

No. 749,413.

PATENTED JAN. 12, 1904.

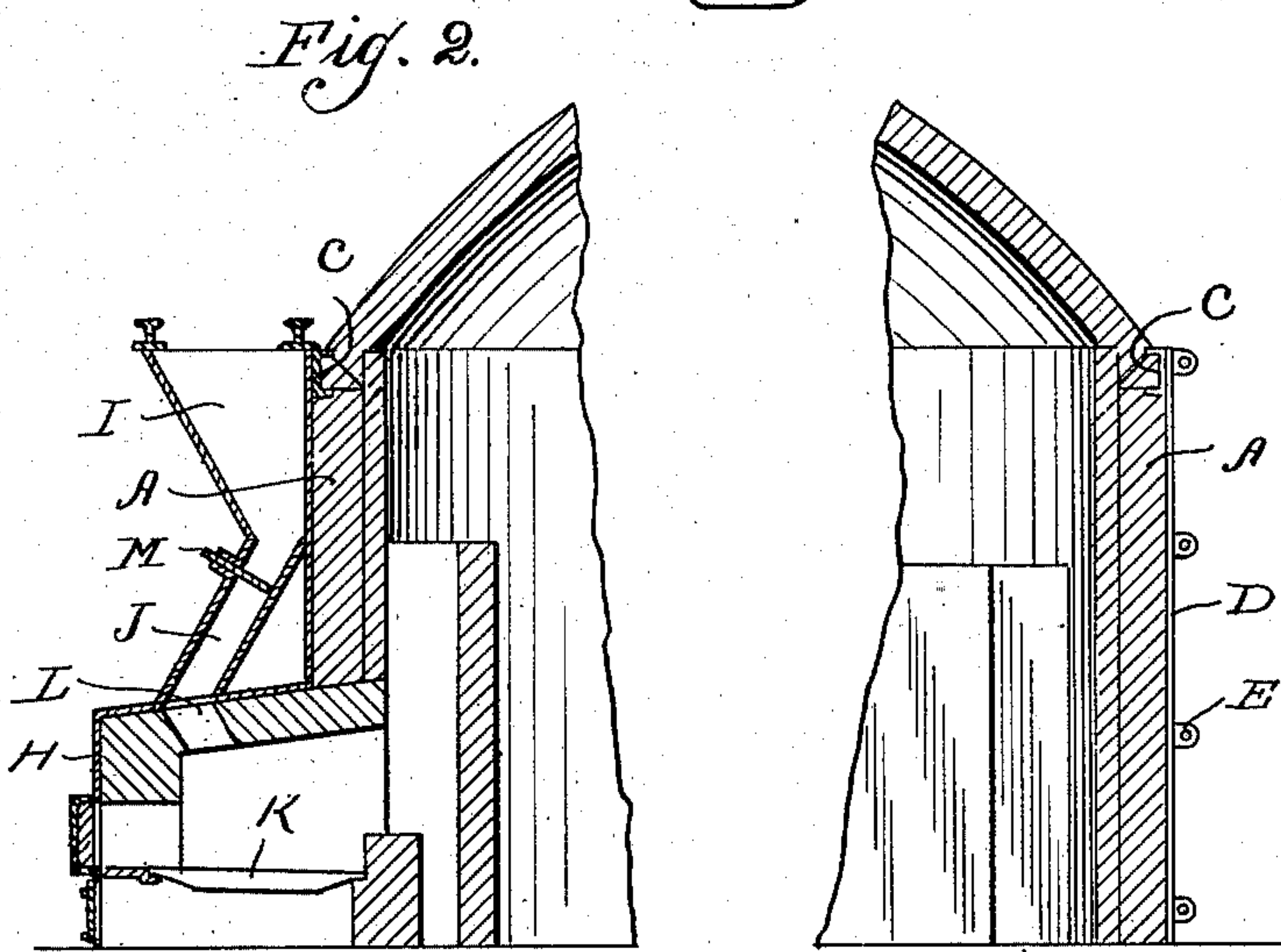
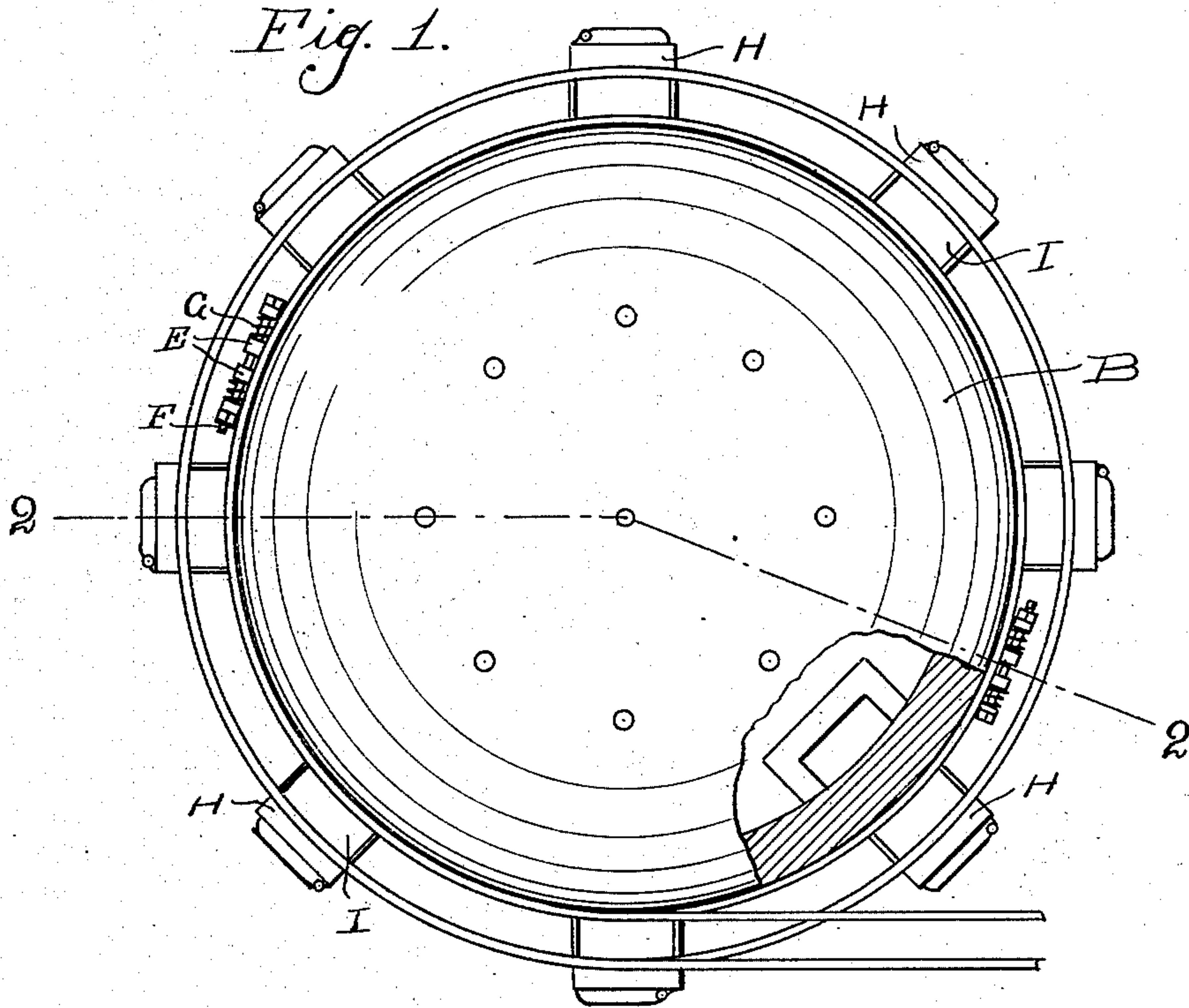
J. F. WARWICK.

KILN.

APPLICATION FILED OCT. 28, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

*E. F. Wilson*  
*F. Schlotfeld*

Inventor:

*John F. Warwick*  
*By Rudolph [Signature]*  
Attorney.

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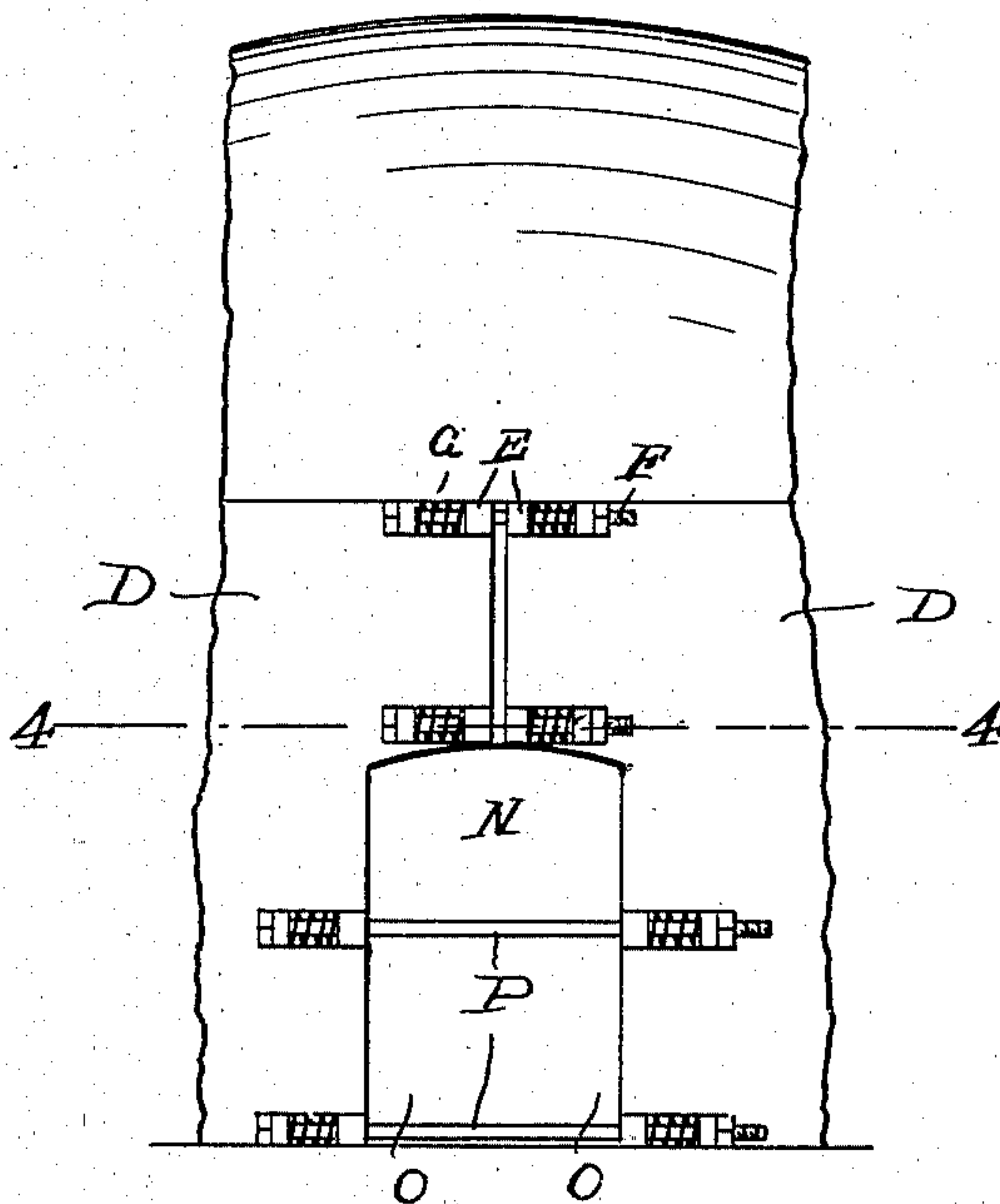
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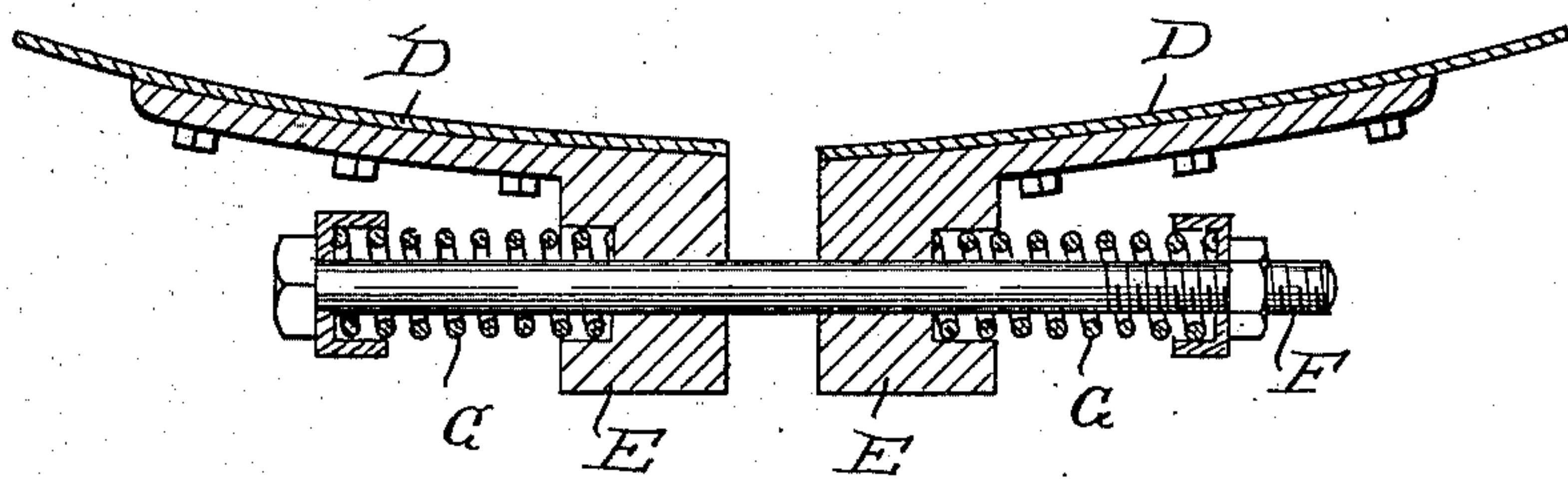
NO MODEL.

2 SHEETS—SHEET 2.

*Fig. 3.*



*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

JOHN F. WARWICK, OF CHICAGO, ILLINOIS.

## KILN.

SPECIFICATION forming part of Letters Patent No. 749,413, dated January 12, 1904.

Application filed October 28, 1903. Serial No. 178,878. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN F. WARWICK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Kilns; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a novel construction in a brick-kiln, the object being to provide a kiln which will be practically impervious to weather and proof against cracking and crumbling through the influence of rapid changes of temperature and the accession of moisture and which is readily fed with fuel and in general efficiently and durably constructed; and it consists in the features of construction and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings, illustrating my invention, Figure 1 is a top plan view, partly in section, of a kiln constructed in accordance with my invention. Fig. 2 is a vertical section of same, partly broken away, on the line 2 2 of Fig. 1. Fig. 3 is a fragmentary side elevation of same. Fig. 4 is a detail section, on an enlarged scale, on the line 4 4 of Fig. 3.

In kilns of the kind illustrated, which, I believe, are generally known as "beehive" kilns, a great deal of expense is incurred for repairs to the outer walls, these being generally built of common brick, which after being maintained hot during the interval in which the kiln is operated become perfectly dry and upon cooling or in case of rain absorb enormous quantities of moisture and in the event of frost chip off so rapidly that frequent repairs are necessary. The moisture thus absorbed is also a source of annoyance, for the reason that in refiring the evaporation of this moisture tends to keep the walls cool for a long time, and hence causes great waste of fuel.

Walls built of brick only are also very apt to crack through frequent expansion and contraction under greatly-varying temperatures to which they are exposed, and to avoid fis-

tures the kilns are generally encompassed by heavy steel hoops. I have also found that owing to the fact that kilns of this character each have a large number of furnaces (usually eight) it is very difficult for one fireman to attend to more than one kiln at a time, for the reason that no means are provided for rendering the feeding of fuel easy, and in this respect the construction of my kiln affords great advantages, enabling me to provide means for economically handling and feeding fuel, so that one fireman can readily attend to a number of kilns simultaneously, the last-named means forming a part of my present invention.

Another great source of trouble in kilns of this description is that no adequate means are provided to reinforce the cylindrical wall against the radial pressure of the dome, which is composed of arched mason-work and is enormously heavy and which in the event of cracking exerts enormous outward pressure. Such dome is frequently the source of great worry, particularly when it is found necessary to repair the wall and for this purpose remove the steel hoops.

To overcome these difficulties, I provide in the upper end of the cylindrical wall A of the kiln B a hoop C, of channel-iron, which lies in the outer face of the wall with its flanges extending inwardly. This said hoop is made of two semicircular sections of a sufficiently heavy channel-iron to withstand the utmost strain to which it can possibly be subjected in the worst event and has the effect of rendering the dome practically independent of the walls upon which it merely rests without in any case exerting a radial pressure, the said sections being secured together at their ends in any suitable manner.

To protect the wall A from atmospheric influences, and, further, to strengthen and reinforce the same, I provide a yielding steel jacket D around the same, which is composed of two semicylindrical sections provided with radial perforated projections E at their ends, through which bolts F pass. Said bolts F are of a length sufficient to permit springs G to be interposed between their heads and nuts and said flanges, respectively, said springs



being of a compression strength so great as to hold the said jacket always in close contact with the outer face of the wall and allow the latter to freely expand and contract. The said  
 5 hoop C may be riveted to and made a part of the jacket D or may be independent of same; but in either case the uppermost bolts F, engaging the flanges of the casing, serve to hold said hoop in place, said uppermost bolts F  
 10 and springs G being preferably made heavier than the lower bolts to carry the greater strains to which they are subjected. The said steel jacket D besides protecting the wall against atmospheric influences has the ad-  
 15 vantage of enabling the wall to be made less thick and by unskilled masons, whereas at present only the most skilled masons can be employed. As said wall is lined interiorly with fire-brick, the protection of the outer  
 20 surface renders repairs necessary only in the interior lining. The said casing D is also advantageous in that it enables the radial furnaces H to be made of steel and bolted or riveted thereon, thus obviating the necessity  
 25 of other mason-work than lining said furnaces with fire-brick. Riveted or otherwise secured to said steel casing D above each of said furnaces is a hopper I, from the lower end of which a trough J leads to a point above the  
 30 forward end of the grate K of the furnace, in the upper wall of which is an opening L, communicating with said trough J. The latter is provided midway between its ends with a slide-valve M, by means of which the feeding of  
 35 coal is controlled. Supported on the upper ends of said hoppers I is a tramway for dumping coal-cars, from which said hoppers are fed. This means for supplying coal to the hoppers and feeding the furnaces renders the work of  
 40 the fireman very easy, he having only to operate the valve and then open the doors of the furnaces to spread the coal over the grates and remove the ashes, which requires very little time and labor and has the further advantage  
 45 of excluding the cold draft usually rushing into the furnace upon opening the door and keeping it open while shoveling coal and

which is apt to injure the bricks being burned by suddenly chilling the same.

A doorway N is provided between two of 50 the furnaces, through which the kiln is loaded and unloaded. As this doorway must be large to admit of free access and egress of the workman, I find it necessary to so arrange the jacket D as to form the corresponding door- 55 way at one of the joints between the two sections thereof, and hence I provide each section at one end with a recess O of half the width and corresponding in height and shape with the doorway of the kiln and at this point 60 provide long bolts P, spanning said doorway, said bolts being removed during the process of loading and unloading.

A kiln constructed as above described corresponds very nearly in original cost of con- 65 struction with those constructed in the usual manner, but in the course of a few years will save more than the original cost in the repairs and fuel saved in consequence of the exclu- 70 sion of moisture.

I claim as my invention—

1. The combination with the peripheral wall of a kiln, of a steel jacket incasing same, said jacket being composed of a plurality of seg- 75 mental sections yieldingly secured together at their ends.

2. The combination with the peripheral wall of a kiln, of a steel-jacket incasing same, said jacket being composed of a plurality of seg- 80 mental sections yieldingly secured to each other along their vertical edges.

3. The combination with the peripheral wall of a kiln, of a steel jacket incasing same, radial steel furnaces secured to said jacket, hoppers secured thereto above said furnaces, 85 troughs connecting said hoppers with said furnaces, valves in said troughs, and a tramway passing over said hoppers.

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

JOHN F. WARWICK.

Witnesses:

RUDOLPH WM. LOTZ,  
F. SCHLOTFELD.