

May 2, 1950

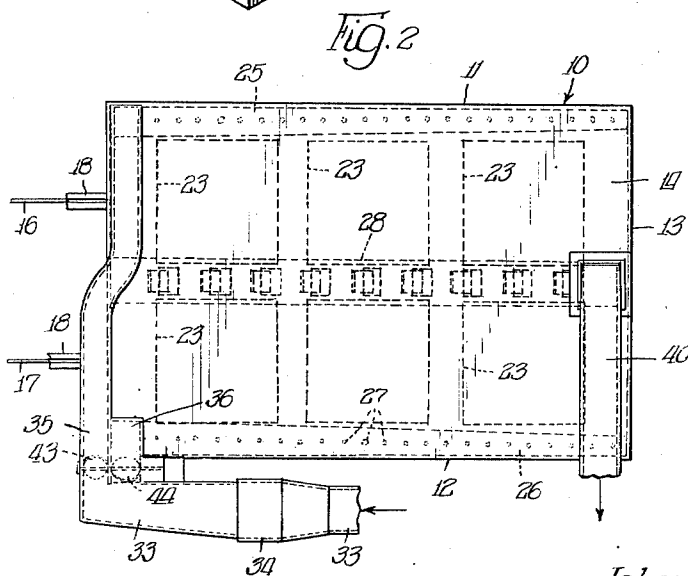
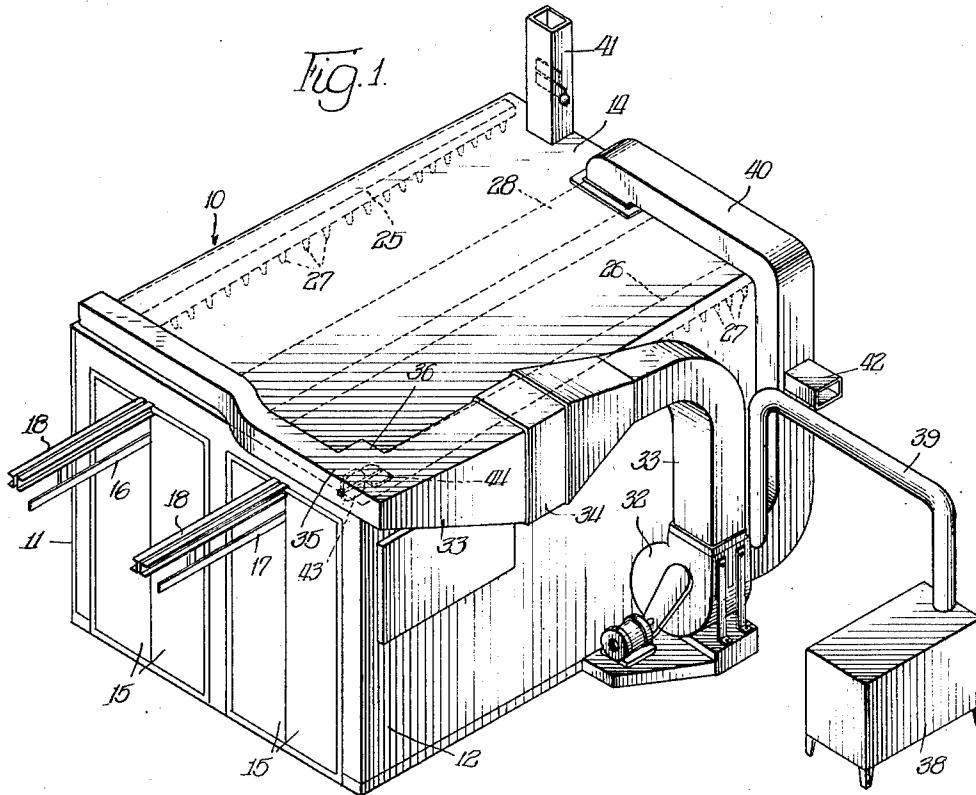
J. A. JULIAN

2,505,973

SMOKEHOUSE

Filed March 19, 1945

4 Sheets-Sheet 1



INVENTOR.

John A Julian,

BY

BT
Gromwell, Grist & Warden

tips

May 2, 1950

J. A. JULIAN

2,505,973

SMOKEHOUSE

Filed March 19, 1945

4 Sheets-Sheet 2

Fig. 3

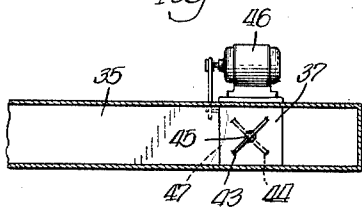


Fig. 4

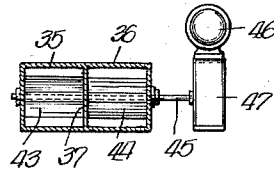


Fig. 5

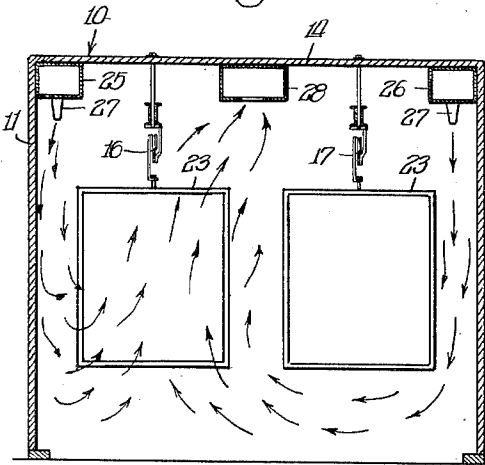


Fig. 6

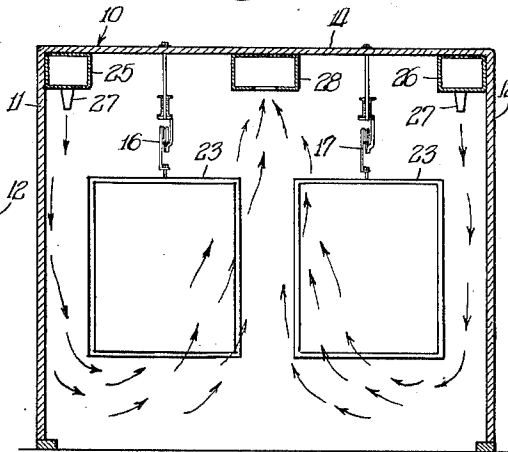
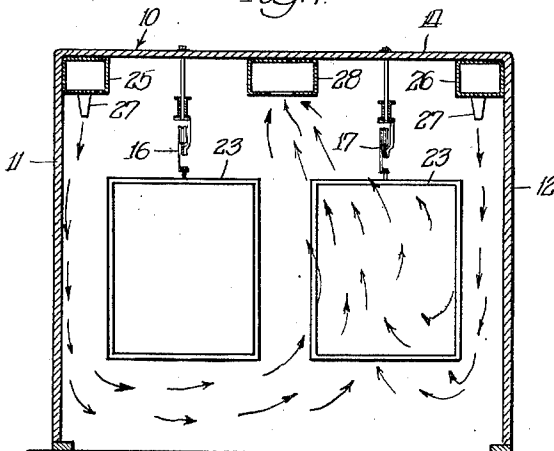


Fig. 7



INVENTOR.

John A. Julian,

BY

Cromwell, Greist & Warden

attys.

May 2, 1950

J. A. JULIAN

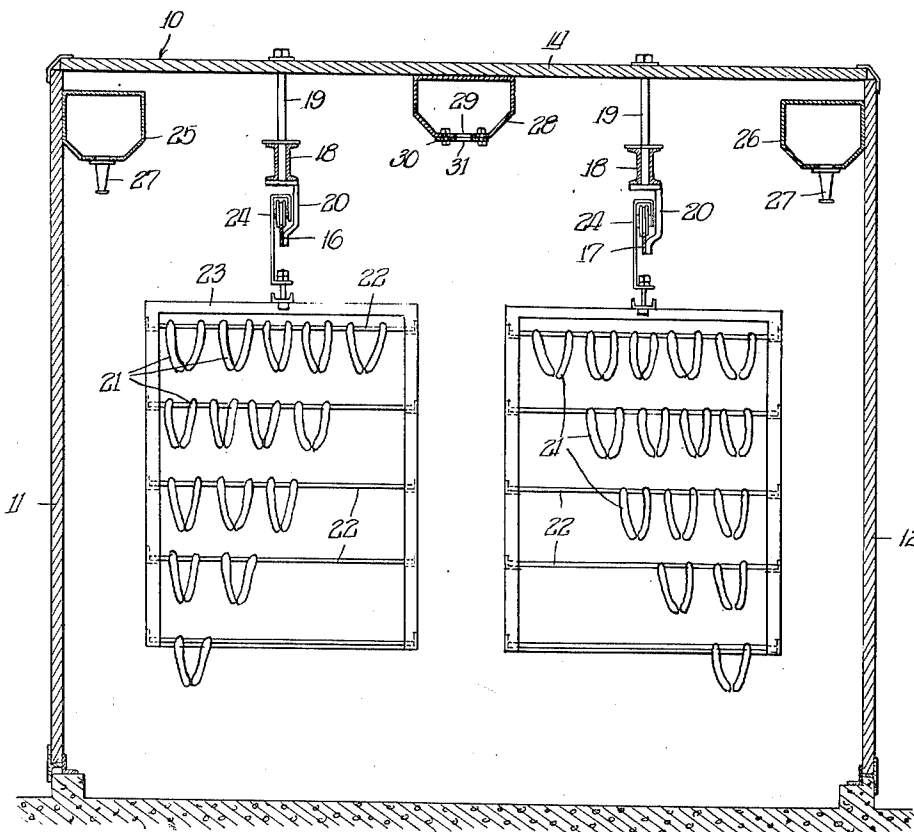
2,505,973

SMOKEHOUSE

Filed March 19, 1945

4 Sheets-Sheet 3

Fig. 8.



INVENTOR.

John A. Julian,

BY

Cromwell, Greist & Warden

attys

May 2, 1950

J. A. JULIAN

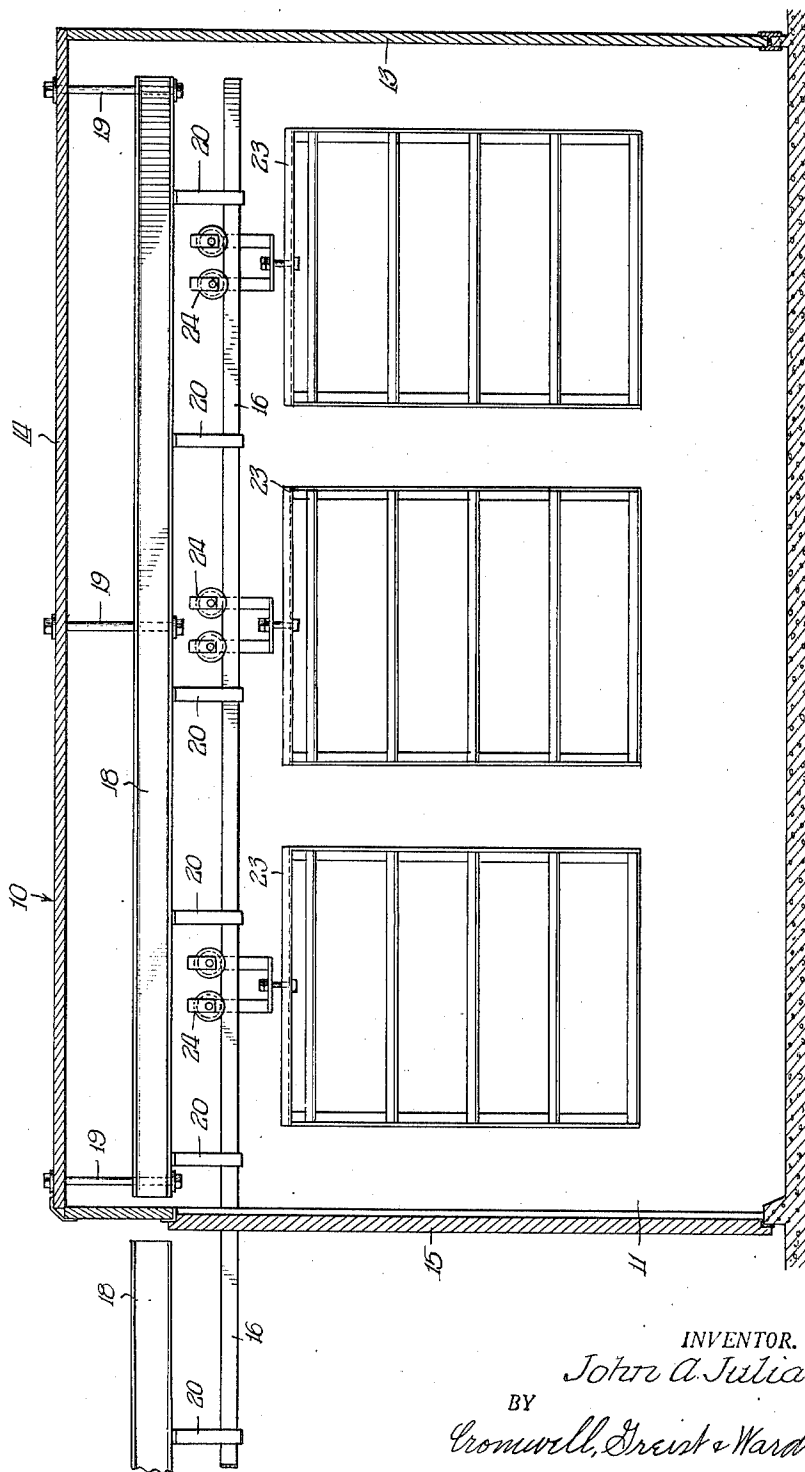
2,505,973

SMOKEHOUSE

Filed March 19, 1945

4 Sheets-Sheet 4

Fig. 9.



INVENTOR.

John A. Julian,

BY

Cromwell, Greist & Warden

attys.

UNITED STATES PATENT OFFICE

2,505,973

SMOKEHOUSE

John A. Julian, Chicago, Ill., assignor to Oscar Mayer & Co., Inc., Chicago, Ill., a corporation of Illinois

Application March 19, 1945, Serial No. 583,417

5 Claims. (Cl. 99—259)

1

This invention has to do with smoke houses of the type in which meat products such as sausages, hams, bacon and the like are treated, and is particularly concerned with the circulation of the smoke in such houses.

The object of the invention is to provide, in a smoke house of the type described, improved smoke circulation, by means of which the contents undergoing treatment will be uniformly smoked.

The invention resides in the means provided for effecting and controlling the circulation, and also in the method employed.

While the foregoing statements are indicative in a general way of the nature of the invention, other more specific objects and advantages will be apparent to those skilled in the art upon a full understanding of the circulation involved.

A preferred embodiment of the invention is presented herein by way of exemplification, but it will of course be appreciated that the invention is susceptible of incorporation in other modified forms coming equally within the scope of the appended claims.

In the accompanying drawings:

Fig. 1 is a perspective view of a smoke house which embodies the invention;

Fig. 2 is a plan view of the house;

Fig. 3 is a longitudinal vertical section through one of the two pipes used in feeding the hot air and smoke into the house, showing the control valve in that pipe;

Fig. 4 is a transverse vertical section through the two pipes used for that purpose, showing the control valves in both pipes;

Fig. 5 is a somewhat schematic vertical transverse section through the house, with arrows showing the circulation of the hot air and smoke in one position of the control valves;

Fig. 6 is a similar view, with the arrows showing the circulation in a different position of the control valves;

Fig. 7 is a similar view, with the arrows showing the circulation in a still different position of the control valves;

Fig. 8 is another vertical transverse section through the house, on a somewhat larger scale; and

Fig. 9 is a longitudinal vertical section through the house.

In the drawings a smoke house 10 of generally rectangular form is shown. This house is provided with spaced parallel side walls 11 and 12, a rear wall 13, a roof 14, and outwardly opening doors 15, which doors are located at the front

2

end of the house. Two tracks 16 and 17 lead into the house through the open front end of the latter and are supported in spaced parallel relation to each other midway between the center of the house and the side walls 11 and 12 by beams 18 and hangers 19 and 20 located above and below the beams.

The meat products to be smoked—for example, ordinary link type sausages 21—are suspended from smoke sticks 22 mounted in open-work cages 23, and the cages 23 are in turn suspended from trolleys 24, which trolleys are swiveled to the cages and are adapted to be moved along the tracks into and out of the house. The house shown has a capacity of six cages, but it can of course be constructed to accommodate a larger or smaller number of cages. The cages are adapted to be spaced apart at regular intervals throughout the interior of the house during the smoking operation.

The mixture of hot air and smoke used in treating the meat products enters the house 10 through two horizontally extending ducts 25 and 26. These ducts extend lengthwise of the house, immediately beneath the roof 14, in spaced parallel relation to each other, with the duct 25 adjacent the side wall 11 and the duct 26 adjacent the side wall 12. The ducts 25 and 26 are preferably of progressively reduced diameter in the direction of flow, which direction is toward the rear wall 13, and are closed off at their far ends. Throughout their lengths the ducts 25 and 26 are provided with downwardly directed nozzles 27.

The mixture of hot air and smoke which enters the house through the nozzles 27 leaves the house by way of a horizontally extending discharge duct 28, through openings 29 provided in the same. The duct 28 is located immediately beneath the roof 14, midway between the ducts 25 and 26, in spaced parallel relation to the latter. The effective size of the openings 29 in the duct 28 can be regulated by means of a longitudinally shiftable plate 30, which plate overlies the openings 28 and is provided with openings 31 in either partial or complete registration therewith. The tracks 16 and 17 from which the cages 23 are suspended, are located midway between the center exhaust duct 28 and the side feed ducts 25 and 26.

The mixture of hot air and smoke used in the operation of the house is circulated at any desired velocity by a motor driven fan (not shown) which is located in a casing 32 at one side of the house. From the casing 32 the air passes upwardly through a pipe 33 to a heater (not shown) which is enclosed within an enlarged portion 34 of the

3

pipe. From the heater the then heated air continues through the pipe 33 to two branch pipes 35 and 36, which branch pipes are arranged alongside each other and are initially separated by a partition 37 (see Figs. 3 and 4). The branch pipe 35 connects with the larger end of the feed duct 25, while the branch pipe 36, which is relatively short, connects with the larger end of the feed duct 26.

The smoke which is mixed with the hot air is generated in a smoke pot 38 and is led into the hot air system through a pipe 39. The mixture of hot air and smoke which is drawn into the discharge duct 28 by the suction of the fan, leaves the house through a pipe 40 which is connected with the duct 28. The pipe 40 returns the mixture to the suction side of the fan in the casing 32, for recirculation. A vent 41 in the roof of the house allows a certain proportion of the circulating mixture to escape continually from the system, whereby to carry off excess entrained moisture and also maintain the system at any desired pressure. An inlet 42 in the return pipe 40 at the same time allows a corresponding amount of fresh air to enter the system.

The circulation of the mixture of hot air and smoke about the meat products is effected and controlled in a unique and highly advantageous manner. At the point where the pipe 33 opens into the branch pipes 35 and 36 the latter are provided with butterfly valves 43 and 44 (see Figs. 3 and 4). The valves 43 and 44 are secured to a common spindle 45, at opposite sides of the partition 37, and at right angles to each other, with the valve 43 controlling the flow through the pipe 35 and the valve 44 controlling the flow through the pipe 36. The spindle 45 is rotatable and is driven at a very low rate of speed from an electric motor 46 through an interposed gear reducer 47, the spindle making about one revolution every two minutes.

The valves 43 and 44 are preferably of smaller size than the pipes 35 and 36 in which they are mounted, with the result that the flow is never completely shut off in either of the pipes, even when the valve in that pipe is in its closed position.

When the spindle 45 on which the valves 43 and 44 are mounted is in the position shown in Fig. 3 the mixture of hot air and smoke will be directed downwardly from the spaced side ducts 25 and 26 toward the floor, will converge generally beneath the cages 23, and will rise more or less centrally through those portions of the cages 23 which are closest to the center of the house, as illustrated by the arrows in Fig. 6, leaving the house through the centrally arranged discharge duct 28.

As the spindle 45 gradually turns, one of the valves, for example the valve 43, will open to its full extent and the valve 44 will close. As this occurs the volume of hot air and smoke entering through the duct 25 will increase and the volume entering through the duct 26 will decrease, causing the column of hot air and smoke rising through the meat products to move laterally toward the side wall 12, as illustrated by the arrows in Fig. 7. And as the spindle 45 continues to turn, the rising column will travel back to the center again and then to the opposite side, continuing to move back and forth crosswise of the house in such manner as to subject all of the meat products uniformly to the action of the hot air and smoke.

The frequency of the above described cycle may be increased or decreased, as desired. The

4

temperature of the mixture can be regulated automatically, as desired, by means well known in the art.

If desired, a system of gearing or other simple means may be introduced to cause the cages to rotate slowly on their swivel supports, either continuously or intermittently, but such rotation forms no part of the present invention.

While the invention has been herein illustrated and described in its application to the smoking of meat products, some features of the invention are also applicable to the drying or cooking of various other products, with or without the addition of smoke.

I claim:

1. In an enclosure in which products are adapted to be positioned for treatment, inlet and outlet ports through each of which heated fluid is adapted to flow in but one direction, one of said ports being divided into two spaced sections, flow control devices associated with said sections, and means connected with said devices for alternately increasing and decreasing the rate of flow through one of said sections while at the same time alternately decreasing and increasing the rate of flow through the other of said sections, whereby to cause the main currents between the ports to shift back and forth between said spaced sections without changing their general direction of flow.

2. In a smoke house in which products are adapted to be positioned for treatment, two spaced inlets from which a mixture of hot air and smoke is adapted to be delivered into the house, an outlet through which the mixture is adapted to leave the house, flow control devices associated with said inlets, and means connected with said devices for alternately increasing and decreasing the rate of flow from one of the inlets while at the same time alternately decreasing and increasing the rate of flow from the other inlet, whereby to cause the main currents of the mixture and accompanying turbulences between the inlets and the outlet to shift back and forth without changing their general direction of flow.

3. In a smoke house in which products are adapted to be positioned for treatment, two spaced feed ducts from which a mixture of hot air and smoke is adapted to be delivered into the house, a discharge duct through which the mixture is adapted to leave the house, said discharge duct being located between the two feed ducts, flow control devices associated with said feed ducts, and means connected with said devices for alternately increasing and decreasing the rate of flow from one of the feed ducts while at the same time alternately decreasing and increasing the rate of flow from the other feed duct, whereby to cause the main currents of the mixture and accompanying turbulences between the feed ducts and the discharge duct to shift back and forth first toward one of the feed ducts and then toward the other without changing their general direction of flow.

4. In a smoke house in which products are adapted to be positioned for treatment, two spaced feed ducts from which a mixture of hot air and smoke is adapted to be delivered into the house, said feed ducts being located along opposite sides of the house adjacent the top of the latter and being provided with longitudinally extending rows of downwardly directed nozzles, a discharge duct through which the mixture is adapted to leave the house, said discharge duct being located adjacent the top of the house midway between the feed ducts and being provided with a longitudi-

5

nally extending row of openings in the under side thereof, flow control devices associated with said feed ducts and means connected with said devices for alternately increasing and decreasing the rate of flow from the nozzles in one of the feed ducts while at the same time alternately decreasing and increasing the rate of flow from the nozzles in the other feed duct, whereby to cause the main upwardly rising currents formed by the convergence of the flows from the nozzles of both feed ducts to shift back and forth beneath the discharge duct, first in the general vicinity of one of the feed ducts and then in the general vicinity of the other.

5. In an enclosure in which products are adapted to be positioned for treatment, inlet and outlet ports in communication with the enclosure, means for causing heated fluid to flow continuously through each of said ports in but one direction, one of said ports being divided into two spaced sections, which sections are located at opposite sides of said other port in spaced relation to the latter, means for causing heated fluid to flow between said sections and said other port to generally U-shaped partially concurrent paths, with the concurrent portions of said paths passing through the zone adapted to be occupied by the products undergoing treatment, flow control devices associated with said sections, and means connected with said devices for alternately increasing and decreasing the rate of flow through

6

one of said sections while at the same time decreasing and increasing in opposite phase the rate of flow through the other of said sections, whereby to cause the concurrent portions of said flows between the ports to shift back and forth between said spaced sections without changing their general direction of movement, first approaching one non-concurrent portion and then the other in traversing said zone.

JOHN A. JULIAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
121,925	Bell	Dec. 19, 1871
1,621,594	Mahoney	Mar. 22, 1927
2,074,945	Skvor	Mar. 23, 1937
2,096,373	Doherty	Oct. 19, 1937
2,246,804	Lipschutz	June 24, 1941
2,281,269	Costello	Apr. 28, 1942
2,310,222	Deverall	Feb. 9, 1943
2,352,590	Trinkle	June 27, 1944
2,380,428	Gilliam	July 31, 1945

FOREIGN PATENTS

Number	Country	Date
303,591	Great Britain	Jan. 10, 1929