T. E. MURRAY.

HEADER FOR WATER TUBE BOILERS.

APPLICATION FILED MAY 26, 1917.

1,291,600.

Patented Jan. 14, 1919.

4 SHEETS—SHEET 1.

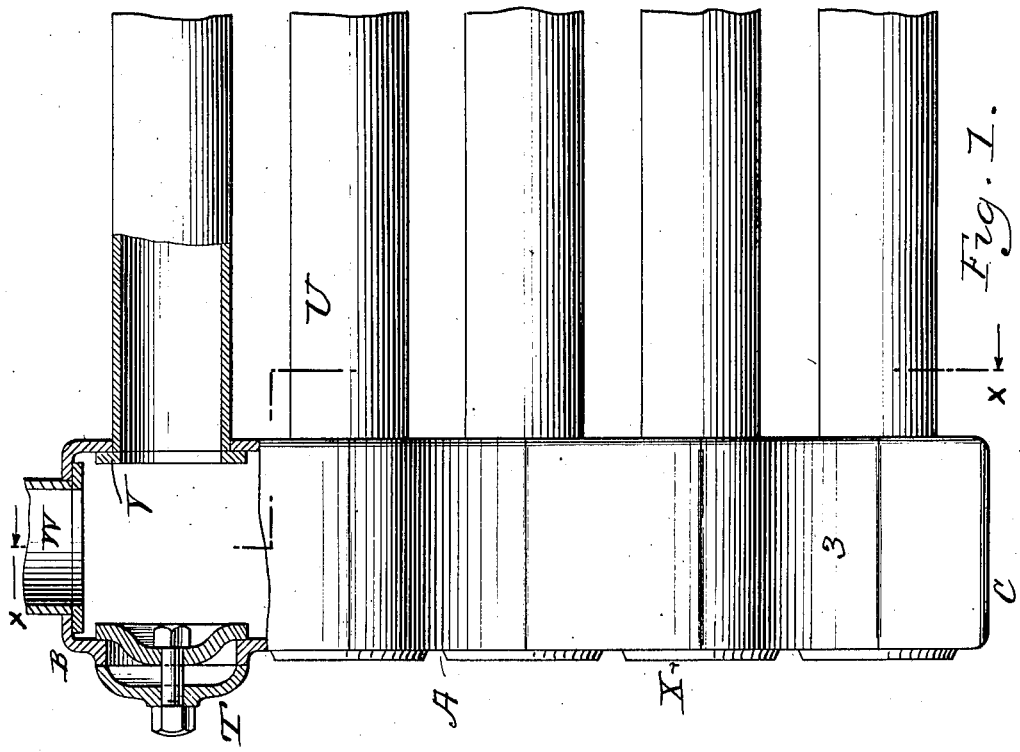

Fig. 1.

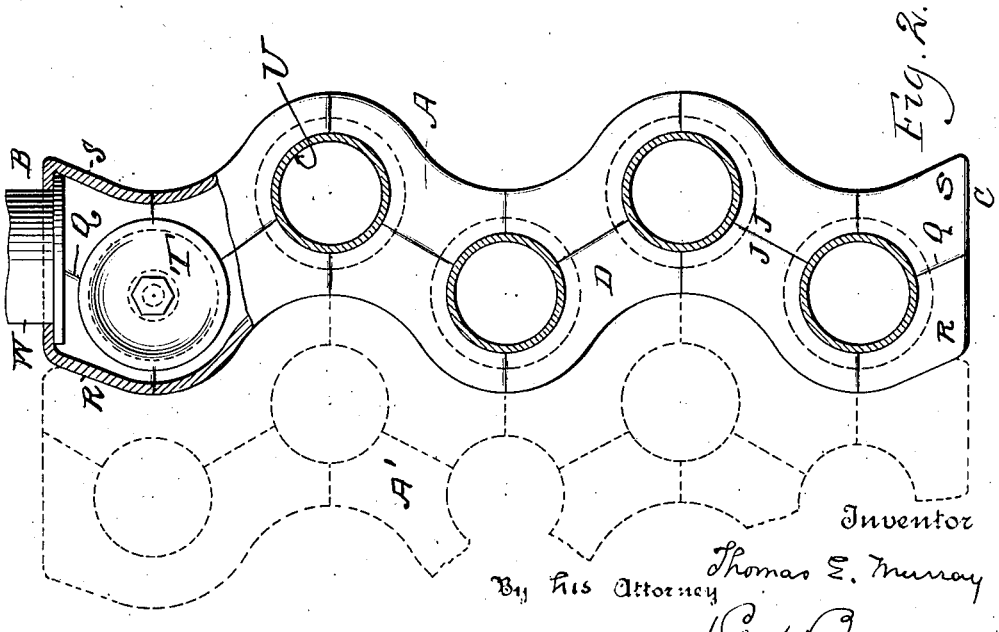

Fig. 2.

Inventor

Thomas E. Murray

By His Attorney

Parker Benjamin

T. E. MURRAY.

HEADER FOR WATER TUBE BOILERS.

APPLICATION FILED MAY 26, 1917.

1,291,600. Patented Jan. 14, 1919.

4 SHEETS—SHEET 2.

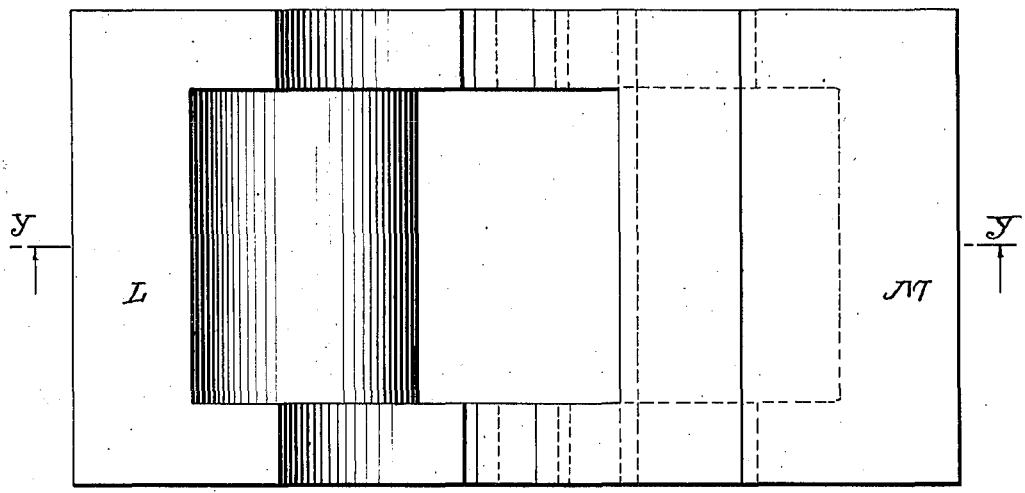

Fig. 5.

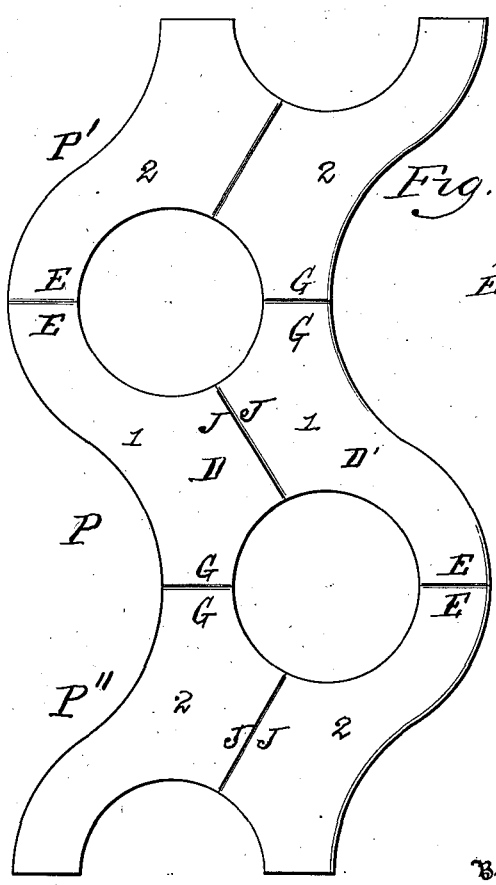

Fig. 4.

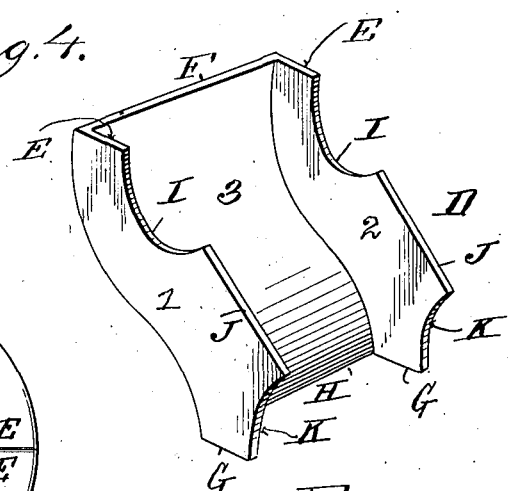

Fig. 3.

Inventor
Thomas E. Murray

By his Attorney
Carl Benjamin

T. E. MURRAY.

HEADER FOR WATER TUBE BOILERS.

APPLICATION FILED MAY 26, 1917.

1,291,600.

Patented Jan. 14, 1919.

4 SHEETS—SHEET 3.

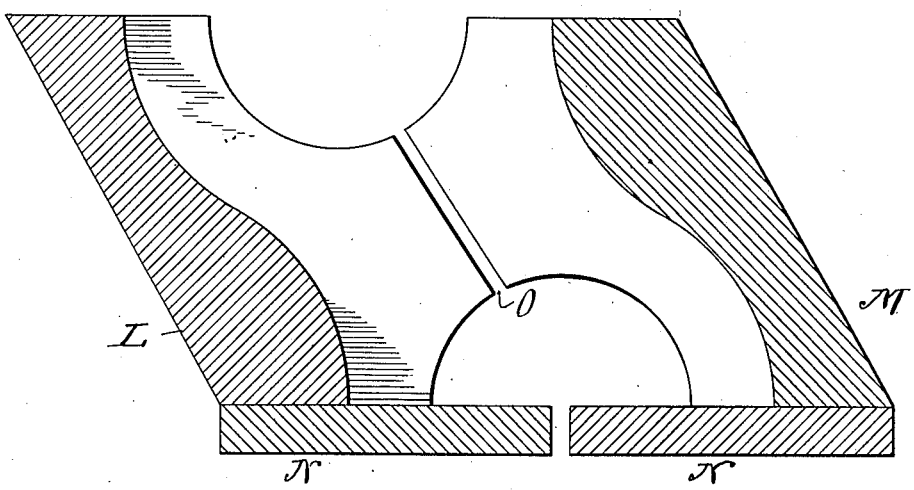

Fig. 6.

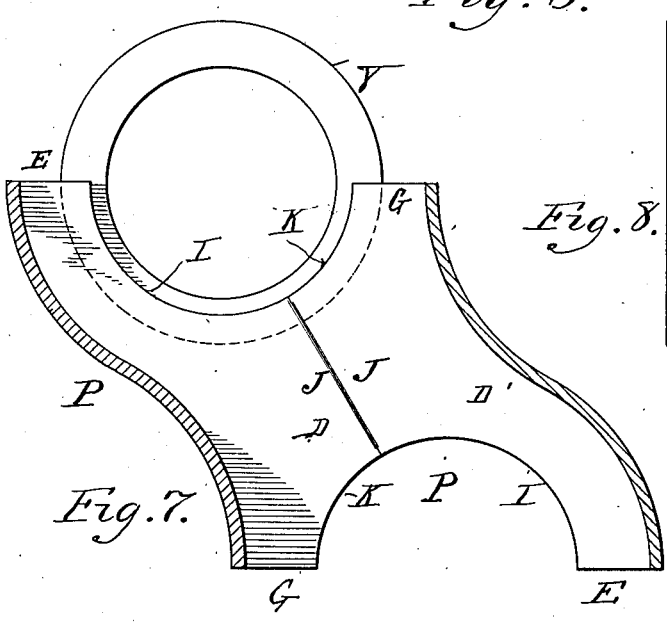

Fig. 7.

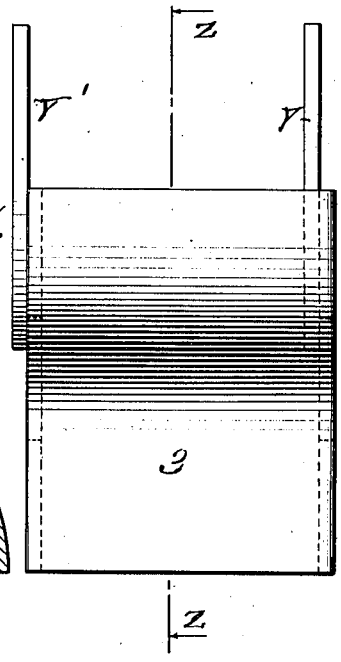

Fig. 8.

Inventor

Thomas E. Murray

By his Attorney

Carl Lenyon

T. E. MURRAY.

HEADER FOR WATER TUBE BOILERS.

APPLICATION FILED MAY 26, 1917.

1,291,600.

Patented Jan. 14, 1919.

4 SHEETS—SHEET 4.

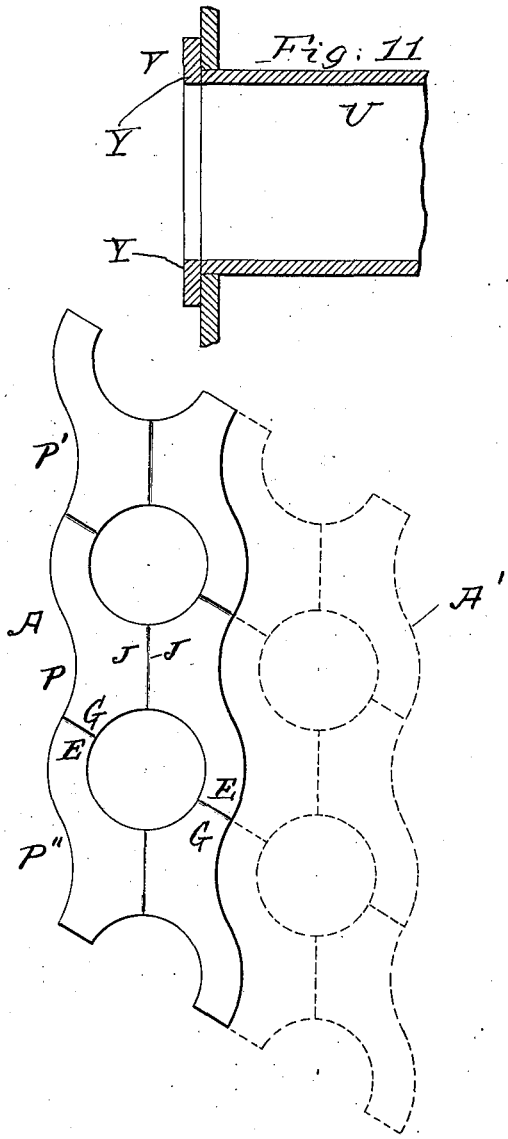

Fig. 9.

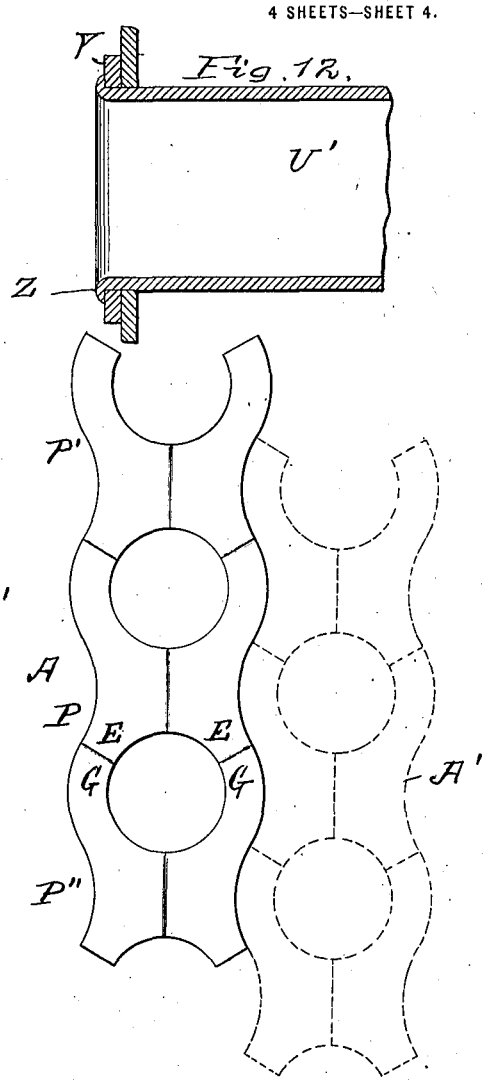

Fig. 10.

Inventor
Thomas E. Murray
By his Attorney
Arthur Benjamin

UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY, OF NEW YORK, N. Y.

HEADER FOR WATER-TUBE BOILERS.

1,291,600. Specification of Letters Patent. Patented Jan. 14, 1919.

Application filed May 26, 1917. Serial No. 171,258.

To all whom it may concern:

Be it known that I, THOMAS E. MURRAY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Headers for Water-Tube Boilers, of which the following is a specification.

The invention relates to headers for water tube boilers, having openings receiving the ends of the tubes, and more particularly to that type of header of quadrangular cross section, wherein two opposed walls are of sinuous or serpentine form. The invention thus includes headers in which the concavities of one of said walls are disposed opposite to the concavities of the other wall, and also headers in which the convexities of one of said walls are disposed opposite the convexities of the opposite wall, the tube openings in the latter case being disposed between said opposite convexities.

The object is to cheapen and simplify the construction of the header. To this end, I form the body portion of the header (thus excluding the caps closing the ends thereof) of a plurality of identically shaped units, each unit comprising two flat side walls and a connecting wall having suitable recesses to form the tube openings, as hereinafter explained. Said units may be made in quantities by stamping, pressing, striking up or casting the metal. Any two of these units are electrically welded together to form a transverse section or fractional portion of the header, and any desired number of said sections or fractional portions may be electrically welded together to produce the desired body portion. The units or half-sections may be assembled in different ways. The header caps are made in two similar sections electrically welded together and to the header ends. The four half sections which make up the caps may also be produced by stamping or otherwise, and hence may be all alike.

In the accompanying drawings—

Figure 1 is a side elevation of a header constructed in accordance with my invention, showing the boiler tubes in place, the upper portion of the header being broken away and in section to exhibit interior construction. Fig. 2 is a section on the line x, x, of Fig. 1. Fig. 3 is a perspective view of one of the unit half sections. Fig. 4 is a side elevation of a portion of the header, showing the welded joints. Fig. 5 is a plan view of the electrodes, wherein the half sections are disposed during welding. Fig. 6 is a section on the line y, y of Fig. 5. Fig. 7 shows a complete header section in section on the line z, z of Fig. 8, with one of the shouldered rings in position. Fig. 8 is an edge view of said header section, showing two of said rings in place. Figs. 9 and 10 are elevations of modified forms of the header. Figs. 11 and 12 are sections of the end of a tube and the header wall, and illustrate the mode of substituting a new tube for one that may be removed because of injury or wear.

Similar letters and numbers of reference indicate like parts.

The header of preferred form is generally shown at A, and with the exception of the caps B and C, respectively at its upper and lower ends, is composed of unit half sections D, one of which is shown in Fig. 3. Said half sections are all alike, and may be made by striking up, stamping, pressing or casting the metal. Said unit half section has flat side walls 1, 2, which are alike in shape, disposed parallel one to the other and united by the curved wall 3. The edges E, E of the walls 1, 2 which are uppermost in Fig. 3, are in the same plane with the edge F of the wall 3. The edges G, G which are lowermost in Fig. 3 are in the same plane with the edge H of the wall 3. In the edges of walls 1, 2 are made arc-shaped recesses I, a straight portion J and shorter arc-shaped recesses K. Any two half sections, as D, D′, may be put together to form a complete transverse section or fractional portion of the header body—as generally shown in Fig. 7 at P. When the header is to be made in the sinuous or serpentine form shown in Figs. 2 and 4, said half sections are juxtaposed to form a section P, as follows; that is to say, the in-

clined straight edges J being placed in contact, the half section D′ is inverted with respect to section D, so that the edges G of one section lie in the same plane with the edges E of the other section, as shown in Fig. 7, and the curved recesses I, K in the edges of walls 1, 2 unite to form semi-circles.

I join together the half sections D, D′, at the meeting edges J by electrical welding, and preferably as follows: I provide two electrodes L, M, Figs. 5 and 6, between which is a gap O, preferably inclined and secured upon plates N, N. In one electrode, as L, is formed a matrix, into which fits the half section D, Fig. 7, and in the other electrode, as M, there is also a matrix, into which fits the other half section D′. The lower edges G, E of the half sections rest upon the plates N, N. By moving the plates N, N toward one another, contact is established at the straight edges J of the half sections, and when the welding current is established, said edges are welded together, thus completing the whole section P.

I now join a series of sections P unitedly to form the header in the following way:

In Fig. 4, the section P stands as shown in Fig. 7. I take a precisely similar section P′, and invert it and place it as shown in Fig. 4, so that the edges E and G of section P′ respectively meet the edges E and G of section P, and I electrically weld said sections together at said edges, and at the edges of the walls intervening. The same rule is followed with respect to section P″. Or in other words, I build the header of sections P, P′, etc., alternately reversed, and welded together at their meeting edges.

In the completed boiler, the headers are grouped together, with the outwardly curved portions of one header entering the inwardly curved portions of the next adjacent header, as shown in Figs. 2, 9, and 10, where an adjacent header A′, dotted lines, is shown beside the header A.

Instead of making the header of the form shown in Fig. 2, I may assemble the unit half sections differently, as shown in Figs. 9 and 10.

Thus in Fig. 9 the three sections P′, P, P″ are disposed with the edges E, G of one section respectively in contact with the edges G, E of the next adjacent section; or in other words, the sections are approximated successively without alternate reversal. In Fig. 10 the three sections P′, P, P″ are disposed with the edges G, G of one section in contact with the edges E, E of the next adjacent section—and here, as in the form shown in Fig. 9, the successive sections are not alternately reversed.

To close the upper and lower ends of the header, I provide at said ends metal caps B, C, each cap being formed in two sections R, S, Fig. 2, electrically welded together at Q, and to the registering edges of the next adjacent header section. The upper cap B has an opening in which a steam pipe W may be secured. In the outer cap section R, I provide a man-hole and cover T, for access to the interior of the header. The boiler tubes U are inserted in the openings in one wall of the header, and may abut against a ring V of less diameter than the header opening, which ring is electrically welded to the inner side of the wall. The tube in turn may be electrically welded to said ring. I may use two of said rings, one (V) arranged inside the header, as described, and the other (V′) welded on the outside of the header, Figs. 7, 8. As these rings extend across the joint between successive header sections when assembled, they also serve, when welded to both of said sections, to increase the strength of said joint. Instead of using the removable cover T, I may close the openings in the outer wall of the header by plates X, Fig. 1, welded in place, the rings V′ then being omitted.

In Fig. 11, I show in section a tube U extending through the header wall and abutting against the ring V, as described. In case it be desired to substitute a new tube, the shoulder Y formed by the ring is cut off, as shown in Fig. 11, the ring opening then being of the same diameter as the opening in the header wall. This permits of the removal of the old tube. The new tube U′ is then inserted in both ring and wall, and may be lapped or expanded over the inner wall of the ring, as shown at Z. Because the ring and wall are welded together, the two unitedly form a strong and solid abutment to support the tube during the lapping over or expanding operation. In other words, if the ring were omitted altogether, the wall might not be rigid enough to permit of the tube being in this way secured to it, and hence the necessity for the ring. But when the ring remains welded to the wall, after the shoulder is removed and the new tube put in place, a double thickness of supporting metal results, which furnishes the necessary rigid and strong abutment.

I claim:

1. A tubular serpentine boiler-header, comprising two like tubular sections united end to end, each section being formed of two like half sections; there being in the meeting edges of said half sections and said sections recesses which when said half sections and sections are assembled conjointly form a circular opening.

2. A serpentine boiler-header half section, comprising a wall 3 of sinuous form and flanges 1, 2 thereon, the said flanges having their corresponding edges formed

with curved recesses I, K and intervening straight portions J, J.

3. A tubular serpentine boiler header section P formed of two half sections, as in claim 2, the straight portions J, J of the flanges of said half sections being united.

4. A tubular serpentine boiler header formed of a plurality of sections P, P′, as in claim 3, the said sections being united in series end to end.

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

THOMAS E. MURRAY.

Witnesses:

GERTRUDE T. PORTER,

MAY T. MCGARRY.