

A. M. LESLIE.

Preparing and Administering Nitrous Oxide Gas.

No. 64,431.

Patented May 7, 1867.

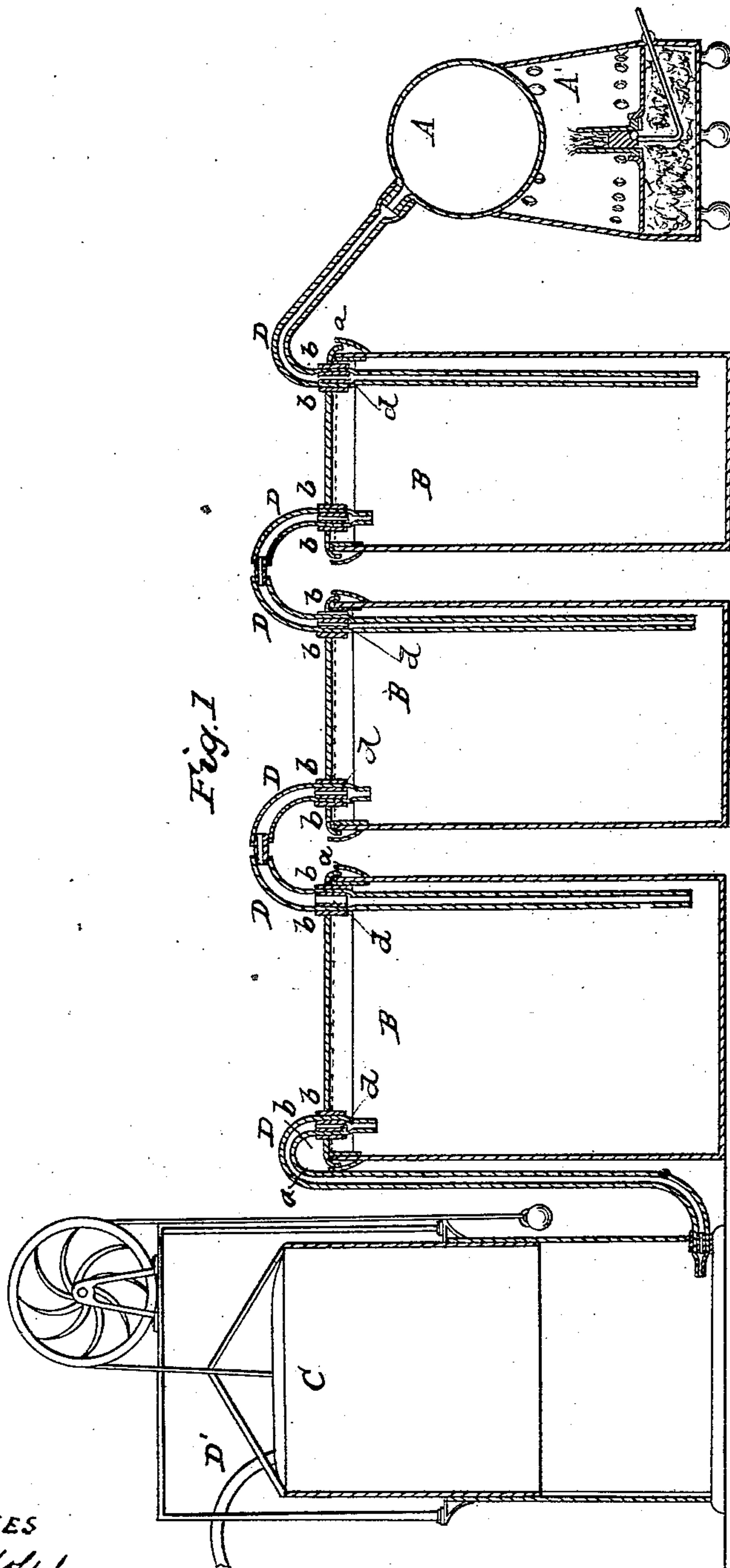


Fig. 1

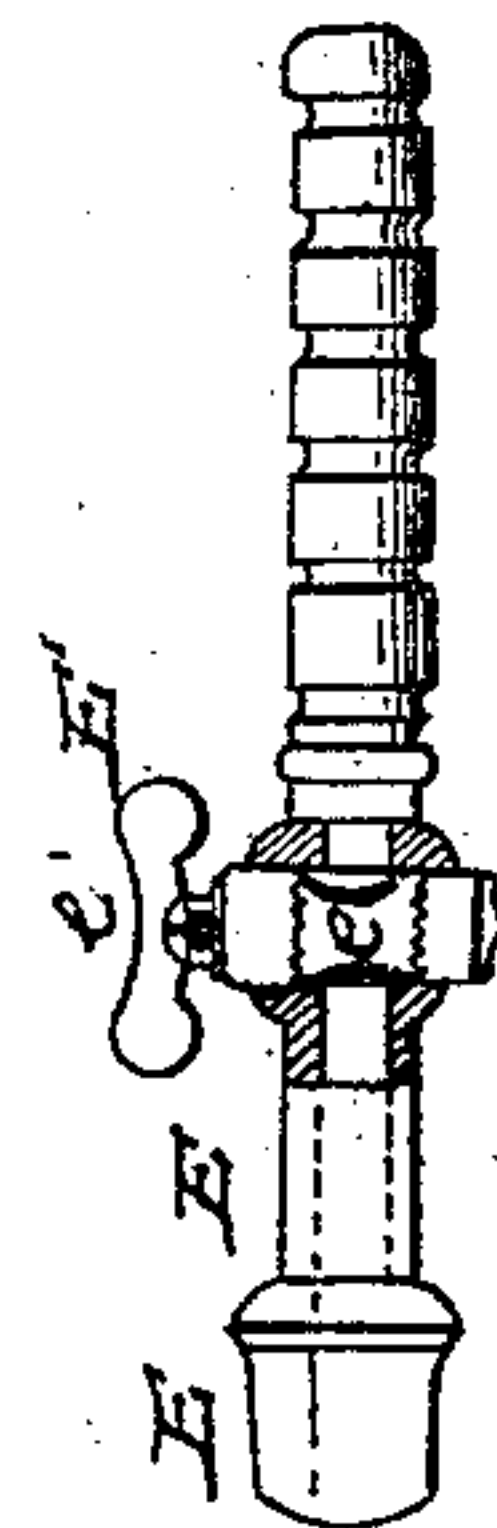
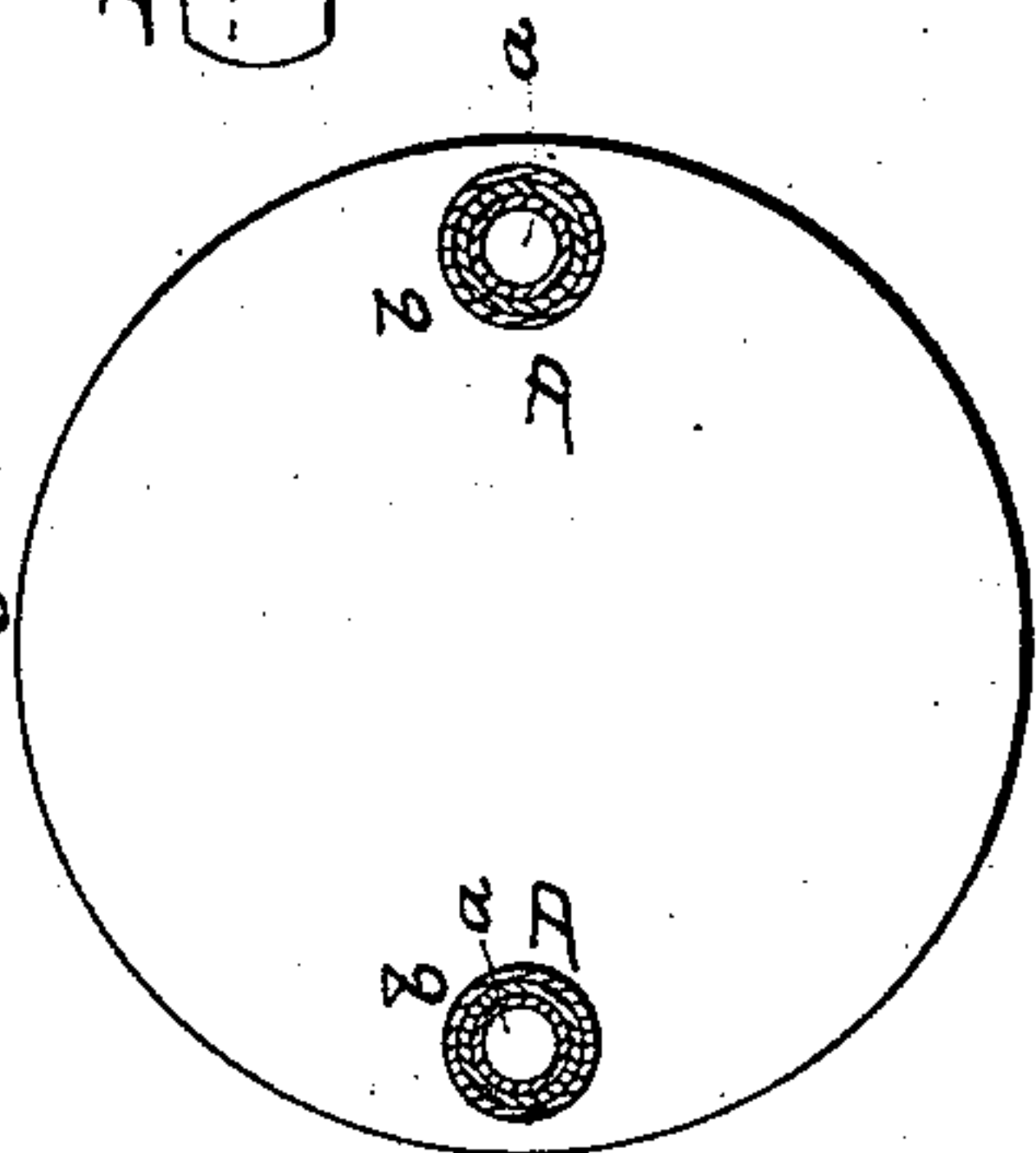


Fig. 2



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WITNESSES  
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A. M. LESLIE, OF ST. LOUIS, MISSOURI.

*Letters Patent No. 64,431, dated May 7, 1867; antedated April 23, 1867.*

## IMPROVED APPARATUS FOR THE PREPARATION AND ADMINISTRATION OF NITROUS OXIDE GAS.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, A. M. LESLIE, of the city and county of St. Louis, have invented a new Apparatus for the Preparation and Administration of Nitrous Oxide Gas; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention has for its object a more perfect connection between the different vessels which are used for the generation, purification, and storage of "nitrous oxide gas" as at present employed by surgeons and dentists to administer to patients during painful operations. This invention also relates to an inhaler by means of which the exhalations of the patient may escape into the open air and not back into the gas-holder, where the carbonic acid gas of such exhalations would tend to affect the purity of the nitrous oxide in a deleterious manner. The details of the first part of the invention refer to a peculiar form of cover for the jars which are used as purifiers, and also the tubing connecting the same, and the manner of packing the tubing and the covers. The details also refer to a peculiar combination of the vessels so as to render them portable.

To enable those skilled in the art to make and use my improved apparatus, I will proceed to describe its construction and operation.

Figure 1 of the drawings represents a sectional elevation of the improved apparatus.

Figure 2 is a plan of the cover of one of the jars.

A B C are a series of vessels, the number of which may be increased indefinitely. The first of these, A, we will call the generator. The second, B, we will call the purifiers or washers, (there should be three or four, more or less, of these,) and the last one, C, we will call the receptacle or holder. In apparatus of this kind it has heretofore been the custom to connect the different vessels of the series together by means of glass tubes, the said tubes being passed through orifices made in the cork stoppers of the jars and then cemented with wax, so as to make the connection air-tight. This arrangement was exceedingly troublesome and untidy owing to the wax packing, which had to be replaced every time the jars were washed or cleansed. In lieu of the connection and of the cork stoppers, I use metallic cans, as represented in the drawings, or, what is more simple still, I take fruit-preserving cans of the variety patented by J. D. Willoughby, January 4, 1859, or W. W. Lyman, August 5, 1862. In the case of the metallic cans it will be necessary to coat the interior of them with japan, shellac, wax, or some similar substance to prevent injurious action on the metal by the contents of the jars. The covers of these metal cans will have flanges, *a*, which will fit down into an annular groove formed on the top edge of the cylindrical sides, and into this groove molten wax may be poured so as to make a tight connection between the parts. This is only one variation of the fruit-cans now in use. In the case of using glass jars, such as are at present in use, and covered by the patents already alluded to, the covers are provided with rubber packing to form an air-tight joint between the metallic cap and glass neck of the jar. Now, into any of these caps or covers, of whatever form they may be, I make two perforations of say one-half an inch in diameter, more or less. Into each of these orifices I place a short tube, *b*, allowing it to project a quarter to half an inch, more or less, on each side of the cover or cap, and then solder these parts so as to form a perfectly tight joint between them. I then pass India-rubber tubes, D, through these short tubes *b*, which now serve as stuffing-boxes, and the rubber tubing serves for the induction and eduction pipes for each of the jars. Within each of the rubber tubes I place a short glass tube, *d*, the length of which is about equal to the length of the tube *b*, and the bore of it should be about the same as the bore of the rubber tubing. This short piece of glass tubing can easily be worked along within the rubber tube until it is made to occupy that part of the latter which will come directly within the tube *b* when all the parts are in place. The rubber tube will then be inserted within the tube *b* and stretched in both directions until the part of it which contains the glass tube is drawn within the tube *b*, when it will be left free to its own contraction, and the glass tube will then expel the rubber out tightly against the interior of the tube *b*, and thereby form a perfectly tight connection between these parts. The only care that need be taken as to the relative proportions of the sizes of the parts *b* D *d* is, that the rubber can easily be passed through the tube *b*, and that the glass tube is large enough to expel it out tightly thereto when once the parts are placed together. By using the patented fruit-cans and this form of connecting pipe a very simple and neat arrangement of gas generator and purifier can be produced that will be of great benefit,



especially to those dentists and surgeons who use nitrous oxide gas. The rubber tubes D that are to serve for induction pipes to each jar are to be taken down to the bottom of the water, so that the gas escaping from them will be forced to rise up through the water and thereby become washed and cleansed. The generator A may be a glass retort, which is fitted to a frame or stand, A', when it is to be heated by means of a spirit lamp. This generator and its lamp and stand may be constructed so they can be placed inside of the smallest one of the jars B, and where these jars are made of metal, as represented in the drawings, they should be made of different sizes, so that the smaller ones will fit inside of the larger ones, and in this manner the whole arrangement may be packed into a very compact space. The holder C may be formed of a simple India-rubber bag, or it may be made in the form of a gasometer, but as there is nothing of especial importance about this it will not be minutely described. From the holder C the gas is to be conducted in a tube, D', to the inhaler E, which is usually constructed of hard rubber. It is little more than a tube, one end of which is corrugated to receive the tube D', and the other end is widened out so as to fit easily into the mouth of the patient. There is a stop-cock, E', which may be turned so as to shut the gas off or so as to let it pass through to the mouth of the patient. A detail drawing exhibits the internal arrangement of this stop-cock. It has a longitudinal orifice, as well as a transverse one; the transverse opening through it being to continue the opening of the piece E through it when turned in the proper direction. There is a small valve, *e*, fitted to the interior of the stop-cock so as to cover its transverse orifice, and there is a valve, *e'*, fitted to cover the small orifice made through the top of the stop-cock and communicating with the cavity within it. Both of these valves may be made of small bits of India rubber, and the one marked *e* may be pushed down inside of the cock-piece when not in use or not needed. The action of these valves is as follows: The nitrous oxide will flow through the valve *e* toward the mouth of the patient as he fills the lungs, and then, as the exhalation commences, it will close the valve *e* and force the valve *e'* open so as to escape through it. It will readily be seen that these two valves are so hung as to continue to repeat these motions as long as the inhalations and exhalations are continued, and the patient will thereby be enabled to breathe pure nitrous oxide and discharge the vitiated breath into the open air.

Having described my invention, what I claim, is—

1. The combination and arrangement of the tubes *b*, in the cap of the jar, and the tubes D and *d*, substantially as herein described and set forth.
2. I claim the employment of the India-rubber tubes D for connecting the different jars together, and these to the generator and receiver, and for conducting the gas down through the water.
3. I claim the portable apparatus A B, when constructed and employed substantially as herein described and set forth.
4. I claim the inhaler E, when constructed with the valves *e* and *e'*.

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Witnesses:

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