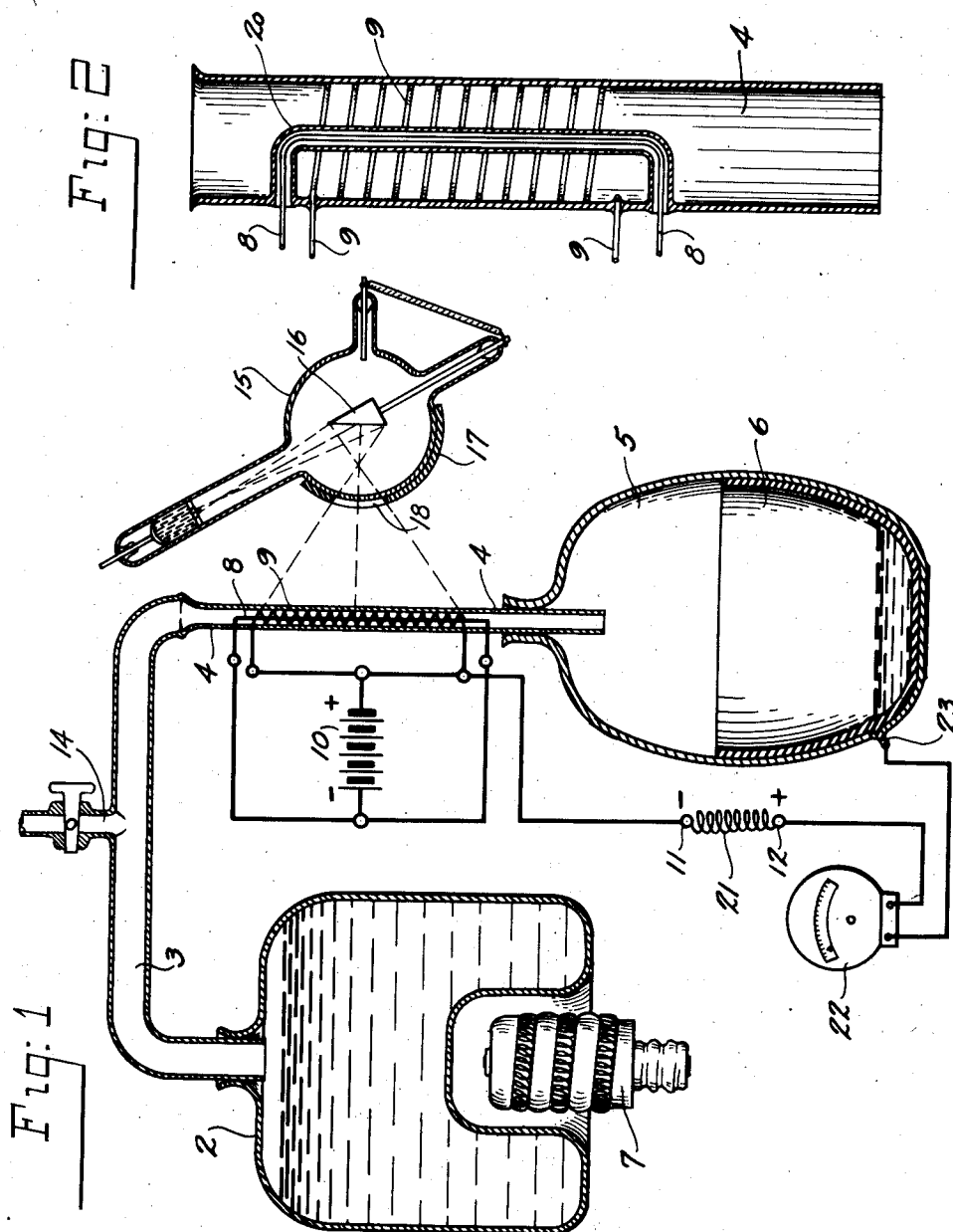


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ELECTRICAL GENERATOR  
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1,964,738



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## UNITED STATES PATENT OFFICE

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## ELECTRICAL GENERATOR

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14 Claims. (Cl. 171—212)

My invention relates in general to electrical generators; and the object of the invention is a novel method of generating electrical current, together with novel and highly effective apparatus for carrying out the same, operating on new principles which so far as I am aware have not hitherto been known or used.

The invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a view of my improved generating apparatus, with the principal parts thereof shown in section; while

Fig. 2 is an enlarged view of the ionization tube 4, Fig. 1, shown also in section.

Referring to Fig. 1, the reference character 2 indicates a boiler which may be of any approved form, but which is represented herein as a cylindrical flask having a circular depression in the lower end for receiving the electrical heating element 7. From the boiler 2 a pipe 3 extends to the right and connects with the ionization tube 4. The latter is a tube of relatively small diameter connected at its upper end to the pipe 3 and having its lower end extending into the condenser 5.

The boiler 2, pipe 3, ionization tube or passage 4, and the condenser form a closed system, which is preferably exhausted of air. The reference character 14 indicates a branch pipe, normally closed by a valve, to which a pump may be attached. The ionization tube 4 should be made of insulating material, and when made on a small scale the entire apparatus comprising boiler, pipes 3 and 4, and condenser 5 may conveniently be made of glass.

The boiler 2 is filled with liquid, preferably mercury, although water or some other liquids could be used. The boiler should be of sufficient capacity so that when in operation vapor can be passed over through the tube or passage 4 into the condenser at high velocity. If the condenser is made of glass as indicated, it should have a metallic lining 6 from which a wire 23, sealed in the glass, extends to the outside.

To prevent premature condensation, the boiler 2, the pipe 3, and the chamber 4 should be covered with some good heat insulating material such as asbestos. In order to heat up the pipe 3 and chamber 4 quickly, this asbestos covering may and preferably should contain heating coils. This enables the generator to be started up in a short time from a cold condition. The asbestos covering and heating coils may be arranged in any desired manner. As these parts will be readily understood they have been omitted from the drawing.

For the purpose of producing ionization within the chamber 4, I provide an X-ray apparatus 15, although other well known means may be used. The side of the bulb from which the X rays are given off, the side next to the tube 4, is covered with a lead shield 17, in which is cut a slot 18. This permits X rays which are given off from the auto-cathode 16 to be expelled from the bulb in a fan shaped beam. The apparatus 15 is positioned close to the tube 4, so that the beam of X rays impinges directly upon it. The asbestos covering is of course cut away from the tube 4 on the side next to the apparatus 15 so as not to unnecessarily absorb the X rays.

Considering now the circuit elements, the reference character 8 indicates a rod or wire centrally located within the ionizing tube 4 and having its ends extending outside the tube as shown. The reference character 9 indicates a coil of wire which lies against the inner wall of tube 4 and which likewise has its ends extending outside the tube. Battery 10 represents a source of D. C. potential which is connected between the central wire 8 and the coil 9. This source preferably is of high voltage so as to establish a strong electrostatic field.

To enable a high voltage to be used without danger of arcing and also to avoid current drain, the central wire or rod 8 is preferably insulated. Reference to Fig. 2 shows how this may conveniently be provided for. A U-shaped glass tube 20 is located within the tube 4, with its two open ends sealed into the wall of the tube 4 as shown. The wire 8 can readily be fished through the tube 20. The coil 9 is of bare wire and the ends can be sealed in the wall of tube 4.

The output terminals are indicated by reference characters 11 and 12. An ammeter 22 may be connected between terminal 12 and the wire 23. Terminal 11 is connected to the ends of the coil 9. The resistance 21 represents any load to which current may be supplied by the generator.

The operation of the apparatus will now be explained. Assuming that the boiler is in operation, the mercury contained therein is vaporized and passes through pipe 3 and ionization tube 4 into the condenser 5. The rate of vaporization should be such that the vapor passes through the tube 4 with considerable velocity. Under the influence of the X rays ionization takes place within the tube 4. Since the battery 10 maintains an electro-static field between wire 8 and coil 9, the negative particles or electrons move at high speed toward the coil 9 as fast as they are liberated in the ionization process, the coil 9 having a positive

potential impressed on it with respect to the wire 3. The electrons which collide with molecules of vapor knock out other electrons which also move toward the coil 9. The relatively heavy positively charged ions are of course attracted somewhat by the negative charge on the wire 3, but due to their kinetic energy are compelled to move against the field into the condenser 5, where condensation to liquid mercury takes place.

It will be clear from the foregoing that the coil 9 will accumulate a negative charge while the lining 6 of the condenser and the liquid mercury therein will become charged positively. These collecting elements, as they may be termed, are connected to the negative and positive output terminals 11 and 12, respectively, and it follows that if a load such as the resistance 21 be connected across these terminals a current will flow.

While I have described in the foregoing a certain specific form of my invention, it will be understood that numerous modifications may be made without departing from the principles of the invention. I do not, therefore, wish to be held to the precise form shown and described, but desire to include and have protected by Letters Patent all embodiments of my invention which come within the scope of the appended claims.

What I claim is:

1. The process of generating electricity which consists in producing a stream of gas, in ionizing the gas, in collecting the negative charge from the stream, in condensing the gas, and in collecting the positive charge from the liquid resulting from condensation.

2. The process of generating electricity which consists in producing a stream of gas moving at high velocity, in ionizing the gas at points within the stream, in collecting a negative charge substantially at the points where ionization occurs, and in collecting the positive charge by condensation of the gas at a remote point to which the positive ions are impelled by the energy of the stream.

3. In a generator, means for producing a moving stream of gas, means for producing free electrons and positive ions by ionizing the gas, a collecting element in the ionization field, means for attracting the electrons to said collecting element, and a collecting element outside the field to which the positive ions are moved by the energy of the moving stream.

4. In a generator, a boiler, a condenser, a conduit for passing gas from the boiler to the condenser, means for ionizing the gas within a portion of the conduit, and collecting elements located within the conduit and condenser, respectively.

5. In a generator, a passage, two elements within said passage, one of said elements being insulated and the other not, means for forcing gas through said passage, means for ionizing the gas, thereby producing electrons and positive ions, means for maintaining potentials on said elements such that the electrons are attracted to the uninsulated element and give it a negative charge, and means beyond the passage for collecting a positive charge from the positive ions.

6. In a generator, means for producing a stream of gas, means for ionizing the gas, means for collecting a negative charge from the stream, whereby the stream beyond the collecting means will contain an excess of positive ions, means for condensing the stream, and means for col-

lecting a positive charge from the liquid resulting from condensation.

7. In a generator, means for producing a stream of gas, means for ionizing the gas in said stream, a terminal located in the stream at a point where the gas is ionized, another terminal, a source of electromotive force connected between said terminals so as to attract the negative electrons to said first terminal, a third terminal for collecting a charge from the positive ions, and means for connecting a load to said first and third terminals.

8. In a generator, a boiler, a condenser, a conduit for passing gas from the boiler to the condenser, a terminal located within said conduit, a terminal located in the condenser, and a load circuit including said first terminal, the second terminal, and the liquid in said condenser.

9. The process of generating electricity which consists in producing a stream of gas moving at high velocity, in ionizing the gas at points within the stream, in causing a field to act on the ionization products and divert the electrons from the stream, in collecting a negative charge at points to which said electrons are diverted by said field, in utilizing the kinetic energy of the stream to carry the positive ions along with neutral molecules to a point beyond the influence of said field, in condensing the neutral molecules and positive ions to form positively charged drops, and in collecting the positive charge from the liquid formed by accumulation of said drops.

10. In an electric generator, a boiler, a condenser, means for passing gas from the boiler to the condenser, said means including a conduit, a collecting element located in said conduit, means for producing free electrons in said gas stream adjacent said element, means for establishing a field which diverts the electrons to said element at high speed to prevent the formation of negative ions, the positive ions resulting from the liberation of electrons being able to overcome the effect of said field due to their greater mass and pass to the condenser along with the rest of the gas, and a second collecting element located in the condenser in contact with the liquid therein.

11. The process of generating electricity which consists in producing a field which will act on charged particles, in producing a stream of gas and causing it to flow through said field, in producing free electrons and positive ions in said stream while it is passing through said field, in collecting electrons from the stream under the action of said field before they can combine with molecules to form ions, thereby building up a negative charge, and in condensing the stream of gas including the positive ions at a point beyond the field to form a positively charged liquid.

12. The process of generating electricity which consists in forming a stream of gas moving at high velocity, in producing electrons and positive ions in the stream by ionization, in producing a field of sufficient strength to divert the electrons but not the positive ions, in collecting the electrons, in condensing the stream at a point to which the gas including the positive ions is impelled against the field by the energy of the stream, and in collecting a positive charge from the liquid resulting from condensation.

13. The process of generating electricity which consists in forming a stream of gas moving at high velocity, in producing electrons and positive ions in the stream by ionization, in collecting the electrons from the stream sufficiently close to

where they are liberated to prevent the formation of negative ions, in utilizing the momentum of the positive ions to impel them along with the rest of the stream beyond the point where the negative charge is collected, in condensing the stream, and in collecting a positive charge from the liquid resulting from condensation.

tricity which consist in producing a stream of gas, in producing electrons and positive ions in said stream by ionization, in causing a force to act on said electrons and ions, and in utilizing said force and the difference in mass between the electrons and ions to effect separation thereof.

14. The steps in the process of generating elec-

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15	90
20	95
25	100
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65	140
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75	150