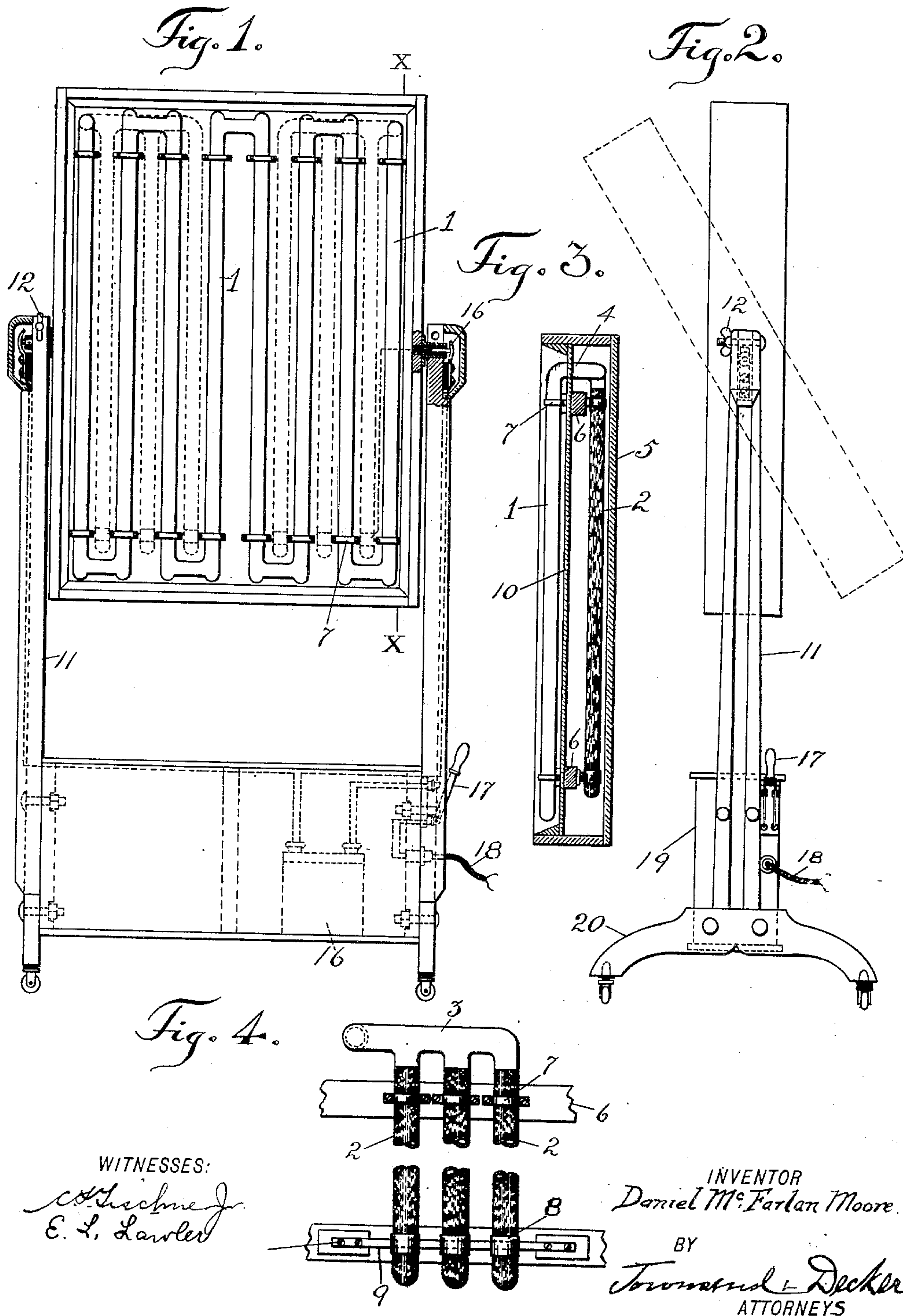


973,685.

Patented Oct. 25, 1910.

3 SHEETS—SHEET 1.



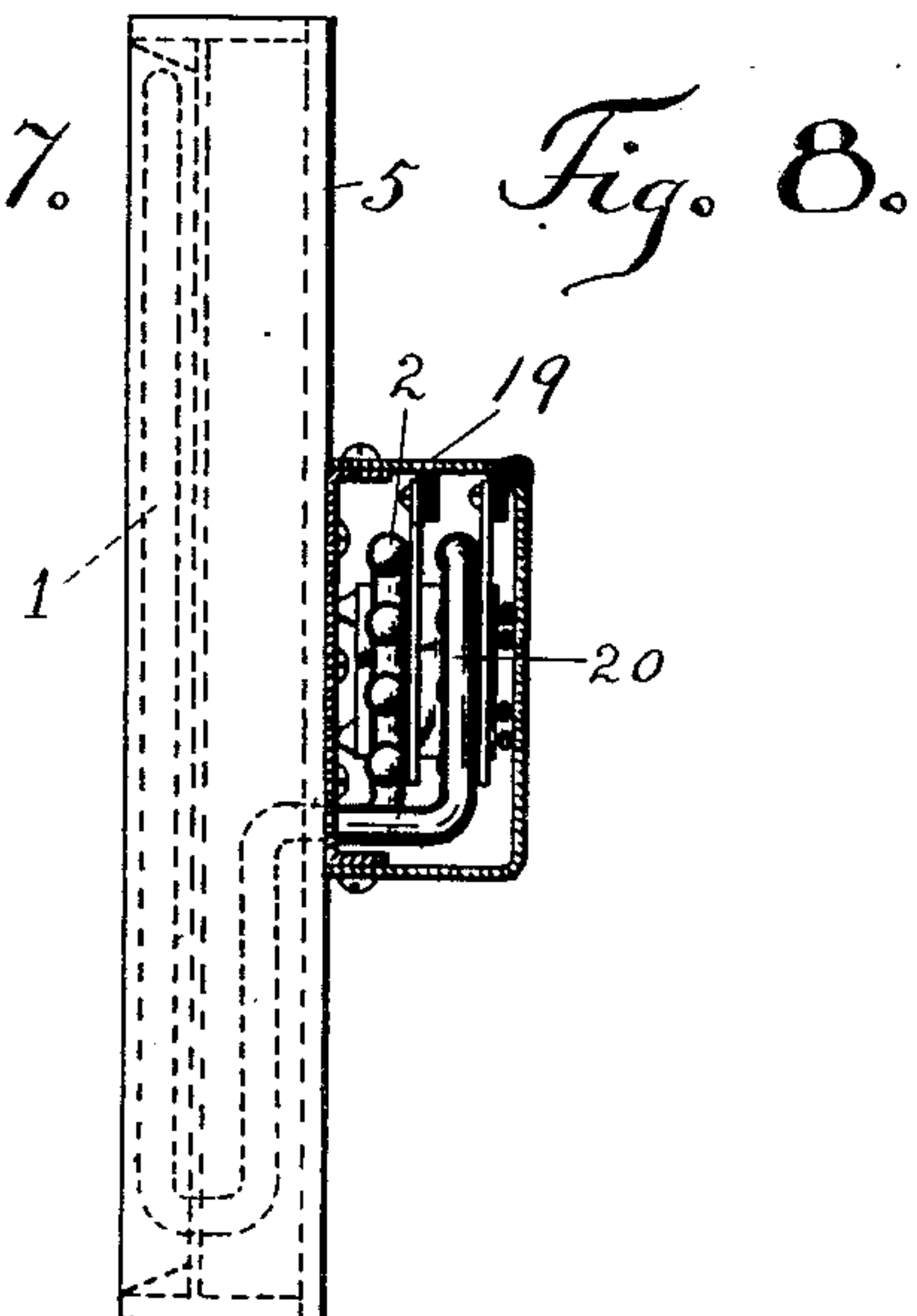
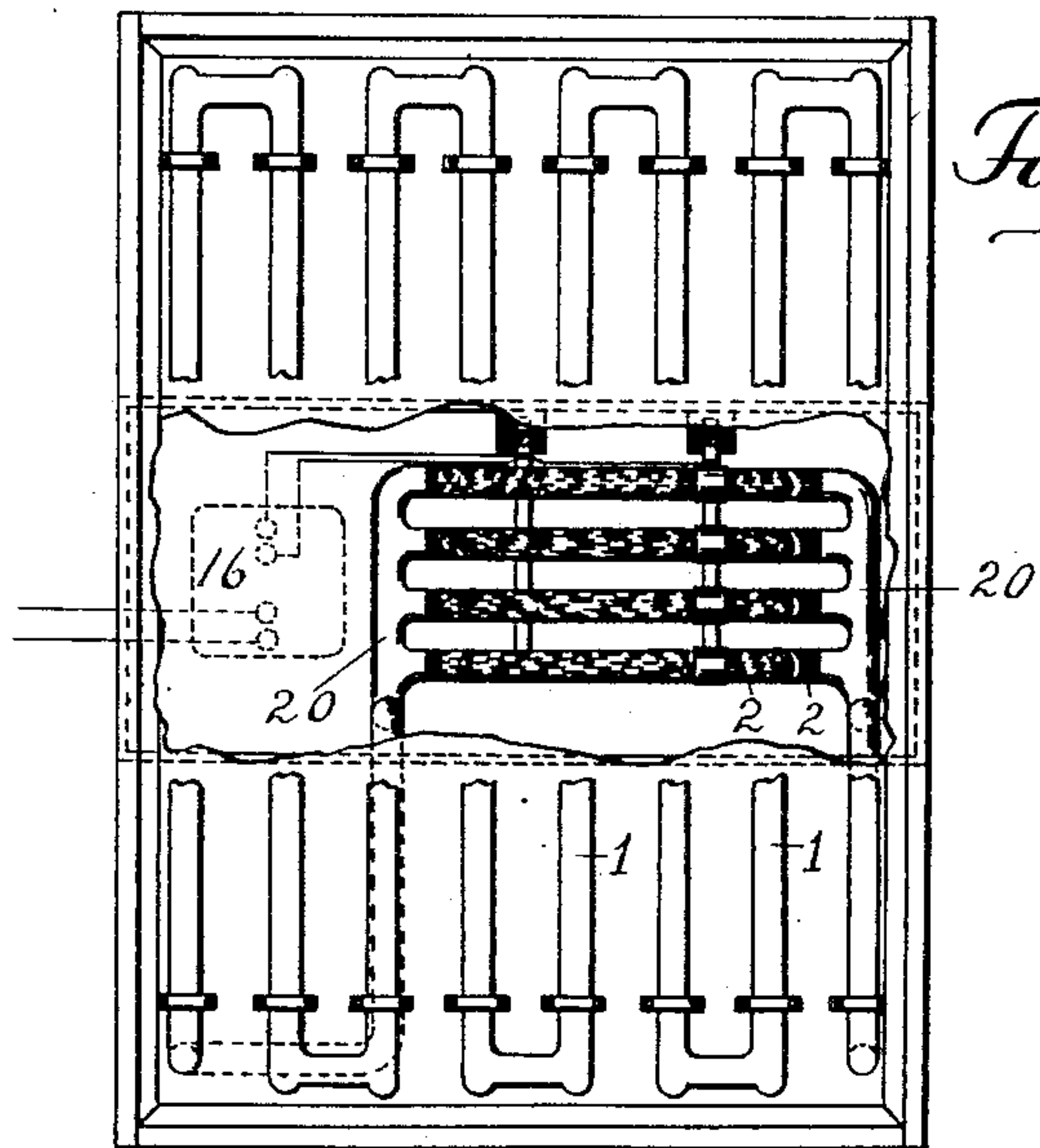
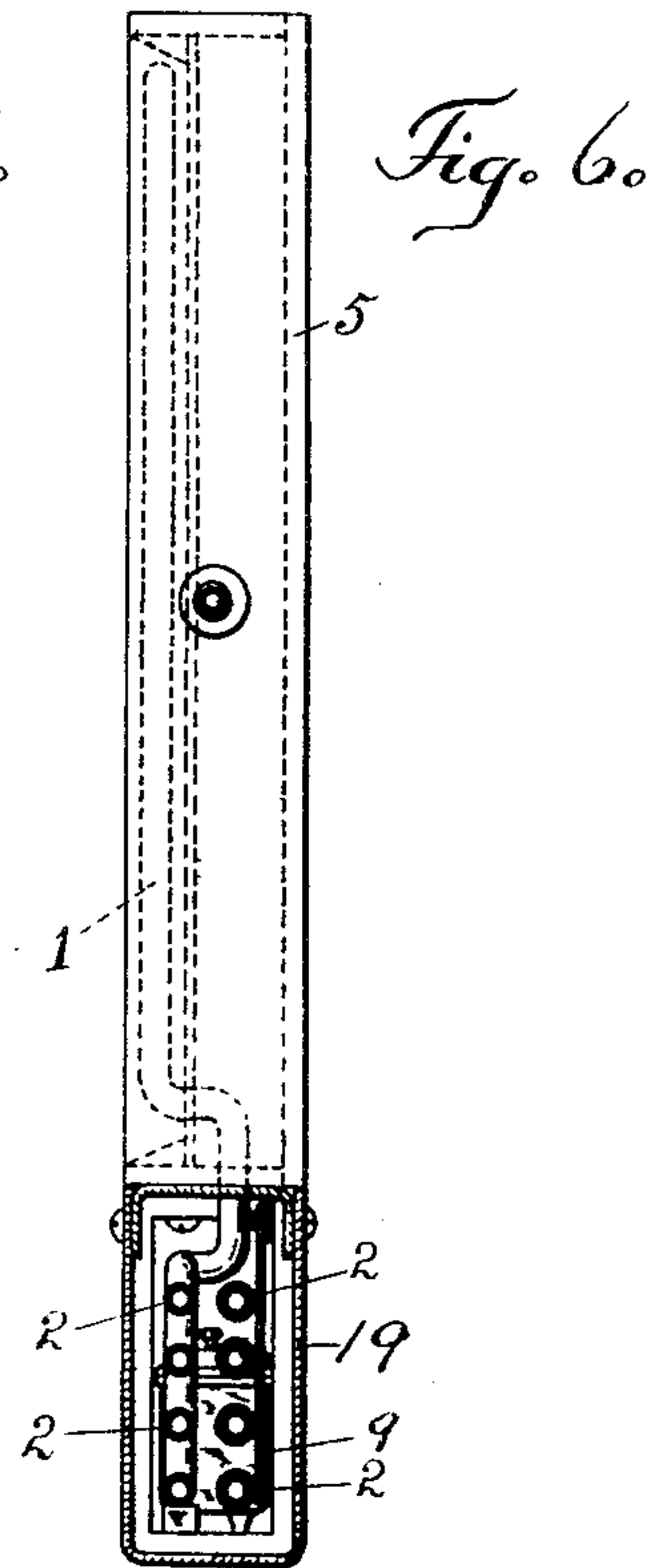
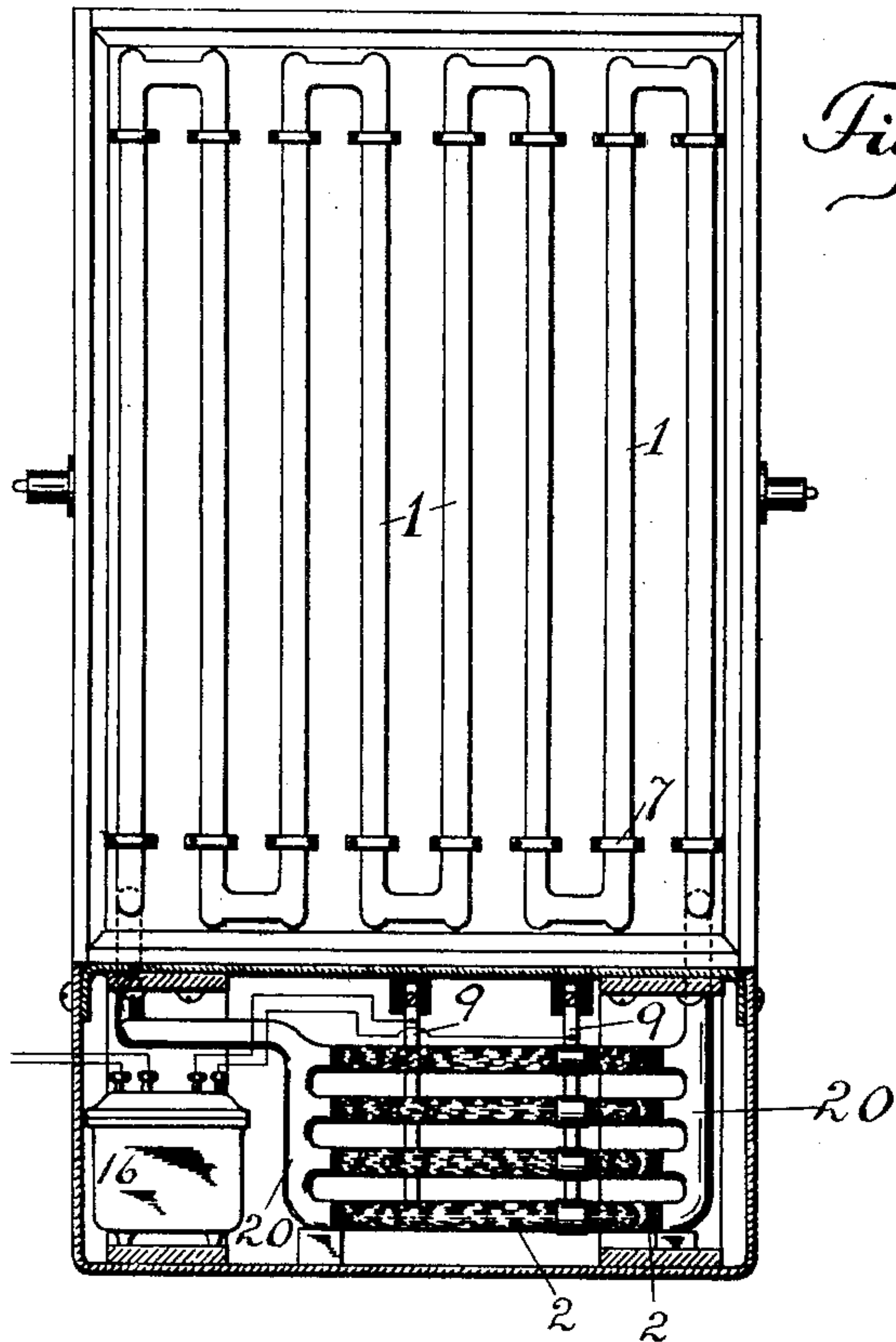
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3 SHEETS—SHEET 2.



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Fig. 9.

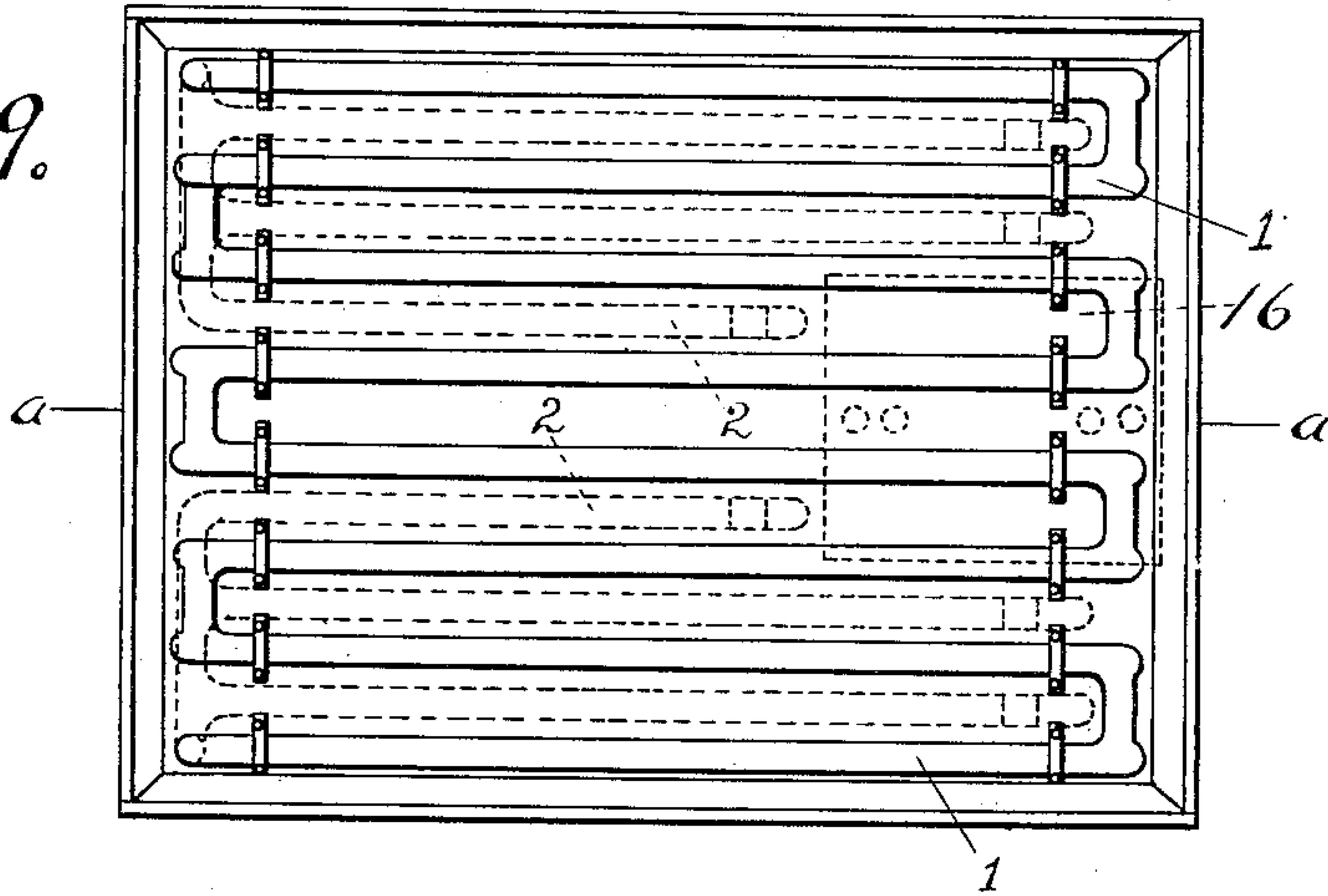


Fig. 10.

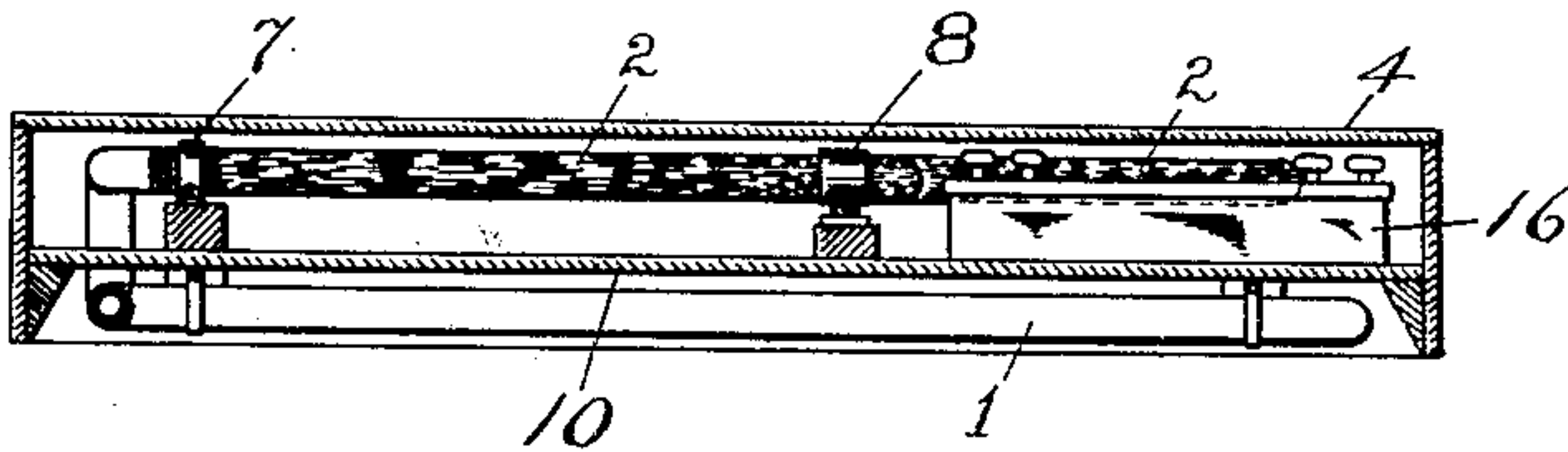


Fig. 11.

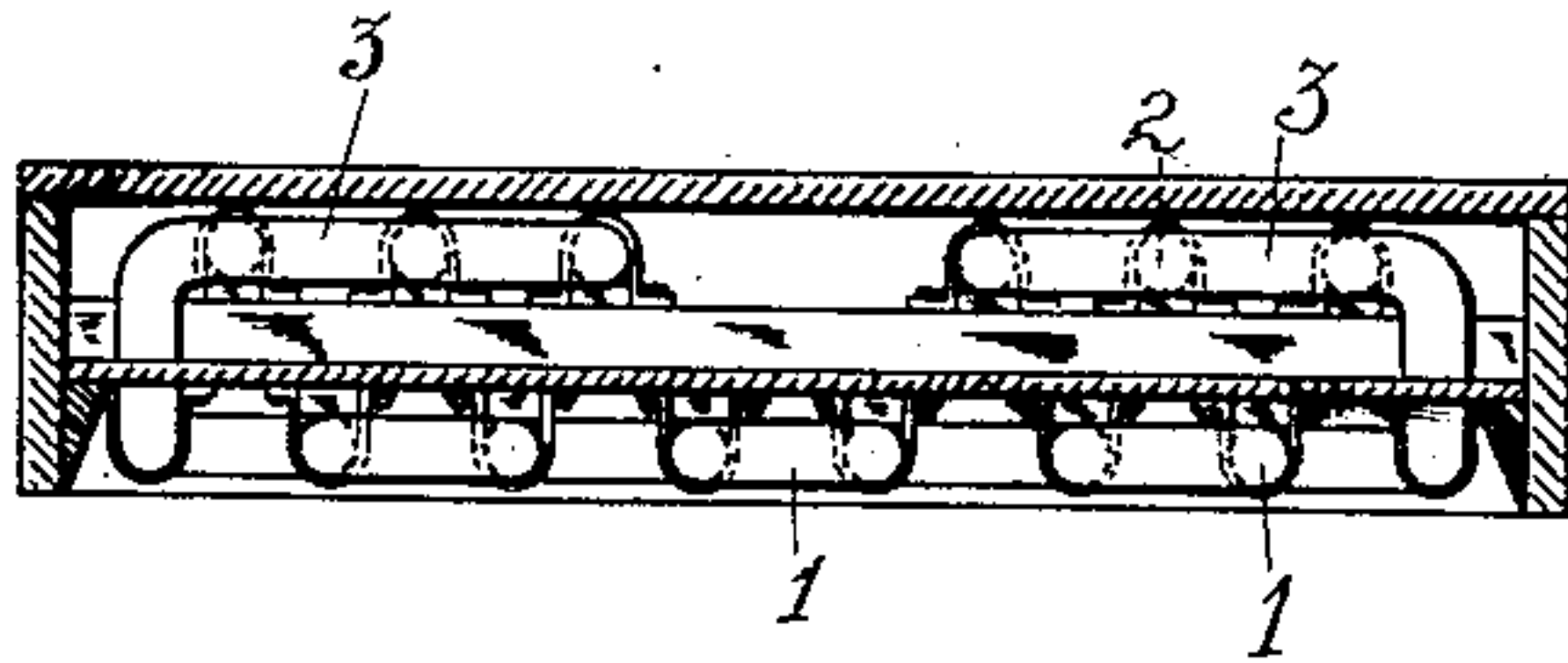
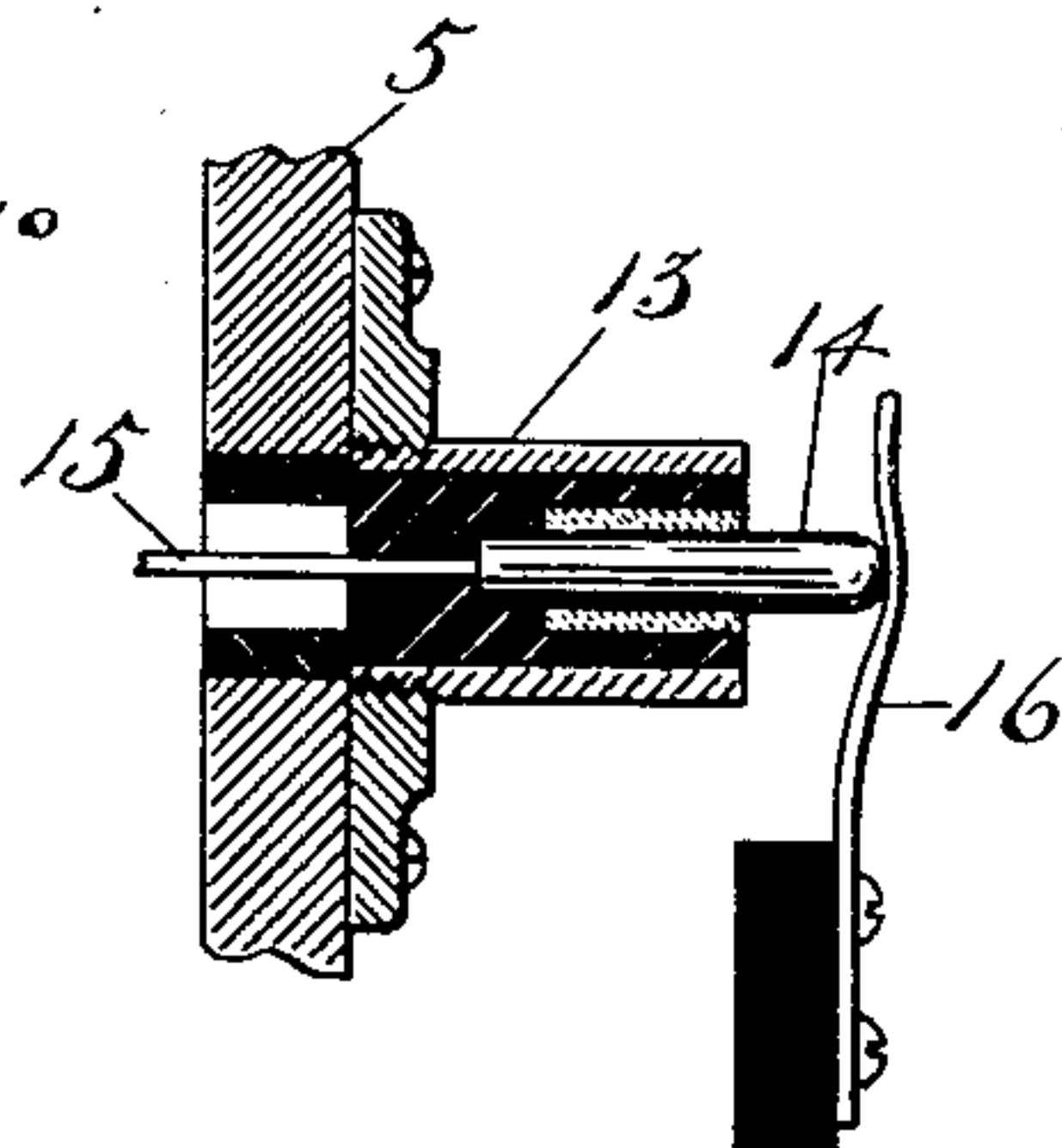


Fig. 12.



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# UNITED STATES PATENT OFFICE.

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## ARTIFICIAL SKYLIGHT.

973,685.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed October 27, 1903. Serial No. 178,700.

*To all whom it may concern:*

Be it known that I, DANIEL McFARLAN MOORE, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Artificial Skylights, of which the following is a specification.

My invention relates to electric lamps and the object is to produce a light which shall be economical and which, at the same time, shall give the effect of a light having a large area of illumination and high degree of diffusion.

A further object of my invention is to produce an electric light which shall be particularly serviceable for photographic uses in that it gives an even and highly diffused light over the whole of the person or object to be photographed.

A further object is to produce a light for photographic purposes which shall in itself and by reason of its general construction and manner of mounting serve as a substitute for the combined light and reflecting screens heretofore employed by photographers for varying the direction and intensity of the illumination of the person or object to be photographed.

In carrying out my invention, I prefer to employ an electric lamp or lamps of that class in which the illuminating agent is a body of more or less attenuated gas or vapor contained in a translucent tube and excited to luminosity by electric energy.

My invention consists in the special disposition and connection of the several illuminating lengths or sections and manner of connecting the same together to form a single continuous tube having the characteristics above stated.

The invention consists also in disposing the terminals of the tube carrying the conducting caps in a plane parallel to the section or sections of illuminating tubing and preferably opposite the spaces between the doubled portions of said illuminating tube.

The invention consists also in an improved lamp for photographers' use comprising substantially one or more lengths or sections of glass tubing containing luminous gas or vapor arranged in close proximity to one another as a gang or group of parallel luminous tubes in a common frame com-

bined with a suitable stand having uprights in which said frame is mounted or pivoted to turn in a vertical plane, said stand itself being of such construction that it may rest upon the floor and be moved freely over the same into any desired position to change the direction of the illumination from the pivoted gang of lights in a horizontal plane.

The invention consists also in details of construction and combinations of parts as hereinafter more particularly described and then specified in the claims.

In the accompanying drawings, Figure 1 is a front elevation of my improved light as arranged for photographers' use; Fig. 2 is a side elevation of the same; Fig. 3 is a vertical section through the casing or framework in which the lamp is supported; Fig. 4 shows in detail the manner of supporting the multiple terminals through which the electric energy is supplied; Fig. 5 shows in front elevation a modification in the manner of disposing of the terminals; Fig. 6 is a side elevation and partial vertical section of the same; Figs. 7 and 8 are corresponding views, corresponding to Figs. 5 and 6, illustrating modifications in the disposal of the conducting terminals and energy supplying transformer; Fig. 9 is a plan of a modified form of apparatus; Fig. 10 is a vertical section through the same on the line *a-a*, Fig. 9; Fig. 11 shows the same apparatus in top view, the casing being shown in section; Fig. 12 illustrates a detail of the pintle on which the apparatus may swing in a vertical plane.

Referring to Fig. 1, a number of lengths of glass tubing containing the gas or vapor adapted to be rendered luminous by electric energy are indicated by the numeral 1. These lengths comprise in the preferred form of my invention, portions of a continuous tube doubled back and forth upon itself as shown in short lengths which are arranged in close proximity to one another as shown to form collectively a plane of light, all portions of which shall act practically with the same value and without obstructing one another to illuminate the object within the field of the lamp. The manner of supplying energy to these lengths or sections of tubing may be varied at will. In practice and for some reasons, I prefer to employ the following arrangement of



tube terminals. It will be understood that in carrying out my invention I do not limit myself in any manner to the particular kind of gas or vapor in the tube, nor to the kind or character of electric energy by which the lamp is excited. The tube is provided at each end, preferably, with a number of tubes or branches, 2, each having the usual conducting cap or terminal for the electrostatic transfer of energy to the contents of the tube. The terminals 2, all branch, preferably, from a header, 3, with which the luminous section 1 of the tubing is connected, the connection with said header being by the branch or elbow, 4, seen in Fig. 3, which passes from the front to the rear of the device as shown, all so that while the tubes 1 are disposed practically in one plane, the terminal section or sections, 2, are in a substantially parallel plane, thus giving compactness and small dimensions from front to rear or from top to bottom of the apparatus.

5, is a suitable frame-work or casing having transverse frames or bars 6, upon which are mounted the devices for securing the tubing in place.

The illuminating portions, 1, may be secured by the clamping rings 7, fastened to the bars 6. The terminal or conducting cap portions, 2, may be fastened at their upper ends as shown in Fig. 4, by similar devices. Their lower ends may have collars or rings 8, closely encircling the conducting cap portion and themselves soldered to a conducting bar, 9, fastened as shown, to the lower cross-bar 6, said bar 9 affording means for making electrical connection with said conducting terminals. These conducting caps or terminals may consist, as described in my prior patents, of some form of carbon closely adherent to the outer surface of the glass, or might be of other conducting material.

The conducting sections are preferably disposed in line with the spaces between the illuminating lengths 1, as shown by the dotted lines, Fig. 1. This is desirable only when the lamp is to furnish illumination both front and rear. When designed to furnish light on one side only, as is frequently desirable in taking photographic negatives, it is preferable to interpose at the back of the illuminating sections a suitable reflector 10.

For photographic purposes the frame may be mounted to turn in horizontal bearings in suitable posts or uprights 11, which rise from a suitable base and constitute with said base and feet or brackets 20 projecting therefrom, a movable stand adapted to rest securely upon the floor and be moved freely into any desired position with relation to the subject being photographed. By this means, the photographer, through swinging

the frame containing the lamp in a vertical plane, may direct the light at any desired downward angle upon the subject and he may move the frame about to any desired position with relation to the subject and may turn the light in a horizontal plane to vary the direction of the horizontal rays. As will be seen, the apparatus in itself gives the greatest facility for changing or varying the illumination of the subject to suit the artistic desires of the operator. The frame may be clamped in the stand at any desired degree of inclination in a vertical plane by means of suitable clamping devices 12. These pivotal supports may be constructed as shown more clearly in Fig. 12, and comprise a brass tubular pivot 13, fastened to the side of the casing 5, and having fixed within it a conducting pin 14 insulated in a suitable manner from the pivot 13. From the inner end of the pin 14 runs a wire 15, which suitably connects with the bar 9, or other devices joined to the conducting caps. Upon the outer end of the pin 14 bears a spring 16, which is electrically connected through the post 11, with the secondary of a transformer 16 in the base of the apparatus. Said transformer supplies energy of suitable potential and has its primary connected within the base to the terminals of a switch 17 joined, as shown, by a conducting cord 18, with any source of alternating currents.

The stand may be provided with a casing 19 for the electric generator or for other devices if desired, although this is not necessary. The feet or brackets 20 may have casters as indicated to render the stand more readily movable over the floor.

As will be seen, the combination of the framework carrying the lamp and adapted to swing in a vertical plane with the stand adapted to be moved readily on the floor, gives the capacity to throw light on the subject in any desired direction, and affords a very valuable substitute for the usual skylight employed in photographic operations with a very much greater capacity for light effects.

In the modification of my invention shown in Figs. 5 and 6, the conducting terminals of the tube or tubing are disposed in a casing 19 immediately beneath the illuminating sections. Each end of the illuminating tube is carried back as shown in the side view, Fig. 6, and down through the top of the casing 19, within which it terminates in the vertical header 20, each header communicating with branches having the conducting caps for the transfer of the energy. The branches for the two ends respectively of the tube are for compactness disposed in parallel vertical planes as shown in Fig. 6. Connection with each of said terminals is made by conducting bars 9, to



which collars upon the conducting caps are suitably soldered.

In Figs. 7 and 8 I show a modification wherein the terminals of the tube are similarly disposed with relation to one another but in a casing 19 applied to the back of the main casing or box 5.

In the same casing, 19, the transformer 16, may be disposed, although this is not necessary for the purposes of my invention.

The portions of casing containing the transformer are preferably made of suitable material to protect the high potentials of the transformer against escape or accidental contact. Similarly those portions of the tube which form the conducting cap portions, are preferably disposed in a danger-proof inclosure as shown.

While it is desirable, for some purposes, to mount the improved lamp as shown in Figs. 1 and 2, upon horizontal pivots to permit it to swing in a vertical plane, this is not always necessary, and for illuminating show windows or for situations where it is desired to dispose the lamp in the ceiling or above the space to be illuminated these devices may be dispensed with.

As shown in Figs. 9 and 10, the transformer 16 might in this case be arranged within the same framework or casing 4, as the illuminating portions of the tube but in a cavity or space at the rear thereof, and separated from the illuminating portion 1 by a suitable reflector 10, which backs the portion 1 as shown. This construction gives compactness both vertically and horizontally.

My apparatus affords not only a useful device for taking photographic negatives, but may also be profitably employed in printing from negatives. In the latter case it may be desirable to dispense with the reflecting partition 10, especially when the apparatus is constructed as shown in Figs. 1 to 5.

My improved light may be used also for therapeutic purposes where it is desired to take advantage of the curative action of light.

As will be well understood, the intensity of the light may be governed by a rheostat or other controlling device as well understood in the art, used at any portion of the circuits. In the dispositions of apparatus shown in Figs. 5, 6, 7 and 8, connection with the transformer may be made by a suitable flexible conductor. These forms, it will be seen, avoid the necessity for the use of the conducting pintles or pivots, and are also desirable because they bring the conducting terminals of the tube in close proximity to the high potential secondary terminals of the transformer.

In all forms it will be seen that the high potential circuits or conductors are not in

any manner exposed, although in its main features my invention is not limited to any particular potentials and even low potentials might be employed in some cases; nor do I limit myself to the use of conducting caps or terminals for transferring the energy to the contents of the tube, but might employ interior electrodes and gases or vapors of any desired kind. Ordinarily I prefer to employ fixed gases rather highly attenuated, and exterior conducting caps, since I have succeeded by this kind of lamp in producing effective results economically and artistically.

It will be observed that the lamp employed by me, being devoid of a contained fluid like mercury, may be readily turned into and maintained at any desired inclination, which would not be the case with an ordinary mercury vapor lamp, the latter form of lamp being unsuited to the purpose of my invention.

What I claim as my invention is:

1. An electric light comprising a luminous section of tubing doubled back and forth upon itself and multiple terminal tubes therefor disposed opposite the spaces between the doubled portion and in a plane parallel to said portions.

2. An electric tube lamp consisting of a translucent tube doubled back and forth upon itself in a single plane and provided at each end with multiple tube terminals each having a conducting cap, said multiple tube terminals being disposed in a plane parallel to the plane of the doubled portion.

3. An electric tube lamp having an illuminating portion composed of a multiplicity of sections arranged parallel and in close proximity to one another in the same plane and terminals for said tubes arranged at the rear of said plane and with their axes parallel to the axis of the illuminating portion.

4. An electric tube lamp having terminals provided with conducting caps and disposed out of line with but in a plane substantially parallel to the plane in which the light-giving portions of the tube connected thereto are disposed.

5. An electric lamp for photographer's use, comprising a stand or base adapted to be moved freely over the floor into any desired position with relation to the sitter, a frame mounted on said stand on suitable pivotal supports and adapted to be turned on said supports in a vertical plane into any desired degree of inclination from the vertical, and a vacuum tube lamp adapted to be operated at any inclination from the vertical and comprising a group of luminous tubes whose members are arranged in close proximity to one another in a common plane, to produce the effect of a sky-light.

6. An electric lamp consisting of a frame mounted on pivotal supports adapting it to

be turned to any desired degree of inclination from the vertical, a vacuum tube lamp adapted to operate at any desired inclination from the vertical and mounted in said  
5 frame, and means for supplying electric energy to said lamp through the pivots of the frame.

Signed at New York city in the county of New York and State of New York this 23rd day of October A. D. 1903.

DANIEL McFARLAN MOORE.

Witnesses:

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C. F. TISCHNER, Jr.