A. M. MAZER.

MANUFACTURE OF SHEET GLASS.

APPLICATION FILED NOV. 22, 1911.

1,069,019.

Patented July 29, 1913.

3 SHEETS—SHEET 1.

FIG. 1.

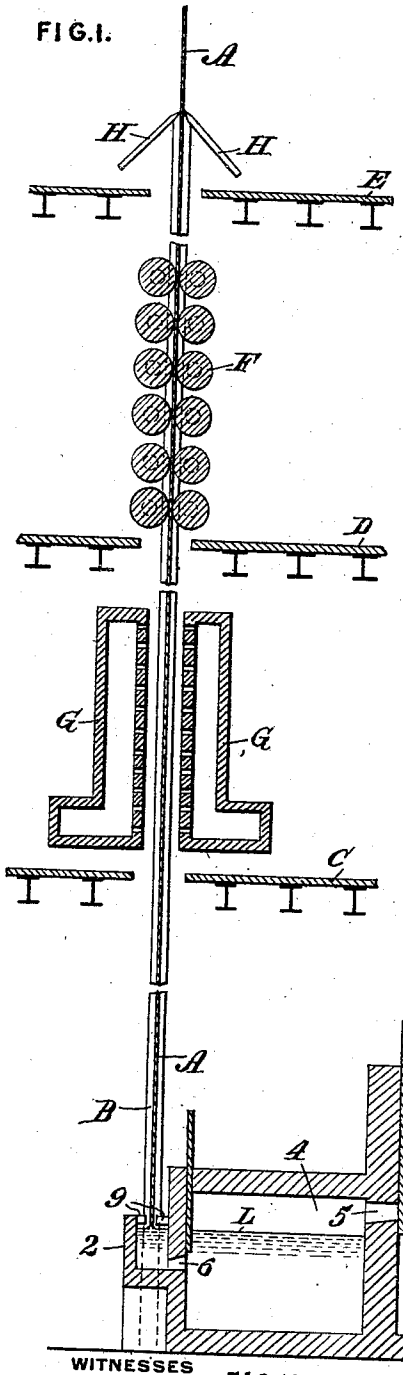
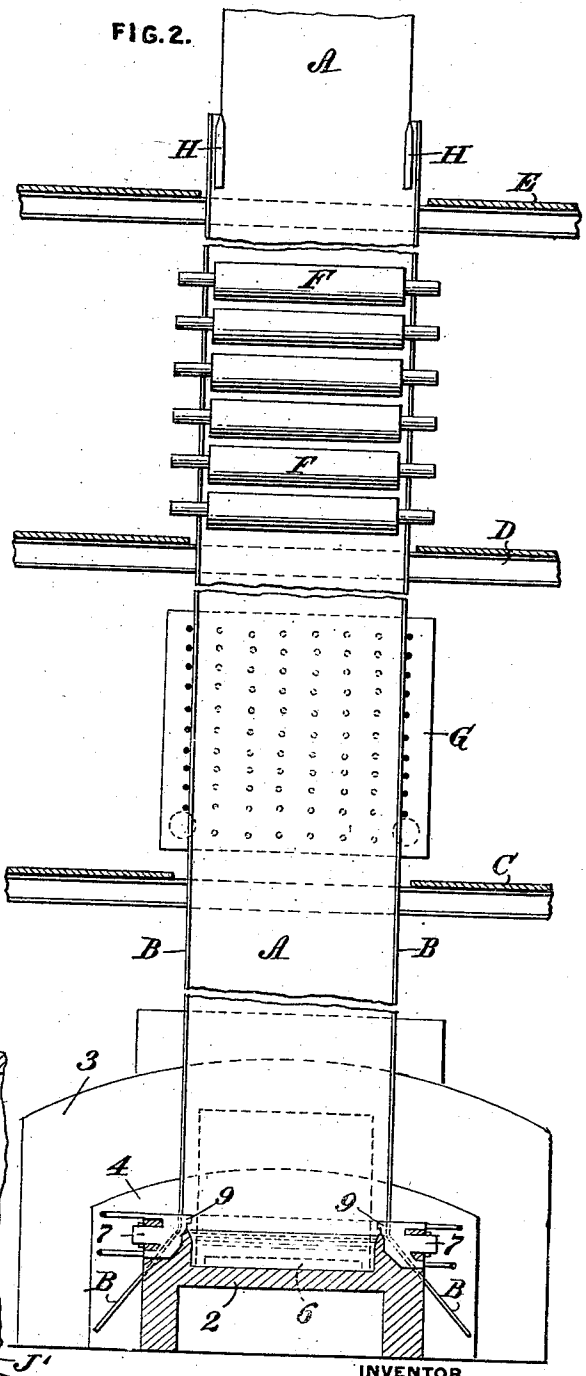


FIG. 2.

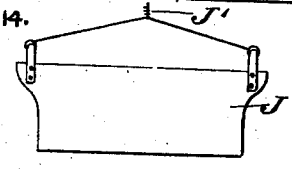


WITNESSES

F. E. Gaither

Ellen McConnell

FIG. 14.



INVENTOR

Alfred M. Mazer,

By J. M. Corbit

Atty

A. M. MAZER.

MANUFACTURE OF SHEET GLASS.

APPLICATION FILED NOV. 22, 1911.

1,069,019.

Patented July 29, 1913.

3 SHEETS—SHEET 2.

FIG. 3.

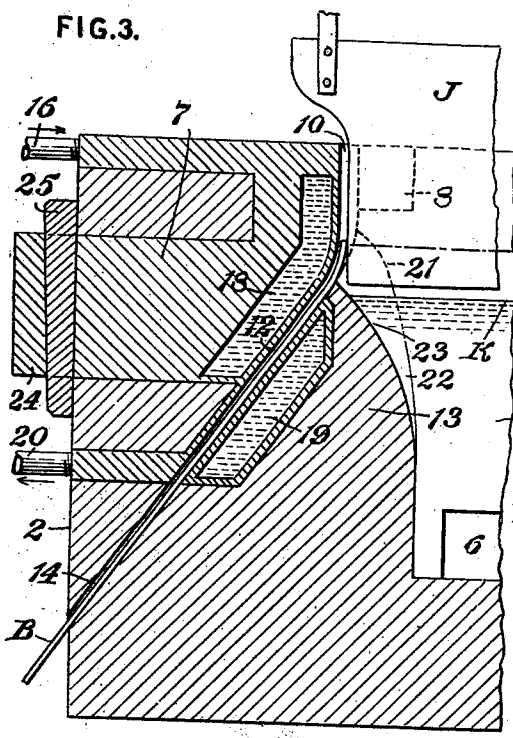


FIG. 4.

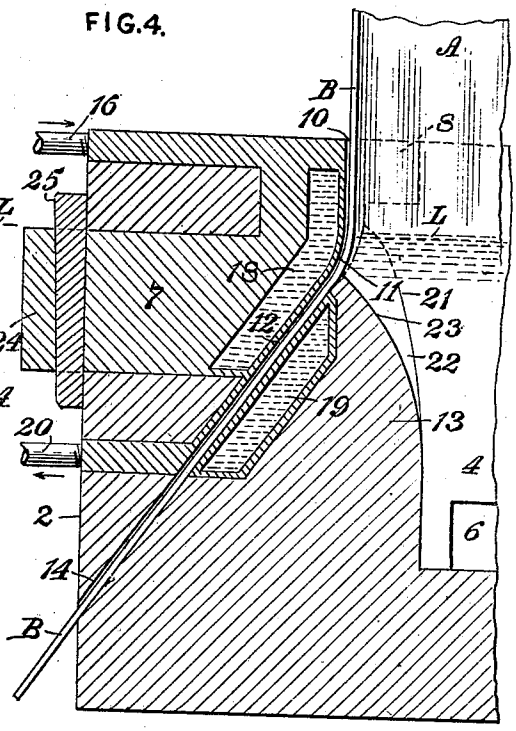


FIG. 5.

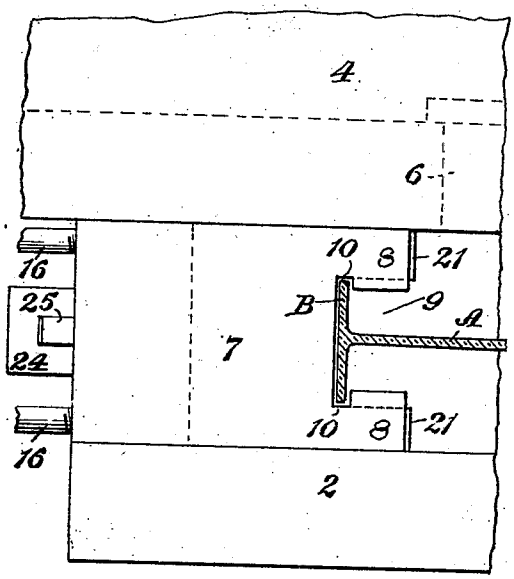
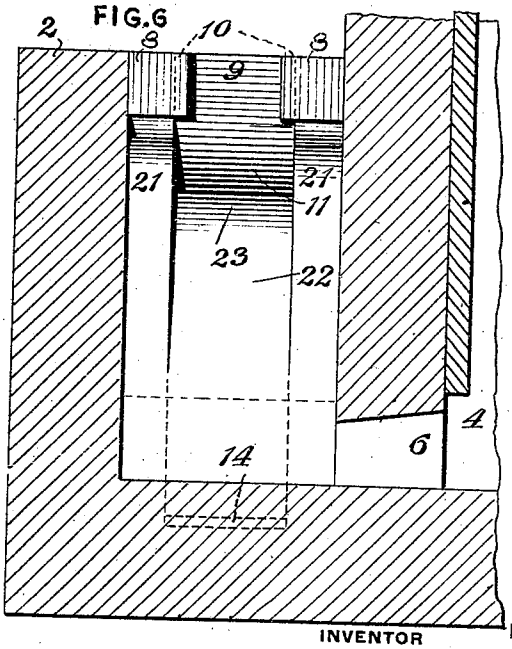


FIG. 6



WITNESSES

F. E. Gaither.

Ella McConnell

INVENTOR

Alfred M. Mazer

By Jas. Norbit Atty

A. M. MAZER.

MANUFACTURE OF SHEET GLASS.

APPLICATION FILED NOV. 22, 1911.

1,069,019.

Patented July 29, 1913.

3 SHEETS—SHEET 3.

FIG. 8.

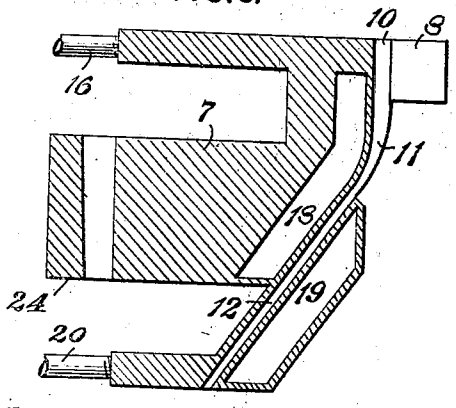


FIG. 9.

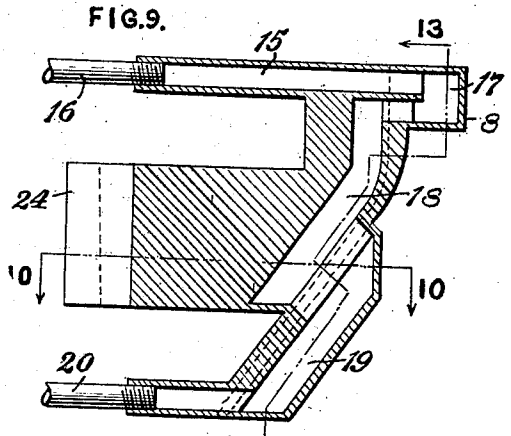


FIG. 7.

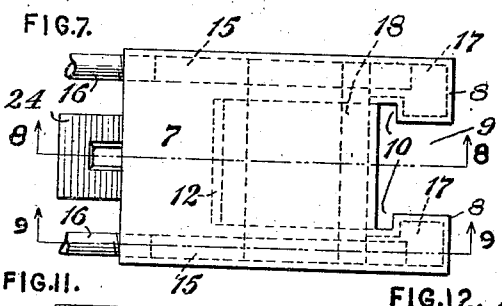


FIG. 10.

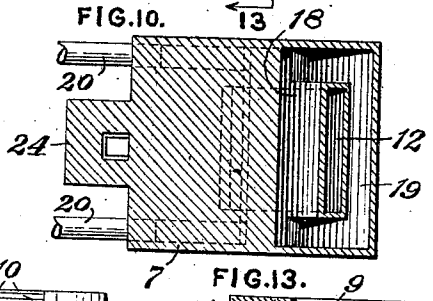


FIG. 11.

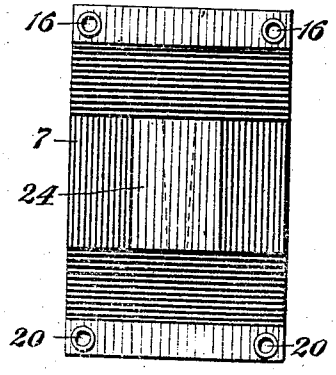


FIG. 12.

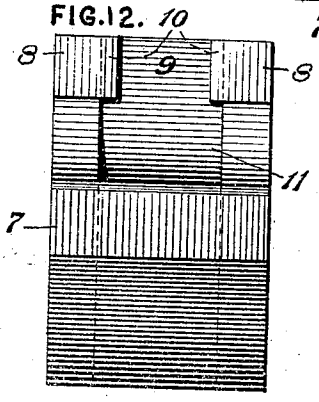


FIG. 13.

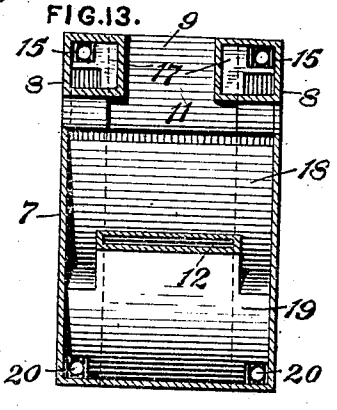
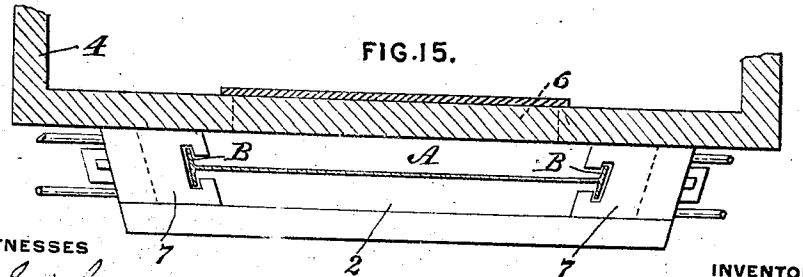


FIG. 15.



WITNESSES

J. E. Faithful

Ella M. Connell

INVENTOR

Alfred M. Mazer

By J. M. Hobbs

Atty.

UNITED STATES PATENT OFFICE.

ALFRED M. MAZER, OF JEANNETTE, PENNSYLVANIA.

MANUFACTURE OF SHEET-GLASS.

1,069,019. Specification of Letters Patent. Patented July 29, 1913

Application filed November 22, 1911. Serial No. 661,736.

To all whom it may concern:

Be it known that I, ALFRED M. MAZER, a resident of Jeannette, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Manufacture of Sheet-Glass, of which the following is a specification.

This invention relates to the manufacture of sheet-glass, and particularly to the production of a sheet of uniform width and of indeterminate length, the sheet being drawn continuously from a supply of molten or viscous glass, and subsequently cut into such lengths or sections as may be necessary for its subequent manipulation.

One difficulty attending the drawing of glass is its tendency to narrow into string form. Expedients more or less successful in practice have been devised for overcoming this trouble, and it is to the elimination thereof that the present invention is directed. Generally stated, it consists in drawing a sheet, together with previously formed edge reinforcements to which the sheet adheres, as by a welding union, the reinforcements being passed continuously to and uniting with the drawn sheet or film of viscous glass as it emerges from the bath, the sheet thus reinforced maintaining a uniform width, the reinforced edges being trimmed therefrom following the drawing operation.

The method of procedure, and apparatus of desirable form for practising the same are fully described hereinafter in connection with the accompanying drawings, wherein—

Figure 1 is a diagrammatic view in vertical section of the apparatus, a tank for the continuous supply of glass being shown, and Fig. 2 is a diagrammatic elevation of the same, the glass container being in section. Fig. 3 is a vertical section of one side of the container with one of the reinforcing guide devices applied thereto, the bait and the reinforcement for one edge of the sheet being shown in position for starting the drawing operation, and Fig. 4 is a similar view, illustrating a portion of the sheet and one of its edge reinforcements after the drawing has been started. Fig. 5 is a view in top plan of the portion of the apparatus shown in Figs. 3 and 4, the sheet and its reinforcement being as illustrated in Fig. 4. Fig. 6 is a vertical section of the container from which the sheet is drawn, one of the guide devices being shown in elevation. Fig. 7 is a top plan of the guide devices. Figs. 8 and 9 are vertical sections of the same, taken on lines 8—8 and 9—9, respectively, of Fig. 7. Fig. 10 is a sectional plan on line 10—10, of Fig. 9. Figs. 11 and 12 are elevations of opposite ends of the guide devices, and Fig. 13 is a vertical cross-section of the same on the irregular line 13—13, of Fig. 9. Fig. 14 is a detail of the bait for starting the drawing operation. Fig. 15 is a view in top plan, illustrating a modified arrangement of the guide devices.

The viscous glass may be supplied in any suitable or convenient manner to the container from which the sheet is drawn. To facilitate a continuous operation, which is preferred, I construct the container 2 as an extension of a glass melting tank 3, with a conditioning and refining chamber 4 interposed between the tank and container, a valved passage 5 controlling the flow of glass from the furnace to chamber 4, and a like passage 6 controlling the flow from chamber 4 to container 2. The ventilation and temperature of chamber 4 may be controlled in any suitable and well known manner, the same forming no part of the present invention. This arrangement of apparatus assures a continuous supply of glass to container 2 at uniform level.

Container 2 is of open-top construction, and is preferably of just sufficient width—outwardly from chamber 4—to accommodate the devices 7 at its opposite ends for directing the edge reinforcements to the sheet being drawn. These devices are of box-like form, being seated or fixed in the end walls of the container, partly above and partly below the level of the glass. At the inner end or side of each device are the projections 8 which are spaced apart vertically at 9 for the upward passage of a glass sheet A, projections 8 being notched to form a guideway 10 for the edge reinforcing strip B. Projections 8 overhang the molten glass within the container, and guideway 10 directs the upward passage of the reinforcement after it has united with the sheet being drawn.

The extension or continuation 11 of guideway 10 below projections 8 is open for a distance to the molten glass, the lower end of the extension 11 being in communication with slot 12 of the box-like structure 7, said slot curving outwardly and downwardly as shown behind the inner portion 13 of wall

or container 2, and being continued at 14 through the outer surface of said wall for passing the reinforcing strip upwardly to part 11 of the guideway where it unites with the edge of the sheet being drawn.

The box structure 7 may be of cast-iron or any other suitable material and to preserve it from the destructive action of the heat it is cored for circulating water around the exposed walls. Referring to this feature of the construction, opposite sides of the top portion of the structure are formed with passages 15 to which water inlets 16 are connected, these passages uniting with cavities 17 in the overhanging extensions 8, while on opposite sides of the reinforcement slot or passageway 12 the structure is made hollow as shown at 18 and 19, cavities 19 extending outwardly around opposite sides of slot 12 with the outlet pipes 20 connected thereto. The inner or front surface of the structure is protected by the formation of wall 13, portions 21 of the latter extending upwardly on opposite sides of the depression 22, the bottom of the latter being rounded outwardly at 23 in ledge-form where it merges with portion 11 of the reinforcement guideway. The box structure 7 may be fixed in the container wall in any suitable manner, in the present adaptation being shown with a projecting portion 24, recessed to receive a key 25.

The reinforcement B may be of any suitable material that will unite with the sheet being drawn in such way as to cause the latter to maintain the desired width. Strips of glass are well suited for the purpose as they are adapted to bend under the action of the heat when being drawn upwardly through the guide devices as hereinafter described, also the viscous glass of the sheet forms a welding union with the strips so that the reinforcement and the sheet comprise practically an integral structure throughout the drawing operation.

The present invention is directed primarily to reinforcing the sheet as it forms, as hereinbefore described, so that the mechanism for effecting the drawing operation is of secondary importance, several forms of apparatus for performing this work and for operating on the sheet after it has been drawn from the molten bath being well known in the art. In Figs. 1 and 2 I have illustrated diagrammatically apparatus that may be used to advantage, showing therein portions of a building structure provided with three floors C, D, and E, through which the sheet is drawn upwardly, a series of rollers F being illustrated diagrammatically above the intermediate floor D for moving the sheet progressively at the required speed. Above the lowermost floor C are the opposite gas-burning annealing devices G between which the sheet is drawn, and above the uppermost floor E are suitable cutters H for trimming off the reinforced edges. While drawing apparatus may be advantageously arranged as thus described, it will be understood that the same may be variously designed without departing from the spirit of the invention.

In starting the drawing operation a bait J of plate-like form is lowered in container 2, as shown in Fig. 3, its lower edge being then slightly above the level K of the glass. After the bait has become heated sufficiently to make a welding union with the reinforcement strip B, the latter is projected upwardly through slot 14 and into slot 12, the extremity thereof softening sufficiently under the heat of the container and the bait to bend as shown in Fig. 3 and to form a welding union with the edge of the bait. This having been accomplished, the level of the glass is raised to the line L, Figs. 3 and 4, submerging the lower edge of the bait and the upper extremities of the reinforcing strips united to its opposite ends. The bait is then drawn upward by any suitable means, thus starting the formation of the glass sheet A, which as it forms unites at its edges with the reinforcements B which are drawn upward initially by the bait and which continue to be drawn upward by the sheet as long as the latter forms.

The reinforcing strips may be supplied in any desired length, being fed upwardly through slots 14 from the exterior of the container 2, each succeeding section of the reinforcement adhering to the extremity of the last preceding section under the influence of the heat of the container and glass, the reinforcements being thus rendered continuous or unbroken so long as the sheet-drawing operation proceeds.

The vertical guideways 10 through the upper portion of the box-like structure give proper upward direction to the edge reinforcements, insuring a sheet of uniform width and thickness, there being no tendency to narrow into string form such as is ordinarily experienced in attempting to draw or separate a portion of a viscous substance from a mass thereof. The arrangement is preferably such that the sheet A unites with the reinforcement B midway between the edges of the latter, as clearly shown in Fig. 5. The apparatus may be so disposed as to position the reinforcements at right angles to the sheet, as in Fig. 5, or the guideways of the box-like structure 7 may be disposed obliquely to the wall of refining chamber 4 in such manner as to more fully expose them to the heat of said chamber and to the glass as it passes from the latter into the container 2, as illustrated in Fig. 15.

When starting the drawing operation as above described, the bait J is moved upwardly by means of suitable elevating line

J' or other device to and through the mechanism above which operates on the sheet. In the arrangement, illustrated diagrammatically in Figs. 1 and 2, the sheet is thus moved upwardly between the annealers G and rollers F, after which the reinforced edges may be severed by any suitable cutting devices, such as H. The sheet may then be cut into sections of any required length.

While I have illustrated desirable means for presenting the reinforcements to the edges of the drawn sheet, I do not limit myself thereto as the underlying method may be practised by various means without departing from the invention.

I claim:—

1. A method of producing sheet glass consisting in drawing a sheet from a bath of molten glass, and drawing therewith a previously formed glass reinforcement to which the drawn glass adheres.

2. A method of producing sheet-glass consisting in drawing a sheet from a bath of molten glass, and reinforcing the edges of the sheet when drawing the same with previously formed pieces of glass.

3. A method of producing sheet-glass consisting in drawing a sheet from a bath of molten glass, and drawing and uniting therewith previously formed glass reinforcements.

4. A method of producing sheet-glass consisting in drawing a sheet from a bath of molten glass, and presenting glass reinforcements to the edges of the sheet as the latter takes form with said edges uniting with the reinforcements intermediate the edges of the latter.

5. A method of producing sheet-glass consisting in drawing a sheet from a bath of molten glass, entering upwardly movable reinforcing strips in the bath beneath the surface thereof with only one face of each strip exposed to the molten glass, and presenting said exposed faces to the edges of the sheet as the latter form and drawing the strips upwardly with the sheet.

6. A method of producing sheet-glass consisting in drawing a sheet from a bath of molten glass, entering upwardly movable previously formed glass strips in the bath beneath the surface thereof with only one face of each strip exposed to the molten glass and with the strips uniting with the edges of the sheet as the latter takes form, and drawing the strips upwardly along with the sheet.

In testimony whereof I affix my signature in presence of two witnesses.

ALFRED M. MAZER.

Witnesses:
J. M. NESBIT,
F. E. GAITHER.