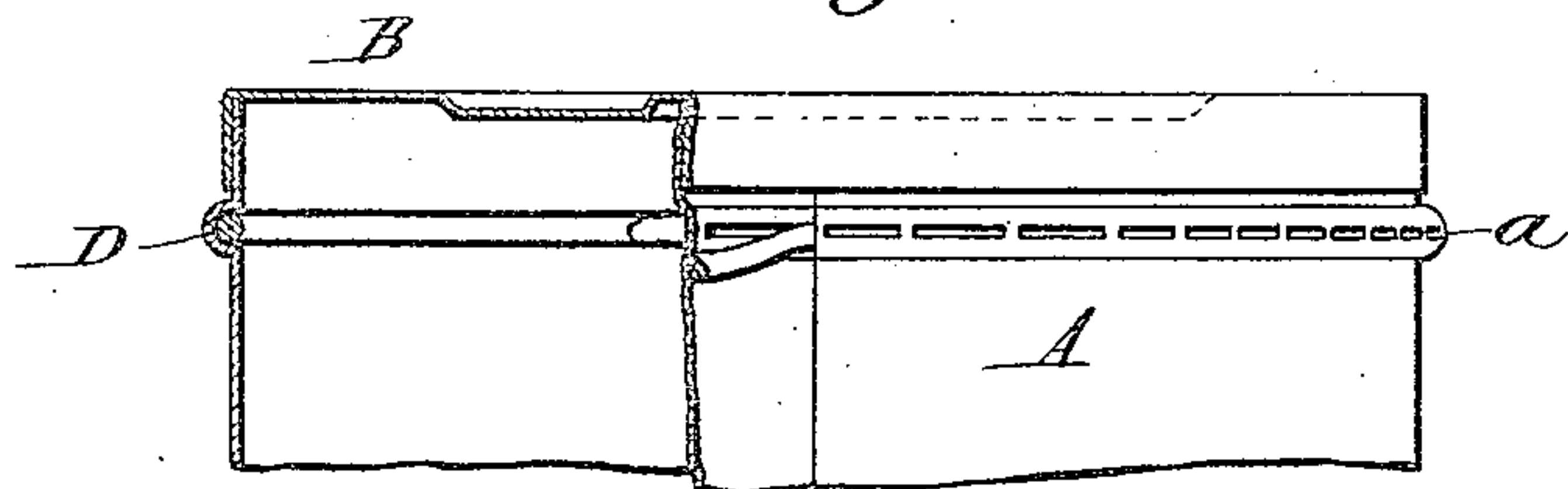


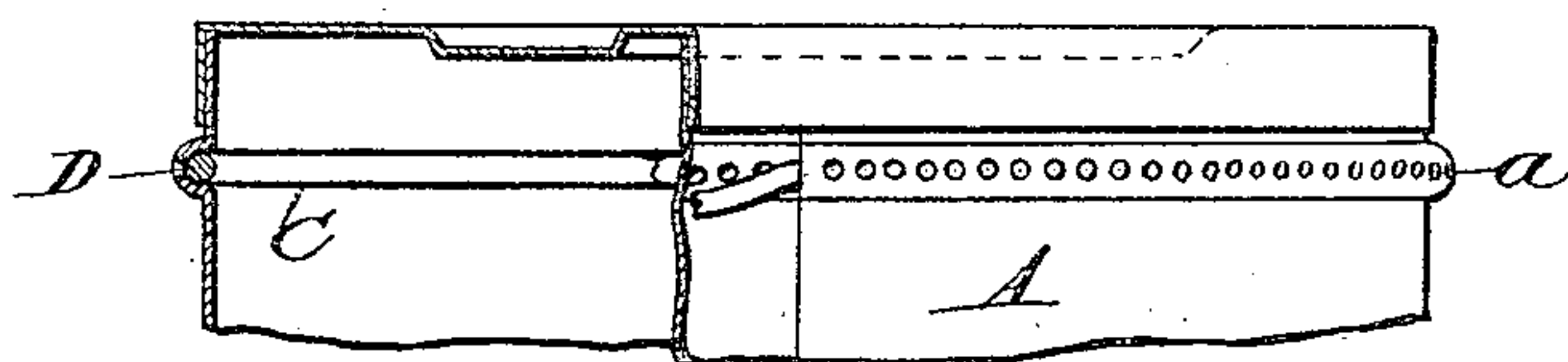
(No Model.)

J. ZIMMERMAN.  
KEY OPENING SHEET METAL VESSEL AND METHOD OF MAKING SAME.  
No. 529,542. Patented Nov. 20, 1894.

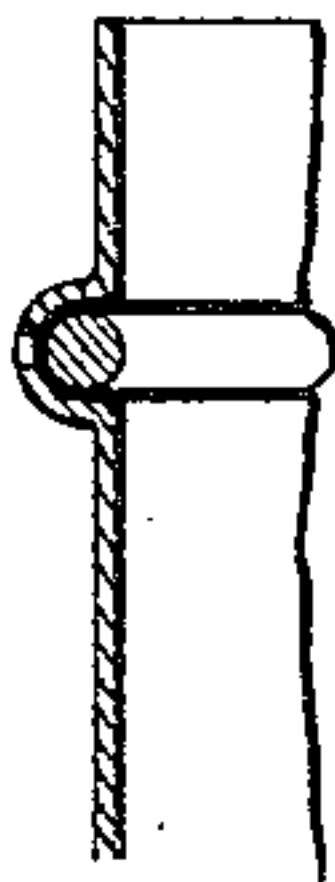
*Fig. 1.*



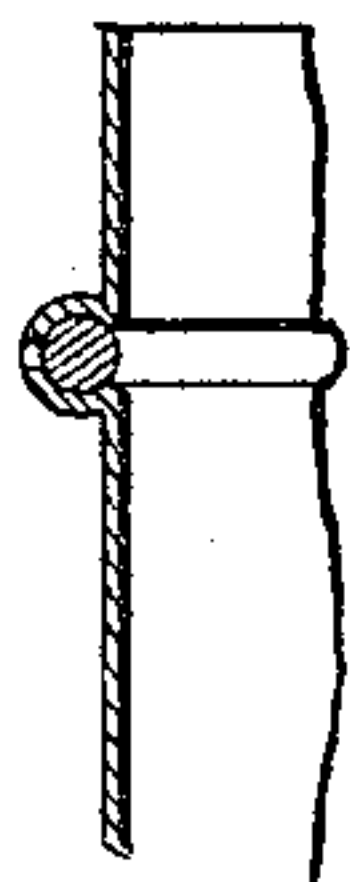
*Fig. 2.*



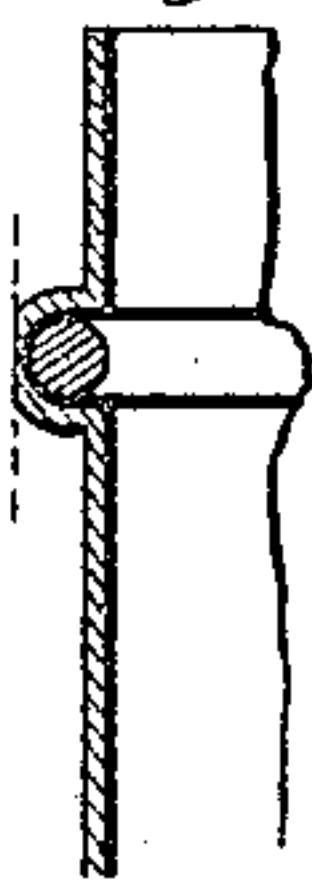
*Fig. 3.*



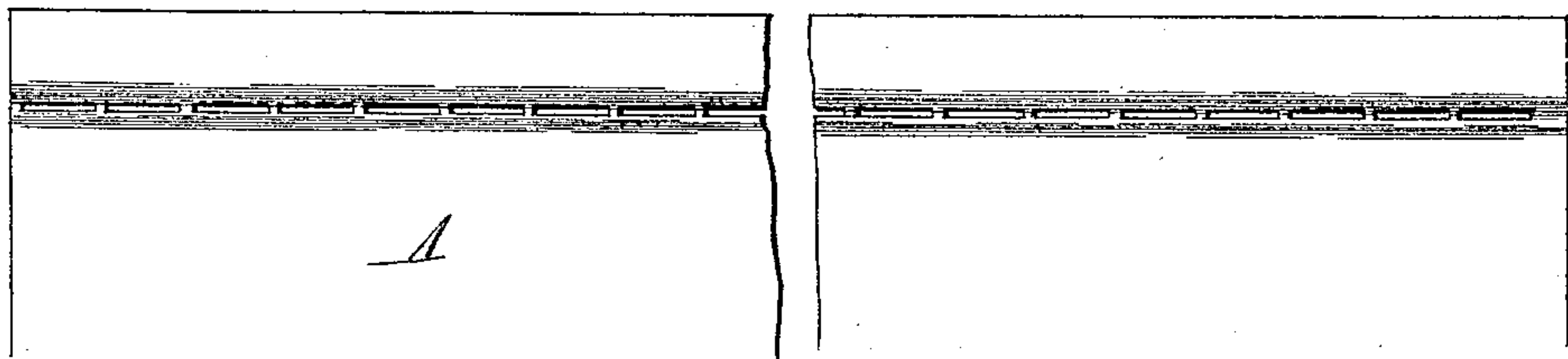
*Fig. 4.*



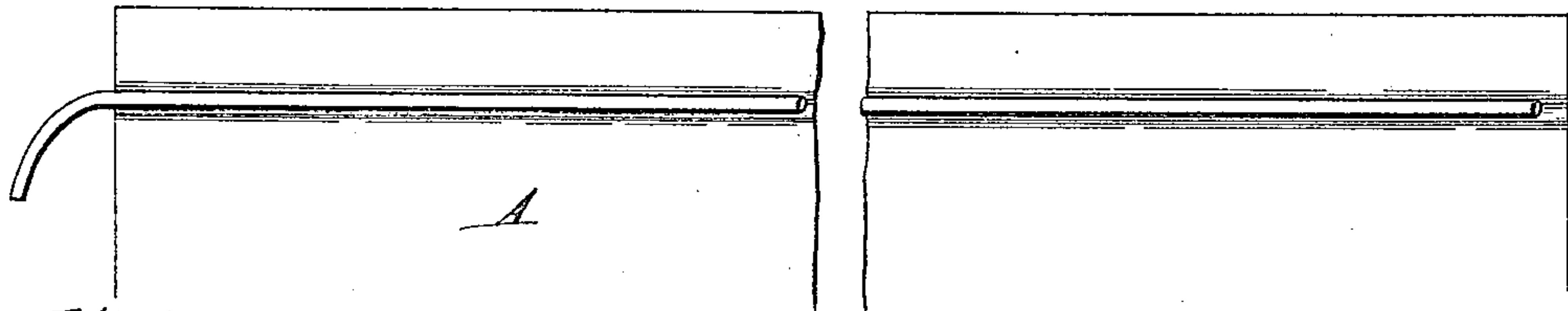
*Fig. 5.*



*Fig. 6.*



*Fig. 7.*



Witnesses.

*Samuel K. L.*  
*Louis M. F. Whitehead.*

*Fig. 8.*



Inventor.  
*John Zimmerman.*  
by *Dayton Poole & Brown,*  
his Attorneys.

# UNITED STATES PATENT OFFICE.

JOHN ZIMMERMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE NATIONAL KEY-OPENING CAN COMPANY, OF SAME PLACE.

## KEY-OPENING SHEET-METAL VESSEL AND METHOD OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 529,542, dated November 20, 1894.

Application filed January 30, 1892. Serial No. 419,754. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN ZIMMERMAN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful  
5 Improvements in Key-Opening Sheet-Metal Vessels and Methods of Making Such Vessels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying  
10 drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to key-opening cans and to methods of making key-opening cans,  
15 in which a wire or similar metal filament is so arranged, with one end thereof exposed, that by seizing said exposed end and pulling outward upon the wire the cover or other part may be detached to give access to the con-  
20 tents.

The object of the invention is to provide a construction which, while reliable, cheap and easily manufactured, gives ease and certainty of separation by the withdrawal of the wire.

25 The invention, as it relates to the structure, consists primarily in a can or similar sheet metal vessel the body of which is partially separated in a line adjacent to the soldered cover and exterior to a wire held in place be-  
30 neath said line of partial separation, an end of the wire protruding to the outside of the can whereby it may be seized for the purpose of extracting it. Upon the outward pulling of the wire, either by the usual key around  
35 which it is wound, or by other means through which the necessary force may be applied thereto, said wire is made to complete the separation of the sheet metal body, already partly provided, and thus to divide the ves-  
40 sel into two parts, by which access is given to its contents.

The invention further consists in a sheet metal vessel having a groove formed in the inner surface of its body adjacent to the sol-  
45 dered lid or cover and along a line of partial separation, the protruding wire being laid in said groove.

It further consists in the structure above described having the partial separation pro-  
50 duced by a line of punctures or perforations.

The invention also consists in the method of

making the vessel as hereinafter set forth and claimed.

In the accompanying drawings: Figure 1 is a side elevation, partly broken away, of the  
55 upper part of a sheet metal can constructed in accordance with one form of my invention, the partial severance of the sheet metal outside the wire being produced by a row of rela-  
60 tively long slits separated from each other by narrow necks of the metal. Fig. 2 illustrates the same construction as that of Fig. 1, except that the partial separation of the sheet metal external to the wire is produced  
65 by a series of circular or short perforations, similarly separated by narrow necks of metal. Fig. 3 is an edge view of the construction shown in Figs. 1 and 2, somewhat enlarged. Fig. 4 illustrates the sheet metal closely in-  
70 folding the wire for more than half its circumference, so that the wire, being applied to the sheet before the formation of the can body and before soldering, will be held in place. Fig. 5 is a section illustrating the wire  
75 soldered in a groove, formed in the sheet, and the metal of the sheet removed externally to the wire by subsequent planing, grinding or other suitable operation. Fig. 6 illustrates a flat sheet or blank for a can body perforated and grooved ready to receive the wire. Fig.  
80 7 illustrates a flat sheet or blank for a can body having the wire laid and secured in the groove preparatory to formation of said can body. Fig. 8 illustrates a modification of Fig. 5.  
85

First describing the preferred construction shown in Figs. 1, 2 and 3, A represents the body of an ordinary sheet metal can and B a head or cover applied thereto by a slip joint.

C represents an interior groove, here shown  
90 as being formed in the can body near its end so as to proximate the lower edge of the can head when the latter is in place on the body.

D is a wire laid in said groove and having one of its ends exposed at the outside of the  
95 completed vessel. Exterior to and along this wire the sheet metal of the part of the can to which said wire is applied is partially separated by a series of punctures *a a*, those of Fig. 1 being oblong slits and those of Fig. 2  
100 being circular holes. In this construction the punctures are filled with solder to pre-



vent leakage and in the arrangement of the line of punctures adjacent to the head joint, such filling thereof may be accomplished by floating at the same time that the solder is floated upon the joint uniting the can head and body.

In Fig. 5 the metal exterior to the wire is illustrated as being partially severed by removal of the top of the external rib which is formed with the groove, as, for example, by planing or grinding, leaving the metal thin opposite the wire. In Fig. 8 the groove and rib are given a particular form especially favorable to this mode of partial separation, the rib being contracted laterally at and near its top.

It will be found most desirable to employ the groove C as a seat for the wire and while the metal is flat or "in the sheet," then securing the wire in the groove, and finally forming up the can with the wire present in the blank. If the partial separation of the metal be attained by a series of through punctures, these will be made while the metal is in the sheet, and may be made either before, after or at the time the groove is formed. If such partial separation be attained by thinning it from the outside, as illustrated in Figs. 5 and 8, such thinning may be done before or after the can is formed.

The wire may be secured to the sheet metal by solder or by the formation of the groove shown in Fig. 4, in which the sheet metal closely embraces the wire for more than half its circumference, or both by solder and the conformation of the groove. If solder be employed to hold or assist in holding the wire, it may be applied as the wire is laid upon the sheet or in its groove, and this is regarded as the preferable mode of construction. That is also considered the better construction in which the partial separation of the sheet metal is made by a series of punctures, and in this case solder applied to hold the wire in the groove will also close the punctures, or applied to the punctures will secure the wire always insuring against leakage. As one mode of soldering the wire in place the solder may be first applied to the wire and as the soldered wire is laid, heat may be applied thereto to fuse the solder.

I claim as my invention—

1. A sheet metal vessel having a line of proximate punctures partially separating the metal, and an interior wire or its equivalent secured beneath said punctures with an end thereof protruding, the punctures being closed by solder.

2. A sheet metal vessel provided with a continuous groove in its inner surface, a series of proximate punctures through the metal along the groove, a wire or its equivalent in said groove having a protruding end, and solder applied to prevent leakage at the punctures.

3. A sheet metal vessel having a continuous groove in its inner surface, and a series of punctures through the metal of the groove, combined with a wire or its equivalent in said groove having a protruding end, and solder closing the punctures and securing the wire.

4. A closed sheet metal vessel provided with an inner groove and a wire or equivalent metal filament arranged within said groove and protruding at one end to the exterior of the vessel, said groove being of proper depth and conformation to closely embrace said wire for more than half its circumference, whereby the latter is held therein independent of other retaining devices, and the metal of the groove being partially separated exterior to the wire.

5. The method of making sheet metal key-opening cans or vessels which embraces the steps of forming a line of proximate punctures in the sheet-metal, placing a key wire or equivalent metal filament against the sheet along said line of punctures and applying solder to close the punctures and fasten the wire.

6. The method of making sheet metal key-opening vessels which embraces the steps of forming a groove in the sheet with a line of proximate punctures along its bottom, placing a key wire in said groove and applying solder to secure the wire, and prevent leakage at the punctures.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JOHN ZIMMERMAN.

Witnesses:

M. E. DAYTON,  
TAYLOR E. BROWN.