

Dec. 30, 1952

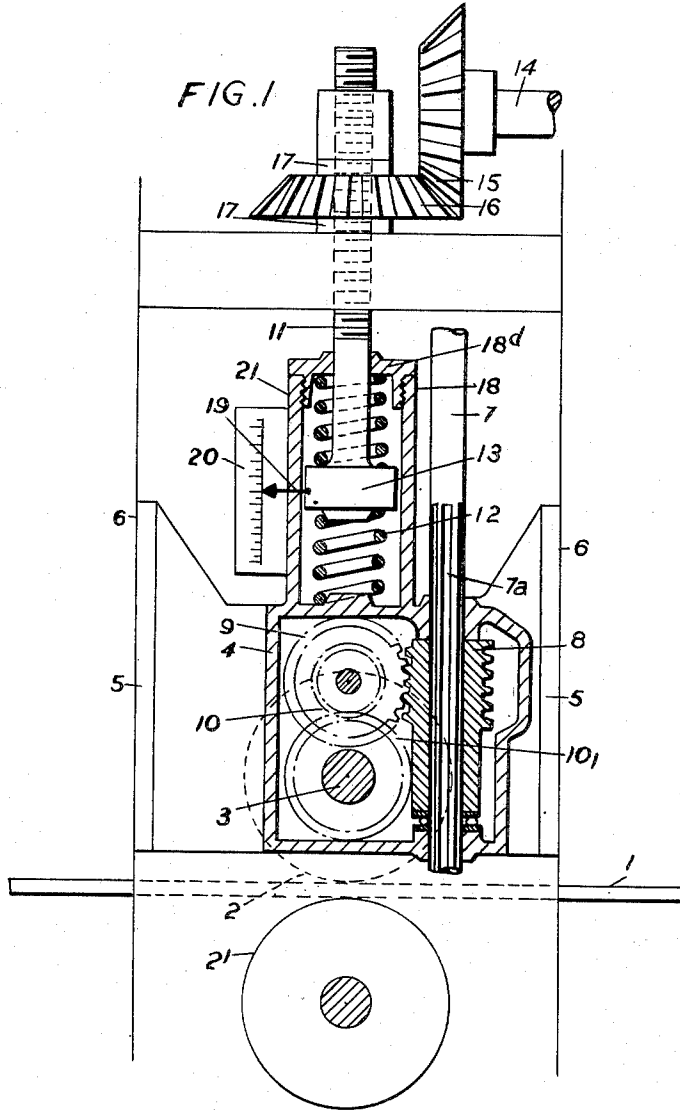
P. BOUSSEAU ET AL

2,623,335

APPARATUS FOR FEEDING GLASS RIBBON

Filed March 29, 1950

2 SHEETS—SHEET 1



Pierre Bousseau
Robert Touway
By *Morrison, Kennedy & Campbell,*
Inventors
Attorneys

Dec. 30, 1952

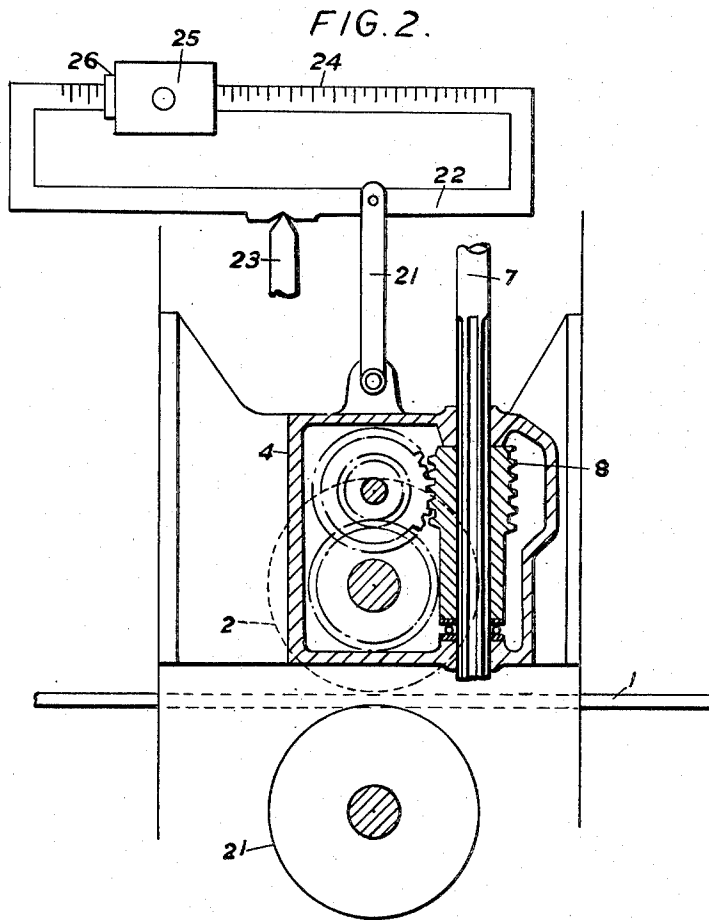
P. BOUSSEAU ET AL

2,623,335

APPARATUS FOR FEEDING GLASS RIBBON

Filed March 29, 1950

2 SHEETS—SHEET 2



Pierre Bousseau
Robert Louvay
By *Morrison, Kennedy & Campbell,*
Attorneys

Inventors

UNITED STATES PATENT OFFICE

2,623,335

APPARATUS FOR FEEDING GLASS RIBBON

Pierre Bousseau, Thourotte, and Robert Touvy,
Paris, France, assignors to Pilkington Brothers
Limited, Liverpool, England, a corporation of
Great Britain

Application March 29, 1950, Serial No. 152,718
In France September 8, 1949

13 Claims. (Cl. 51-215)

1

The present invention relates to apparatus for acting simultaneously on the two faces of a continuously advancing ribbon of glass.

In apparatus of this nature, there are disposed at intervals between the working tools driving rollers, which have the object of ensuring the advancing movement of the glass in the longitudinal direction thereof.

These rollers are arranged in pairs, the one roller of each pair supporting the ribbon of glass, and the other roller, located above the first roller being situated in a vertical plane perpendicular or substantially perpendicular to the direction of advance of the ribbon of glass, the upper generatrix of the lower roller being situated in the same plane as the surface of the lower operating tools. The rollers of each pair rotate in opposite directions to each other, exerting a certain pressure on the ribbon of glass. In this apparatus the pressure is exerted by the weight of the upper roller, and generally speaking is not regulable, and in any case it is always at least equal to the pressure exerted by the weight of the roller.

The invention relates to a means permitting of regulation and of precise measurement of the pressure of the rollers on the ribbon of glass and of the accomplishment of a pressure which may be as weak or as strong as desired, irrespective of the weight of the roller, and such pressure may even be greater than that exerted by the roller under the effect of its own weight.

Now it has been recognised that advantages are obtained by precisely regulating this pressure, and that, generally speaking, such pressure should be proportionately less as the ribbon being treated is thinner, i. e., more fragile.

The invention not only permits of regulation of the pressure in accordance with the thickness of the ribbon, but it also enables this pressure to be precisely adjusted according to a predetermined scale. It is thus possible, after the best pressure conditions suitable for all possible thicknesses have been determined by experience, to bring about at any time, without trial and error, the pressure conditions which are suitable for a given thickness of the glass.

The regulable pressure may be applied to the roller by way of a deformable connection, and the said pressure may be measured by the degree of deformation of the said connection when the pressure is applied thereto.

The invention accordingly comprises in or for an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass which is adapted to be advanced continuously through the apparatus by means of driving rollers arranged in pairs, the rollers of each pair being disposed on opposite sides of the glass, a pres-

2

sure-applying device for applying a regulable and determinable pressure to one roller of each pair in the direction of the opposing roller of the pair.

In order that the invention may be more clearly understood, two forms of embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which

Fig. 1 shows, somewhat diagrammatically, a view in section, perpendicular to the axis of the roller, of one embodiment according to the invention mounted at one end of the roller shaft, an identical arrangement being mounted at the other end of the shaft.

Fig. 2 is a similar view through the second form of embodiment.

These embodiments are applied to an apparatus in which the ribbon of glass 1 is moved horizontally by the rollers 2 and 2', the upper roller 2 being the roller transmitting the pressure and the roller 2' the opposing roller. This pressure is exerted at each end of the roller 2 on its bearings.

In Fig. 1 the end of the shaft 3 of the roller 2 rotates in a bearing not shown in the drawing, which bearing is integral with a housing 4. It is on this housing that the pressure is exerted. The housing is movable vertically in such a way as to permit the roller 2 to bear on the ribbon of glass irrespective of the thickness of the latter. For this purpose it is furnished with shoes 5, which slide along two guideways, the guide faces of which are designated 6. The rotary movement of the roller 2 is obtained in the following manner:

The vertical shaft 7 of an endless screw 8 has a rotary movement imparted thereto by a motor not shown. The endless screw 8 engages with a toothed wheel 9 which, by means of a gear train 10, 10', transmits its rotary movement to the shaft 3 of the roller 2.

In order to permit of vertical displacement of the housing 4 in accordance with the thickness of the ribbon of glass the driving shaft 7 possesses longitudinal grooves 7a, which engage in corresponding grooves in the hub of the endless screw 8. The lower roller 2' can be loose on its shaft, or it can also be mechanically actuated by a similar gear system engaged by the same shaft 7.

The pressure is obtained by a vertical force applied to a rod 11 and transmitted to the pressure element by way of the housing 4 through the medium of a resilient connection constituted by the springs 12 and 21.

The rod 11 carries a reciprocable member 13 located between the two springs. The spring 12 bears at its lower part against the housing 4, and

3

the spring 21 bears with its upper part against a cap 13d screwed on to the vertical extension 13 of the housing 4.

The rod 11 terminates at its upper part in a thread, and the vertical force applied to the rod 11 is obtained by exerting a turning moment on the shaft 14, which is transmitted to the pinion 16 by the pinion 15. The pinion 16, which acts as nut for the rod 11, is held between the bearings 17, which are integral with the frame of the apparatus. Rotation of the pinion 16 accordingly brings about displacement of the rod 11 towards the top or the bottom, the latter being prevented from turning by reason of the rectangular form of the member 13 and of the part 13 which acts as guide therefor.

In its downward movement the member 13 compresses the spring 12, the action of which is added to that of the weight of the roller 2. On the other hand upon its upward movement it is the spring 21 which is compressed and thus relieves the weight of the roller. The more the spring 21 is compressed, the smaller is the pressure which is exerted on the ribbon of glass. There is a certain state of compression of the spring 21 which balances the weight of the roller 2 and of elements attached to the same. At this moment the pressure on the ribbon of glass reaches zero, and if the rod 11 continues to be displaced upwardly the roller is lifted above the ribbon. It is possible, therefore, if the springs have been suitably calculated to regulate the pressure on the ribbon from a zero pressure up to any pressure as desired. The mechanism transmitting the force being irreversible, the latter is maintained even when the turning moment ceases to be applied to the shaft 14.

The pressure is measured and indicated by an indicator 19 carried by the reciprocable member 13, movable in front of a scale 20 integral with the housing 4.

It is obvious that, the rollers being in contact with the ribbon, the pressure indicated will vary, on the one hand according to the thickness of the ribbon of glass, this lifting more or less the housing 4, and on the other hand according to the turning moment applied to the shaft 14, which causes to a greater or smaller extent a downward movement of the rod 11. These two variable factors both modify the tension of the springs, but to one position of the indicator 19 in front of the scale 20 there will always correspond one pressure. It will be possible, therefore, irrespective of the thickness of the ribbon of glass, to regulate the pressure to a given value by manipulation of the rod 11.

It is possible to regulate the pressures on the two bearings of the same roller either separately or conjunctively.

In Fig. 2 the pressure is applied to the roller through the medium of a connection which is deformable by articulation. The actuating mechanism for the rollers remains the same as before. In this case the force is exerted by a weight, and it is transmitted to the housing 4 by a lever and an articulated rod, which constitute the deformable connection. The housing 4 is suspended by a rod 21 from the end of a beam 22 capable of rocking on a knife edge 23. Integral with the lever 22, and parallel to this lever, there is provided a graduated scale 24, along which there can be displaced a weight 25 furnished with a runner 26. In accordance with the fact as to whether the weight 25 is to the right or the left of the knife edge 23 it will load

4

or relieve the roller, and it is possible, therefore, by reason of its displacements, to regulate the pressure of the roller on the ribbon of glass from a zero pressure up to any pressure as desired. Opposite the runner there can be read on the scale the pressure exerted. As in the form of embodiment previously described, each bearing of the roller can be furnished with a regulating device. It is also possible, with the object of simplifying the operation, to combine the two bearings in such a way as to make use of only one regulating device, which will preferably be disposed on the tool-operating side of the apparatus.

In the two forms of embodiment described the measuring scales can be graduated in pressure; or the graduation can be set up in millimetres of thickness of the ribbon, in such a way that for a given thickness of the ribbon, for example 5 mm., the corresponding marking 5 will be that at which the runner requires to be placed to obtain the pressure found to be the best for a ribbon of this thickness.

Various modifications and changes in details of construction of the specific embodiments described and illustrated herein may, of course, be made without departing from the spirit of the invention as defined by the appended claims.

We claim:

1. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable pressure, deformable means for transmitting pressure from said pressure-producing means to one roller of each said pair of rollers in a direction towards the second roller of said pair of rollers, and means for indicating the degree of deformation of said transmitting means when pressure is transmitted thereby.

2. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable pressure, deformable means for transmitting pressure from said pressure-producing means to one roller of each said pair of rollers in a direction towards the second roller of said pair of rollers, and means for translating into desired terms the degree of deformation of said deformable means when pressure is transmitted thereby.

3. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable and regulable pressure, a deformable connection including oppositely acting springs for transmitting an exactly determinable positive or negative pressure from said pressure-producing means to the upper roller of each said pair of rollers in a direction towards the lower roller of said pair of rollers for the purpose of augmenting or relieving the weight of said upper roller, and means

5

operated by said deformable connection for translating into desired terms the degree of pressure transmitted by said connection to each said roller.

4. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable and regulable pressure, and means for transmitting an exactly determinable pressure from said pressure-producing means to one roller of each said pair of rollers in a direction towards the second roller of said pair of rollers, said pressure transmitting means comprising for each pair of rollers at each end thereof a housing supporting the said first roller at its respective end, a spring bearing against said housing in a direction towards said second roller of said pair of rollers, a second spring bearing against said housing in a direction opposite to said first spring and a reciprocable member within said housing, said reciprocable member being connected with said pressure-producing means and being movable between said two springs to augment the weight of said first roller when said member is moved against said first spring and to relieve the weight of said first roller when said member is moved against said second spring.

5. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable and regulable pressure, means for transmitting an exactly determinable pressure from said pressure-producing means to one roller of each said pair of rollers in a direction towards the second roller of said pair of rollers, said pressure transmitting means comprising for each pair of rollers at each end thereof a housing supporting the said first roller at its respective end, a spring bearing against said housing in a direction towards said second roller of said pair of rollers, a second spring bearing against said housing in a direction opposite to said first spring and a reciprocable member within said housing, said reciprocable member being connected with said pressure-producing means and being movable between said two springs to augment the weight of said first roller when said member is moved against said first spring and to relieve the weight of said first roller when said member is moved against said second spring, and means operated by said pressure transmitting means for translating into desired terms the degree of pressure transmitted by said transmitting means to each said roller.

6. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable and regulable pressure, means for transmitting an exactly determinable pressure from said pressure producing means to one roller of each said pair of rollers in a direction towards

6

the second roller of said pair of rollers, said pressure transmitting means comprising for each pair of rollers at each end thereof a housing supporting the said first roller at its respective end, a spring bearing against said housing in a direction towards said second roller of said pair of rollers, a second spring bearing against said housing in a direction opposite to said first spring and a reciprocable member within said housing, said reciprocable member being connected with said pressure-producing means and being movable between said two springs to augment the weight of said first roller when said member is moved against said first spring and to relieve the weight of said first roller when said member is moved against said second spring, and a pointer mounted on said reciprocable member and a stationary graduated scale cooperating with said pointer for indicating in terms determined by the graduation of said scale the degree of pressure transmitted by said transmitting means to each said roller.

7. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable and regulable pressure, an angular housing for each said pair of rollers at each end thereof supporting one roller of said pair of rollers at its respective end, a spring bearing against said housing in a direction towards the second roller of each said pair of rollers, a second spring bearing against said housing in a direction opposite to said first spring, and an angular reciprocable member within said housing, said reciprocable member being movable between said two springs to augment the weight of said first roller when said member is moved against said first spring and to relieve the weight of said first roller when said member is moved against said second spring, said means for producing a variable pressure comprising a manually operable bevel gear, a second bevel gear meshing with said first bevel gear and having an internal thread therein, and a rod integral with said reciprocable member and threaded to engage with the internal thread in said second bevel gear for converting rotary movement imparted to said first bevel gear into linear movement of said reciprocable member.

8. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable and regulable pressure, an angular housing for each said pair of rollers at each end thereof supporting one roller of said pair of rollers at its respective end, a spring bearing against said housing in a direction towards the second roller of each said pair of rollers, a second spring bearing against said housing in a direction opposite to said first spring, an angular reciprocable member within said housing, said reciprocable member being movable between said two springs to augment the weight of said first roller when said member is moved against said first spring and to relieve the weight of said first roller when said member is moved against said second spring, said means for producing a vari-

able and regulable pressure comprising a manually operable bevel gear, a second bevel gear meshing with said first bevel gear and having an internal thread therein, and a rod integral with said reciprocable member and threaded to engage with the internal thread in said second bevel gear for converting rotary movement imparted to said first bevel gear into linear movement of said reciprocable member, and means in association with said reciprocable member for translating into desired terms the degree of linear movement of said reciprocable member.

9. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable and regulable pressure, a deformable connection including an articulated system for transmitting a positive or negative exactly determinable pressure from said pressure-producing means to the upper roller of each said pair of rollers in a direction towards the lower roller of said pair of rollers for the purpose of augmenting or relieving the weight of said upper roller, and means operated by said deformable connection for translating into desired terms the degree of pressure transmitted by said connection to each said roller.

10. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable and regulable pressure, and means for transmitting an exactly determinable pressure from said pressure-producing means to one roller of each said pair of rollers in a direction towards the second roller of said pair of rollers, said pressure transmitting means comprising for each said pair of rollers a housing supporting the said first roller, a pivoted beam, a rod articulated to said housing and to said beam laterally of the pivot of said beam, and a weight slidable along said beam to augment the weight of said first roller when said weight is moved in one direction along said beam away from said pivot and to relieve the weight of said first roller when said weight is moved in the opposite direction along said beam beyond said pivot.

11. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable and regulable pressure, means for transmitting an exactly determinable pressure from said pressure-producing means to one roller of each said pair of rollers in a direction towards the second roller of said pair of rollers, said pressure transmitting means comprising for each said pair of rollers a housing supporting the said first roller, a pivoted beam, a rod articulated to said housing and to said beam laterally of the pivot of said beam, and a weight slidable along said beam to augment the weight of said first roller

when said weight is moved in the direction along said beam away from said pivot and to relieve the weight of said first roller when said weight is moved in the opposite direction along said beam beyond said pivot, and means operated by the said pressure transmitting means for translating into desired terms the degree of pressure transmitted by said transmitting means.

12. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, means for producing a variable and regulable pressure, and means for transmitting an exactly determinable pressure from said pressure-producing means to one roller of each said pair of rollers in a direction towards the second roller of said pair of rollers, said pressure transmitting means comprising for each said pair of rollers a housing supporting the said first roller, a pivoted graduated beam, a rod articulated to said housing and to said beam laterally of the pivot of said beam, and a weight slidable along said beam to augment the weight of said first roller when said weight is moved in one direction along said beam away from said pivot and to relieve the weight of said first roller when said weight is moved in the opposite direction along said beam beyond said pivot, said weight co-operating with the scale on said beam to indicate in terms determined by the graduation of said scale the degree of pressure transmitted to each said roller by said transmitting means.

13. In an apparatus for grinding or polishing the two faces simultaneously of a ribbon of glass, driving rollers arranged in pairs in the apparatus for advancing a ribbon of glass continuously in the longitudinal direction therethrough, the rollers of each pair being disposed on opposite sides of a ribbon of glass when the said glass traverses the apparatus, deformable means for transmitting a variable and regulable pressure to one of said rollers of each pair of rollers, and means for indicating the degree of deformation of said deformable means when pressure is transmitted thereby.

PIERRE BOUSSEAU.
ROBERT TOUVAY.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
551,752	Boardman	Dec. 24, 1895
844,350	Hale	Feb. 19, 1907
1,713,678	Seibert	May 21, 1929
1,714,248	Seibert	May 21, 1929
1,729,498	Waldron	Sept. 24, 1929
1,907,446	Schick	May 9, 1933
1,932,305	Escole	Oct. 24, 1933
2,130,255	Waldron et al.	Sept. 13, 1938
2,187,462	Mulholland	Jan. 16, 1940
2,212,219	Wood	Aug. 20, 1940
2,230,670	Sieger	Feb. 4, 1941
2,297,976	Nachtman	Oct. 6, 1942
2,358,572	Hamilton	Sept. 19, 1944

FOREIGN PATENTS

Number	Country	Date
355,129	Germany	June 22, 1922
618,016	Great Britain	Feb. 15, 1949