

(No Model.)

D. D. ESSON.
FLUID PRESSURE GENERATOR.

No. 580,613.

Patented Apr. 13, 1897.

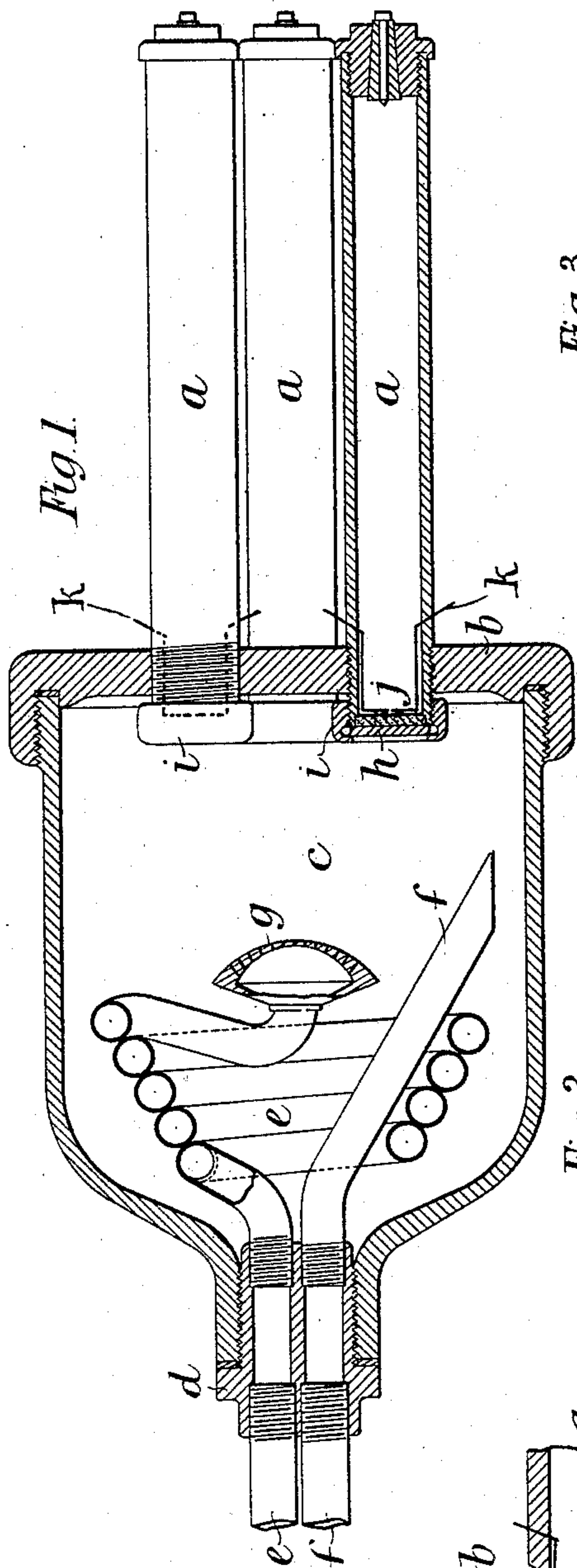


Fig. 1.

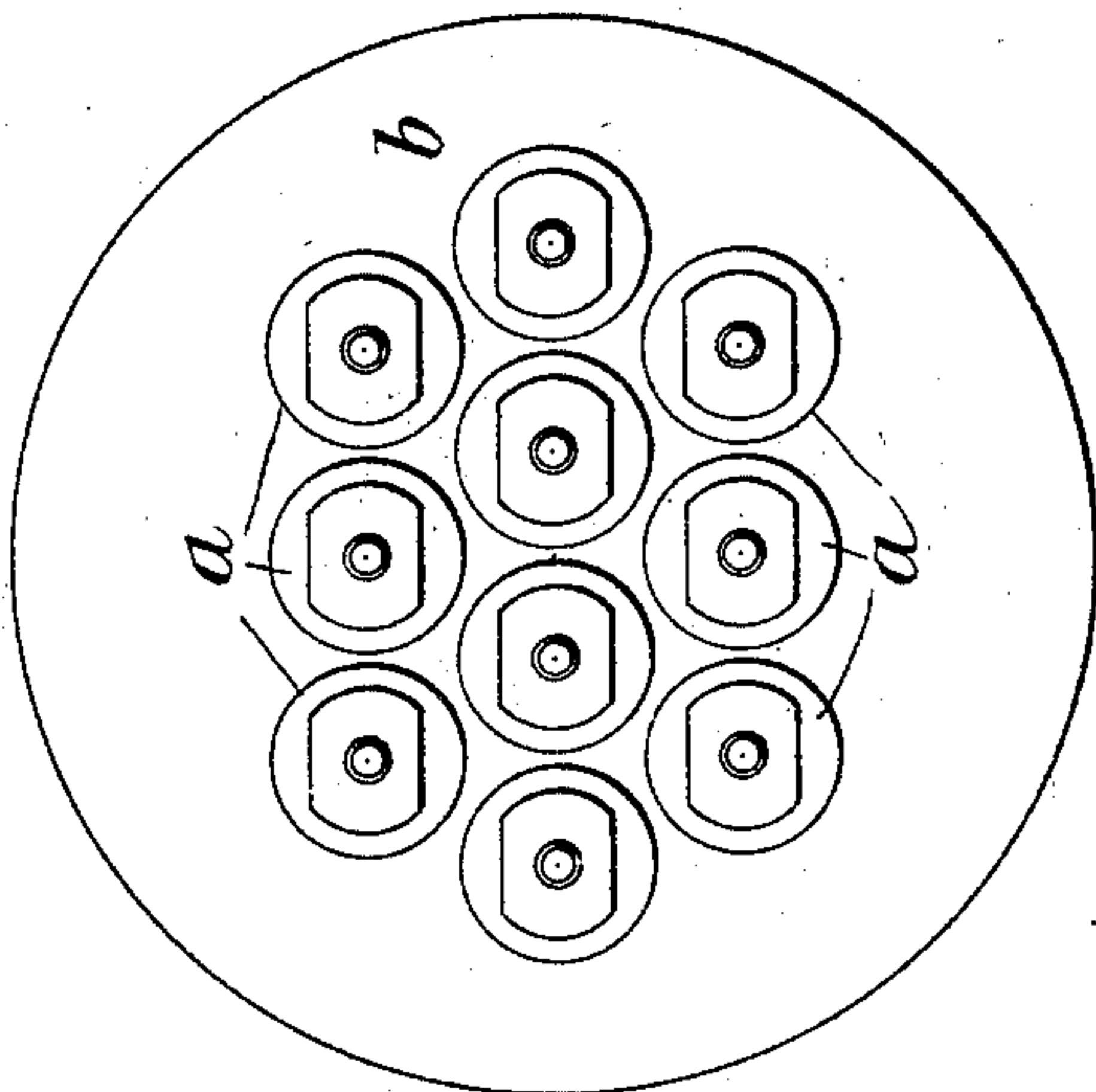


Fig. 3.

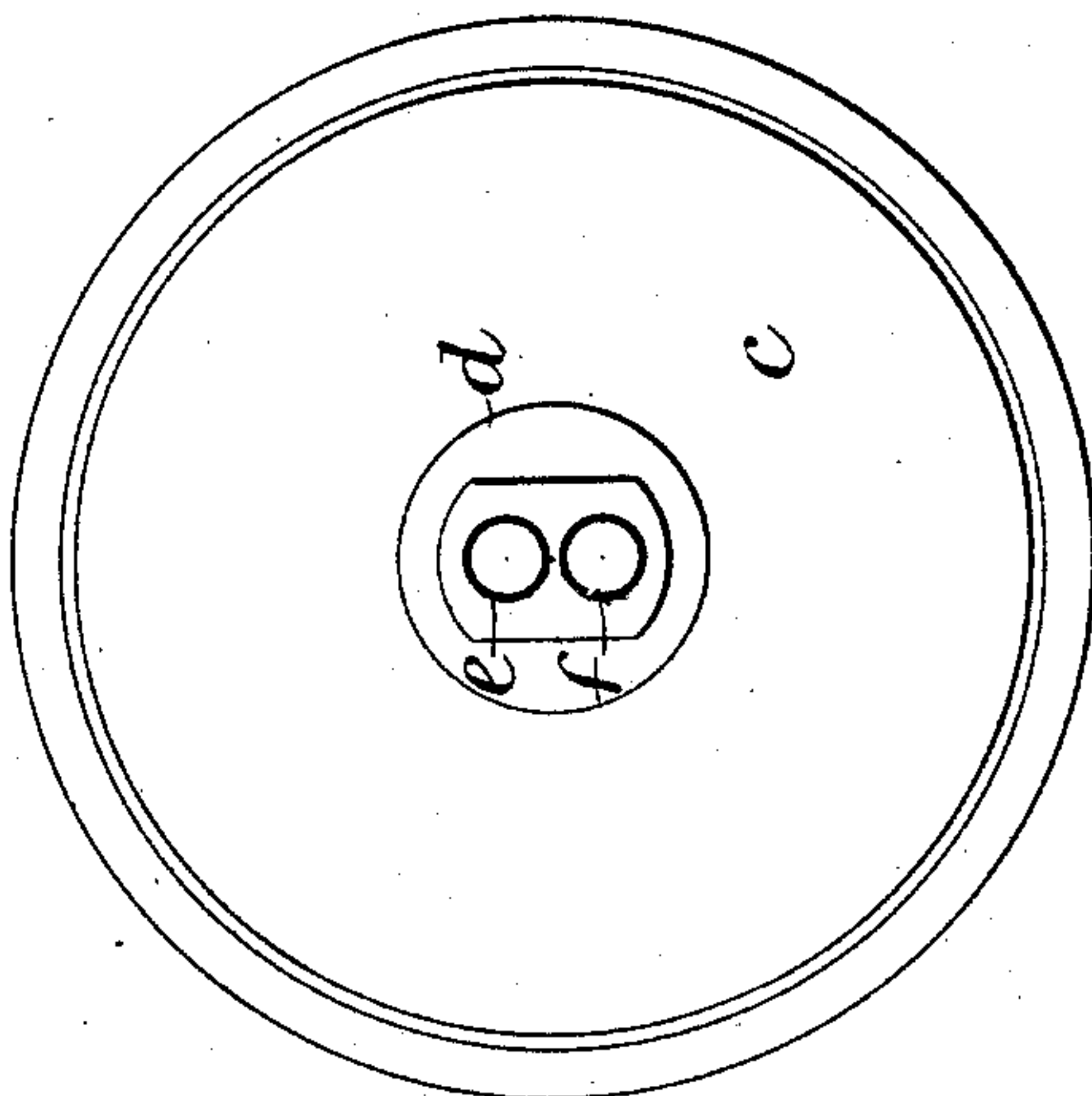


Fig. 2.

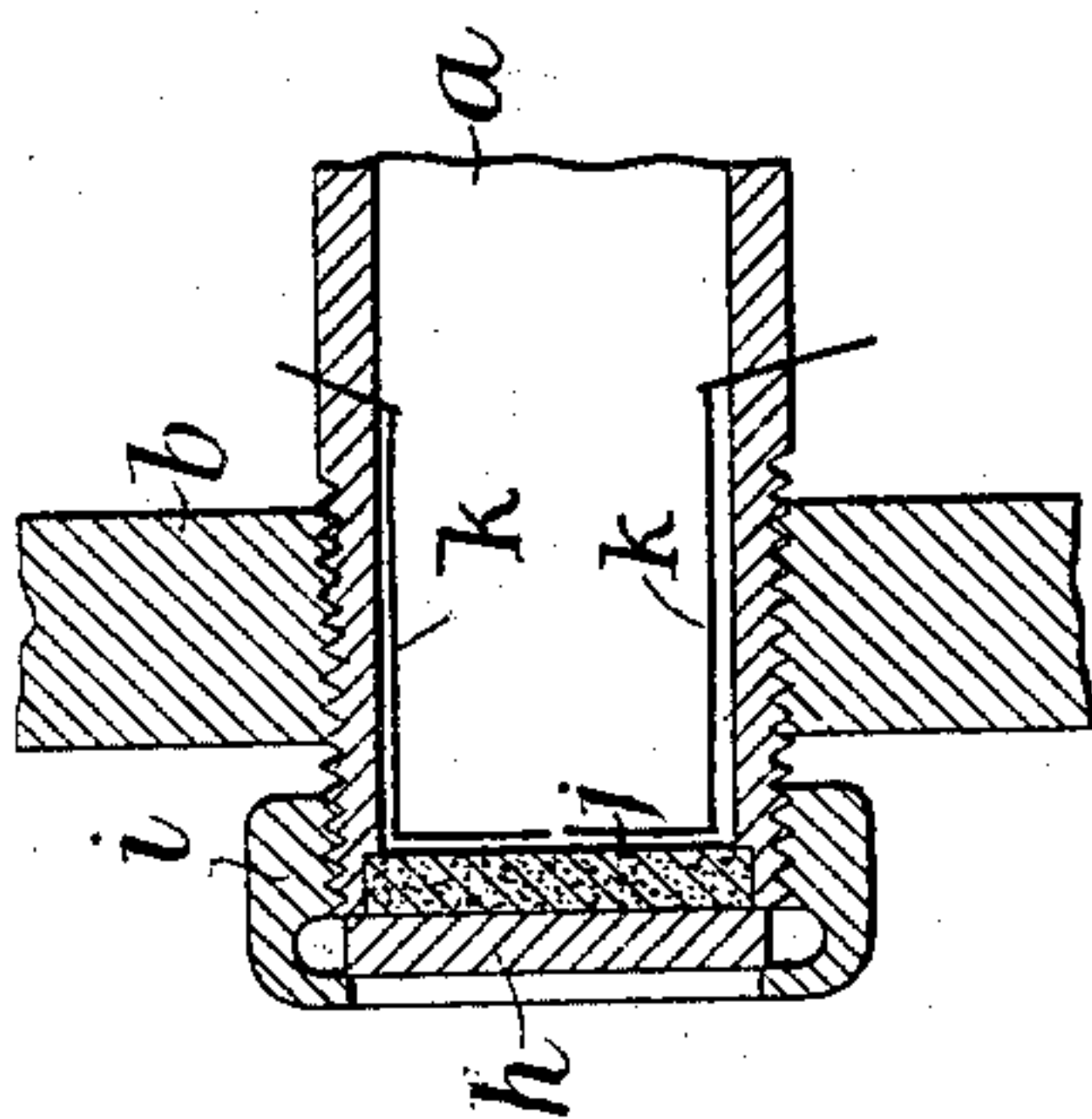


Fig. 4.

Witnesses.

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FLUID-PRESSURE GENERATOR.

SPECIFICATION forming part of Letters Patent No. 580,613, dated April 13, 1897.

Application filed November 7, 1896. Serial No. 611,373. (No model.)

To all whom it may concern:

Be it known that I, DAVID DUNCAN ESSON, a subject of the Queen of Great Britain, residing at Faversham, in the county of Kent, England, have invented new and useful Improvements in the Generation of Fluid-Pressure and Apparatus Therefor, of which the following is a specification.

My invention relates to the generation of gaseous-fluid pressure for motive-power purposes, and has for its object to provide a mode of generation whereby a high pressure can be quickly obtained and generating apparatus which will occupy a relatively small space.

In carrying out my invention I make use of the gases produced by the combustion of a material which possesses sufficient oxygen to burn in a closed chamber and which generates large volumes of gas, and by the injection of water-spray, which is converted into steam and which serves, primarily, to prevent the overheating of the chamber in which the combustion takes place.

A form of apparatus which I have found in practice gives good results comprises a series or congeries of tubes for containing the combustible compound or fuel and a chamber into which all the said tubes open and which serves as a reservoir for the produced gases. The water-spray is introduced into this chamber by any suitable means—for instance, by a pump operated by the fluid-pressure generated—and in such quantities that directly it comes into contact with the hot gases of combustion it is converted into steam, which, together with the said gases of combustion, is conducted through pipes to any desired point where the pressure is to be utilized. The several tubes of the series or congeries are provided with means whereby their communication with the interior of the reservoir shall be cut off, for instance, when the contents of several tubes are to be consumed successively. I have found that disks on the inner ends of the tubes answer the purpose, the said disks being so held that they can be blown off by the pressure when the compound is ignited. Suitable means, such as an electric current, are provided for igniting the compound.

To enable my invention to be fully under-

stood, I will describe the same by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of apparatus suitable for use in carrying out my invention. Figs. 2 and 3 are left and right hand end views, respectively, of the apparatus shown in Fig. 1. Fig. 4 is a view of a detail drawn to a larger scale than the other figures.

a a are the tubes of the congeries, which tubes extend through and are securely fixed in the tube-plate *b*. *c* is the chamber into which the said tubes open, the said chamber having one end formed by the tube-plate *b* and being at the other end contracted and fitted with a screw-nipple *d*, through which extend two tubes *e f*, the former serving for conveying water into the chamber *c* and the latter for the exit of the fluid-pressure from the chamber.

It will be noticed that the pipe *e* is coiled within the chamber *c*, so that the water is heated before escaping from the spray rose or nozzle *g*. If desired, however, the water may be caused to flow around the congeries of tubes in order to heat it prior to entering the chamber *c*, or it may be heated by passing it over any other heated part of the apparatus.

h h are the disks which are fitted against the ends of the tubes *a a* within the chamber *c*, and which are blown off by the pressure generated when the combustible compound in the several tubes is ignited, the said disks being held in position by a ring or collar *i*, screwed onto the end of the tube and adapted to slightly engage with the disk around its edge, so that under the pressure generated in the tube when the combustible compound is ignited the disk will be blown out of position.

j indicates a disk of asbestos or other non-conducting material placed behind the disk *h* and serving to prevent the heat which is within chamber *c* from prematurely igniting the compound in a closed tube.

It is obvious that the combustible material used in my apparatus must be one which is capable of gradually burning without the liability of exploding, and any composition capable of fulfilling this condition may be used in my apparatus.

A composition which answers my purpose

well is described and claimed in the specification of my application of even date with this application and given Serial No. 611,372.

The compound referred to consists of nitro-
 5 glycerin, dry guncotton, vaseline, and camphor in about the following proportions: nitroglycerin, by weight, fifty-five parts; dry guncotton, by weight, thirty parts; vaseline, by weight, ten parts; camphor, by weight, five
 10 parts. The camphor delays the combustion of the material, so that the production of gases is not so sudden as to cause an explosion, and by varying the proportion of camphor the combustion can be retarded or accelerated,
 15 if desired. In combining these ingredients I prefer to intimately mix the nitroglycerin, guncotton, and a portion of the camphor and to use the other portion of the vaseline and the camphor as a coating for the main
 20 part of the compound. This composition is made up into sticks or rods and a number of these sticks or rods are packed in each tube, the spaces around and between the rods being filled up, say, for instance, with vaseline,
 25 which assists in delaying the combustion of the composition. In practice the said sticks or rods are made of varying lengths in order that the area of the surface of the combustible compound shall gradually decrease as
 30 it burns back into the tube. The several tubes are connected with a battery or electric generator (not shown) by means of wires *k k*, (see Fig. 1,) so that they can be ignited successively or simultaneously or in any desired
 35 combination, according to the pressure required or the duration of time during which pressure is to be maintained.

The ignition of the composition takes place immediately behind the disk, so that the high
 40 pressure produced by the burning of this compound serves for blowing off the disk.

When the composition in one or more of the tubes is ignited, the heated gases due to the combustion rush out of the tube or tubes and
 45 meet the water-spray injected into the chamber *c* through the nozzle *g*, the quantity of water injected being so regulated that the whole of it is converted into steam. This mixture of steam and gases then flows through the pipe
 50 *f* to the apparatus wherein the pressure is to be utilized.

Having now particularly described and as-

certained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The process of generating fluid-pressure which consists in burning a mixture of nitroglycerin, guncotton, vaseline and camphor in an inclosed space, and injecting a spray of water into the gas formed by the combustion
 60 of said mixture, substantially as described.

2. An apparatus for generating fluid-pressure comprising an inclosing casing, a series of feeding-tubes communicating at one end with said casing and closed at their outer
 65 ends, igniting devices for said tubes adjacent to their communication with said casing, and a water-spraying device within said casing and a discharge-passage for said casing, substantially as described.

3. An apparatus for generating fluid-pressure comprising an inclosing casing, a series of feeding-tubes communicating at one end with said casing and closed at their other
 70 ends, removable disks for closing the communication between said tubes and said casing, detachable securing devices for holding said disks in position, a water-spraying device in said casing, igniting devices for said tubes
 75 and a discharge-passage for said casing, substantially as described.

4. An apparatus for generating fluid-pressure comprising an inclosing casing, a series of feeding-tubes closed at their outer ends and having their inner ends opening into said
 80 casing, controlling devices for the inner ends of said tubes for establishing communication between said tubes and the casing, a water-spraying device in said casing, igniting devices for said tubes and a discharge-passage
 85 for said casing, substantially as described.

5. An apparatus for generating fluid-pressure comprising an inclosing casing, means for holding a gas-producing material communicating with said casing, a water-pipe having
 90 a portion coiled within said casing terminating at its inner end in a spraying device, an igniting device for said material and a discharge-passage for said casing, substantially as described.

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Witnesses:

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