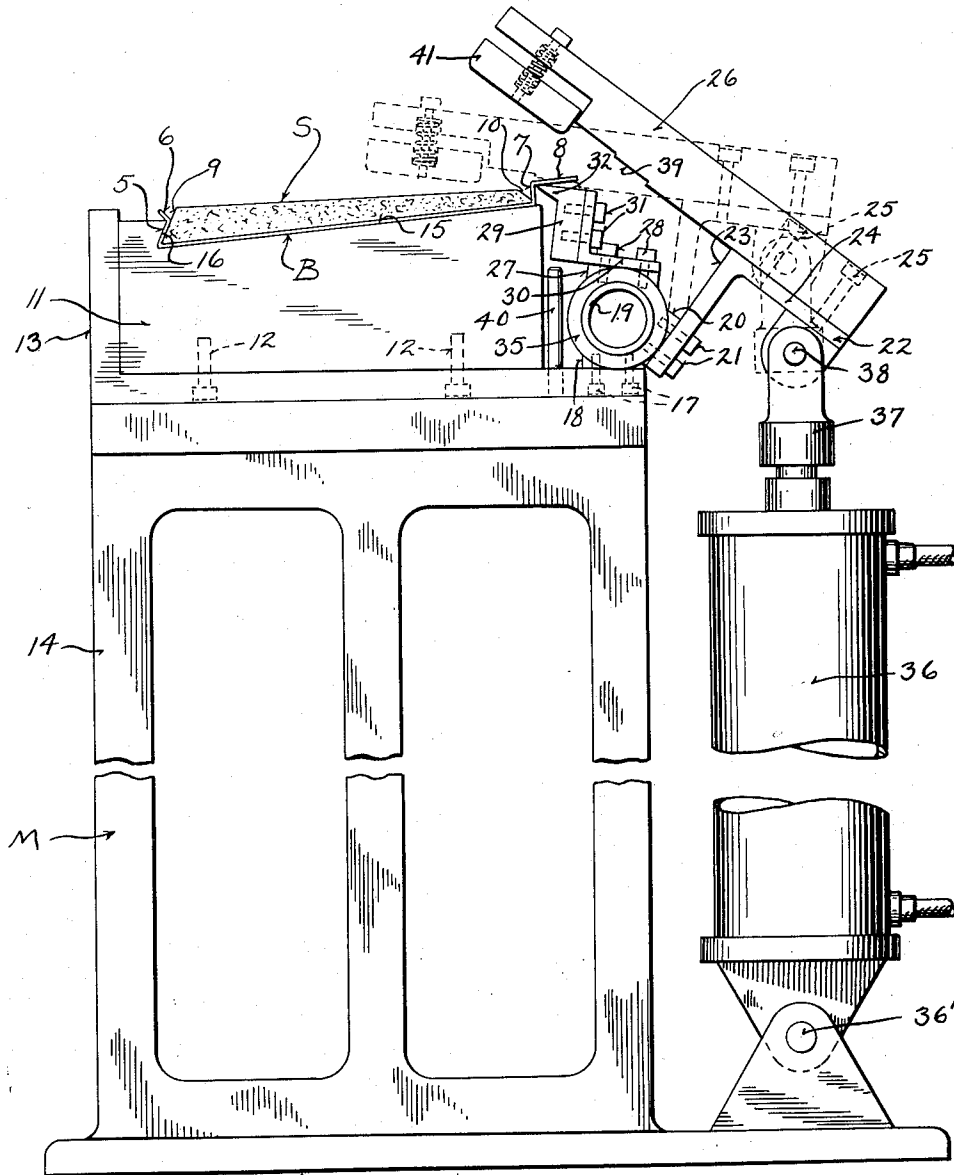
R. J. CASTLETON ET AL  
MACHINE TO BEND METAL WEATHERBOARD  
OVER INSULATION SHEATHING

2,850,070

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3 Sheets-Sheet 1

*Fig. 1.*



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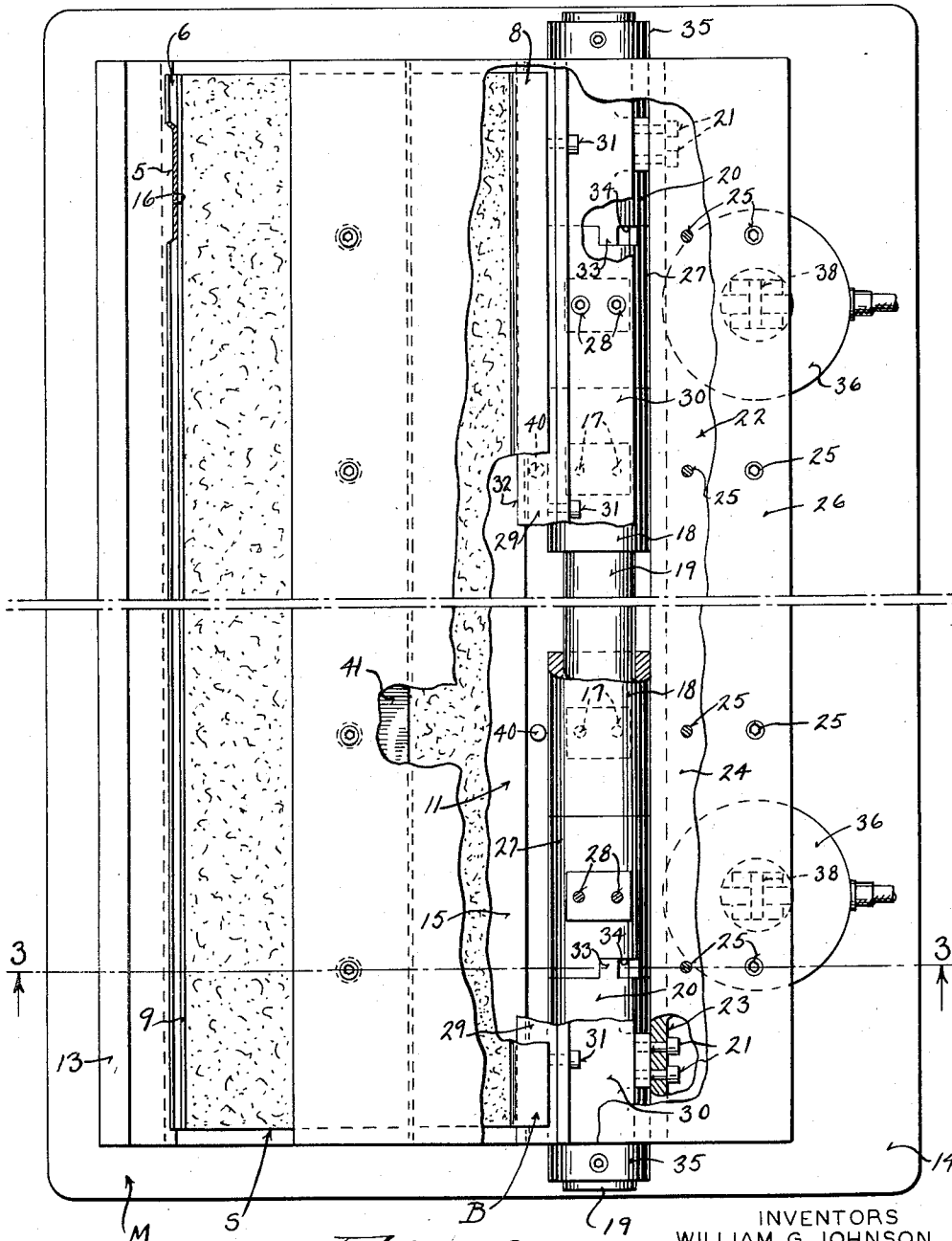


Fig. 2.

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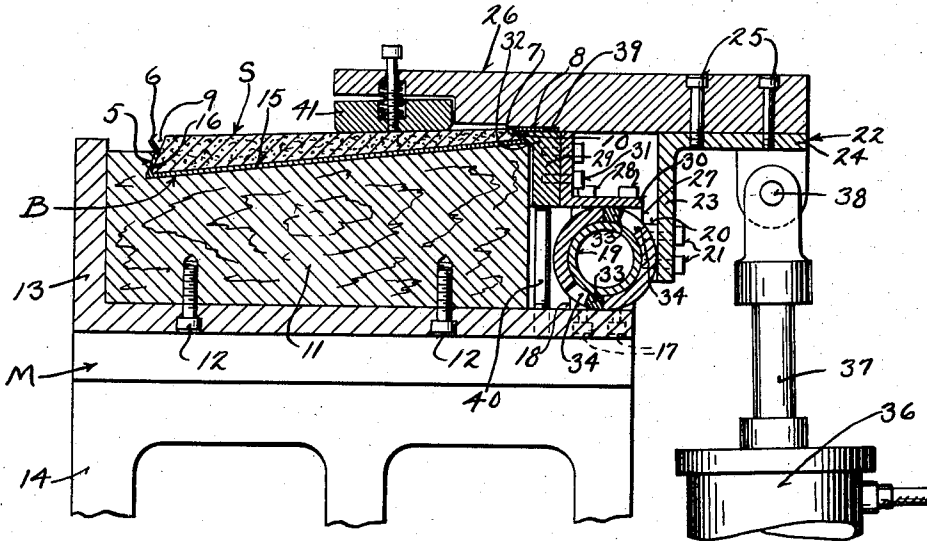
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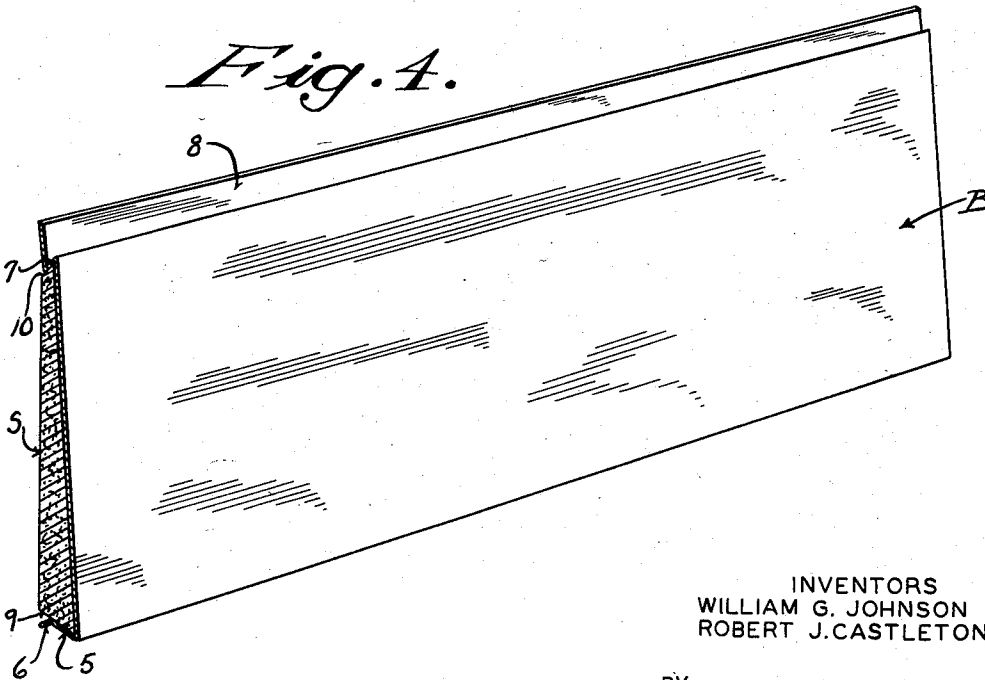
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*Fig. 3.*



*Fig. 4.*



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## MACHINE TO BEND METAL WEATHERBOARD OVER INSULATION SHEATHING

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3 Claims. (Cl. 153—1)

This invention appertains to the fabrication of metal sheets and more particularly to a novel machine for automatically bending sheet metal weatherboard into gripping contact with a backing of insulation sheathing.

In the building art, it has been proposed to incorporate directly with aluminum siding or weatherboard, a backing of insulation sheathing, such as "Celotex," and to simultaneously apply the aluminum weatherboard and insulation sheathing to a building as a unit. In all such structures, with which we are familiar, the insulation sheathing has been secured to the inner face of the aluminum weatherboard by an adhesive. In actual practice, this procedure has not been satisfactory and during handling of the product, the sheathing breaks loose from the metal weatherboard, and this is particularly true, where the product has to be cut to size and where the product has been stored under varying temperatures which affect the adhesive.

It is, therefore, one of the primary objects of our invention to provide means whereby the sheathing is effectively held in place against accidental dislodgement by the bending of the aluminum siding or weatherboard into firm gripping contact with the longitudinal edges of the sheathing and thereby eliminate the use of a bonding agent or adhesive.

Another salient object of the invention is to provide means for clamping insulation sheathing to an enameled aluminum weatherboard by the bending of the weatherboard into gripping contact with the sheathing in such a manner that the bending forms interlocking joints for the siding when the same is applied to a building.

A further important object of the invention is to pre-bend one (lower) longitudinal edge of the weatherboard to form a V-shaped channel into which is slipped one longitudinal edge of the sheathing, with novel means for bending the other (upper) longitudinal edge of the weatherboard over and into gripping contact with the other longitudinal edge of the sheathing and simultaneously forming an attaching flange.

A still further important object of the invention is the provision of a machine for securing an insulation sheathing within an enameled metal weatherboard embodying a bed die block having a smooth non-scuffing upper surface for receiving the partially pre-fabricated enameled weatherboard and the sheathing, with a bending die and a presser plate mounted for rocking movement, and a single means for actuating the bending die and the presser plate to form the clamping flange for the sheathing and the attaching flange for the weatherboard.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described and claimed, and illustrated in the accompanying drawings, in which drawings,

Figure 1 is a side elevational view of the improved machine, showing the partially pre-formed weatherboard in position on the bed die block and the insulation sheath-

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ing associated therewith ready for the final bending operation;

Figure 2 is a top plan view of the machine with parts thereof broken away and in section to illustrate structural detail;

Figure 3 is a transverse vertical sectional view through the machine taken on the line 3—3 of Figure 2, and showing the bending die and presser plate in their lowered position for bringing about the final bending operation, and

Figure 4 is a detail perspective view of a completed weatherboard with the insulation sheathing clamped thereto.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter M generally indicates the novel machine for bending aluminum siding or weatherboard into gripping contact with insulation sheathing S.

The siding or weatherboard B is of sheet metal and preferably of aluminum of a desired gauge having its outer face provided with a desired number of coats of baked enamel. In accordance with our invention, one longitudinal edge (the lower) of the aluminum weatherboard is pre-bent to form an inwardly and rearwardly directed inclined gripping flange 5, and an outwardly bent seating flange 6, for a purpose which will later appear. The other longitudinal edge of the weatherboard B is pre-bent to form a substantially right angularly extending flange 7 and an attaching or nailing flange 8.

The insulation sheathing S can be of any desired type now found in the open market, such as Celotex, and this sheathing is pre-cut to an exact width to conform to the width of the weatherboard B and the opposite longitudinal edges of the sheathing are beveled, as indicated by the reference characters 9 and 10, respectively.

The machine M functions to bend the flange 7 into gripping contact with the inclined edge 10 of the sheathing S and the flange 8 at its angle for proper attachment to a building, as will also later appear. The machine M includes a longitudinally extending bed die block 11 and this die block corresponds in length to the length of the weatherboard being fabricated. The die block 11 can be detachably held in place by suitable machine screws 12 to a holding frame 13. The holding frame 13 in turn is rigidly fastened to any desired type of base or table 14.

In accordance with this invention, the upper face of the die block 11 is provided with a seat 15 for receiving the weatherboard B and the outer normally exposed enameled face of the weatherboard fits snugly in the seat. The seat 15 is provided with a smooth, polished non-scuffing surface, so as to prevent damage to the enamel, with which the weatherboard is finished. The die block 11 is preferably formed from wood to give some resiliency. The forward edge of the seat 15 is provided with a longitudinally extending substantially V-shaped groove 16 which corresponds exactly to the shape of the pre-formed gripping flange 5, and the seating flange 6 extends beyond the block and the groove 16, as best shown in Figs. 1 and 3. With the weatherboard seated in the die block 11, the next step is the placing of the pre-formed strip of sheathing S into intimate engagement with the normal inner face of the weatherboard B and the beveled edge 9 of the sheathing is placed in engagement with the flange 5. This is easily accomplished due to the fact that the flange 7 of the weatherboard at the moment is at right angles to the body portion of the weatherboard (see Fig. 1).

Rigidly secured to the holding frame 13 by any suitable means such as machine screws 17 are sleeves 18 in which is fitted a longitudinally extending shaft 19. The

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shaft 19 is arranged at one side of the bed die block 11 and below the upper face thereof. Rockably mounted at spaced points on the shaft 19 are bearing sleeves 20, and these sleeves have rigidly fastened thereto by machine screws 21 or the like, a longitudinally extending mounting plate 22. This mounting plate 22 is of an angle shape in cross-section and defines a depending leg 23 and a top leg 24. The depending leg 23 is secured by the machine screws 21 to the bearing collars and the top leg 24 has rigidly secured thereto by machine screws or the like 25, a presser plate 26. The presser plate 26 extends longitudinally of the machine for the full length thereof and is of such a width as to extend over the board B and the sheathing S upon the rocking thereof, by means which will later be described.

Also rockably mounted on the shaft 19 are bearing sleeves 27 and these bearing sleeves have rigidly secured thereto by machine screws 28 or the like, the longitudinally extending bending die 29. The bending die 29 also extends the full length of the machine and is positioned directly below the presser plate 26, for cooperation therewith. For easy mounting and for repair the bending die 29 is preferably secured to angle brackets 30 by machine screws 31 or the like, and the angle brackets 30 are in turn fastened by the screws 28 to the bearing sleeves 27.

The bending die 29 has formed thereon on its upper longitudinal edge, the forwardly extending V-shaped bending anvil 32, and it is to be noted that the upper face of the bending die and the anvil 32 is formed with a smooth plane surface. The bending die 29 and the presser plate 26 operate in unison and to aid in their proper movement, the bearing sleeves 20 for the presser plate have formed thereon teeth 33 which are received in notches 34 formed in the bearing sleeves 27 for the bending die 29. The bearing sleeves are all held against lateral shifting movement by end collars 35 keyed, or otherwise secured on the terminals of the shaft 19.

Any desired means can be employed for bringing about the proper rocking of the presser plate 26 and we prefer to use hydraulic or pneumatic means for this purpose. Hence, we have shown air cylinders 36 rockably mounted at their lower ends, as at 36', on the base 14 with the piston rods 37 rockably connected, as at 38, to the carrier plate 24 at one side of the shaft 19. The means employed for rocking the presser plate is conventional and hence need not be described in detail, and the control valves etc. have not been shown.

In operation of the machine, and with the weatherboard B and the sheathing S in place, as illustrated, air is admitted by the operator to the lower ends of the cylinders 36 forcing the rods 37 in an upward direction and bringing about the swinging of the presser plate 26 toward and over the sheathing S. With this rocking movement of the presser plate, the teeth 33 on the bearing sleeves 20 move into engagement with the forward walls of the notches 34 and the bending die 29 is rocked forwardly bringing the anvil 32 into intimate engagement with the weatherboard B at the juncture of the flanges 7 and 8, forcing the flange 7 forwardly and toward the beveled edge 10 of the sheathing. At this time, the presser plate 26 rides down into intimate contact with the bending die 29, forcing the flange 8 over and into engagement with the upper surface of the bending die. The lower face of the presser plate 26 has formed therein a longitudinally extending seat 39 for the flange 8, and the engagement of the presser plate with the die 29 moves these two parts in direct unison and the flange 7 is brought into gripping contact with the beveled face 10. The inward movement of the flange 7 also tends to force the sheathing toward and into intimate contact with the flange 5 of the weatherboard B (see Fig. 3). There can be a slight slipping movement of the flange 8 over the bending die 32 and the seat 39 of the presser plate.

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Upon completion of the bending operation, the operator actuates the controls so as to release pressure at the lower ends of the cylinders 36 and to permit the entrance of air pressure in the upper ends of the cylinders and thus bring about the raising of the presser plate. As the presser plate 26 moves to its raised position, the teeth 33 move into engagement with the rear walls of the grooves 34 and bring back the bending die 32 to its normal raised position and the completed weatherboard can be removed from the machine.

Stop pins 40 carried by a frame 13 can be employed for limiting the downward movement of the bending die 29 beyond a certain point.

In order to prevent injury to the sheathing S by undue pressure thereon from the plate 26, I preferably mount on the presser plate 26 a spring pressed pad 41 for engaging the sheathing and this pad will give and move upwardly upon the engagement thereof with the sheathing.

Stress is laid on the fact that the gripping flanges 5 and 7 not only effectively form means for holding the sheathing in place, but also form means for interlocking engagement with adjacent weatherboard during the placing of the siding on a building. As best shown in Figure 4, the flange 7 and the attaching flange 8 by their bending define a longitudinally extending seat in which is received the flange 6 of an adjacent strip of siding and the flange 5 rests upon the outer edge of the flange 7 of the adjacent piece of siding.

Various changes in details may be made without departing from the spirit or the scope of this invention, but what we claim as new is:

1. A machine for bending one longitudinal edge of a sheet metal weatherboard into gripping engagement with one longitudinal edge of a strip of insulation sheathing comprising a bed die block having a seat for receiving the weatherboard with the sheathing thereon, a bending die mounted for rocking movement having a substantially V-shaped anvil movable over the die block and sheathing upon rocking movement thereof in one direction and into engagement with a portion of said weatherboard for bending said weatherboard into gripping engagement with the sheathing, said bending die having a plane upper face for receiving a portion of the weatherboard, and a presser plate rockably mounted relative to the die block and said bending die for movement over the plane upper face of the bending die and sheathing upon the rocking movement of said bending die, said presser plate having a seat for intimately engaging a portion of the weatherboard on said plane upper face of the bending die, means for synchronously actuating the presser plate and bending die into operative position.

2. A machine as defined in claim 1, and a spring pressed pad carried by the presser plate for contact with the sheathing.

3. A machine for bending one longitudinal edge of a sheet metal weatherboard into gripping engagement with a strip of insulation sheathing comprising a base, a bed die block on said base having a seat for receiving the weatherboard with the sheathing thereon comprising a shaft extending longitudinally of the base and the die block and disposed below said seat, bearing sleeves on said shaft, a bending die secured to said sleeves for movement therewith on the shaft, said bending die being movable toward and over one edge of the bed plate and one longitudinal edge of the sheathing, a presser plate, bearing sleeves for the presser plate rockably mounted on said shaft and said presser plate being disposed above the bending die and movable with its sleeves over the bending die and into engagement therewith, means for rocking the presser plate and its sleeves on the shaft, the sleeves for the bending die and the presser plate being provided respectively with notches and teeth fitting in said notches.

## References Cited in the file of this patent

## UNITED STATES PATENTS

97,762	Clark	Dec. 14, 1869
461,137	Sweeney	Oct. 13, 1891
601,774	Fowler	Apr. 5, 1898
932,367	Bassford	Aug. 24, 1909
1,747,317	Norris	Feb. 18, 1930
2,114,155	Streich	Apr. 12, 1938

2,159,784  
2,209,283  
2,421,667  
2,672,224  
2,707,510  
2,717,668

584,362

Demmin	May 23, 1939
Ronzone	July 23, 1940
Veit	June 3, 1947
Horwitz	Mar. 16, 1954
Gershon	May 3, 1955
Johnson	Sept. 13, 1955

## FOREIGN PATENTS

Germany	Sept. 19, 1933
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