

(No Model.)

G. H. WHITTINGHAM.
ELECTRIC HEATER.

Patented Oct. 15, 1895.

No. 547,979.

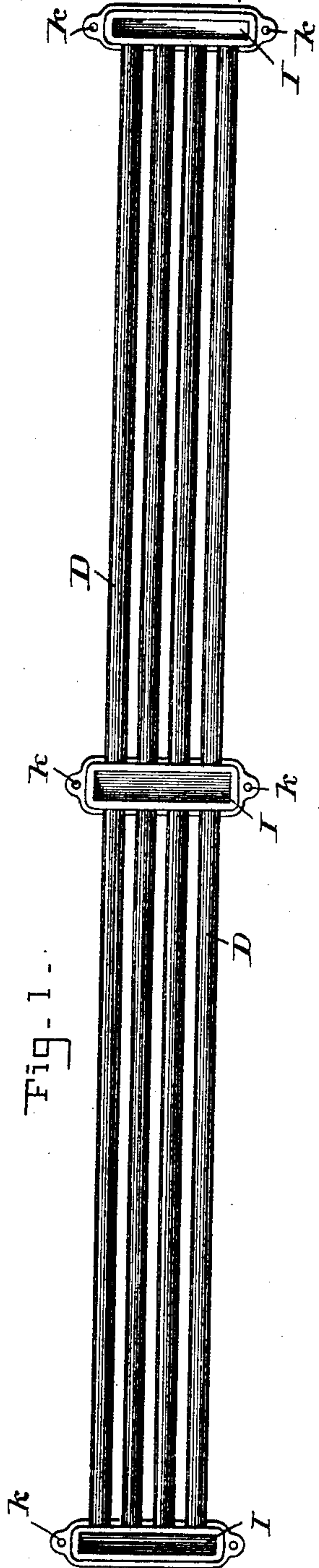


Fig. 1.

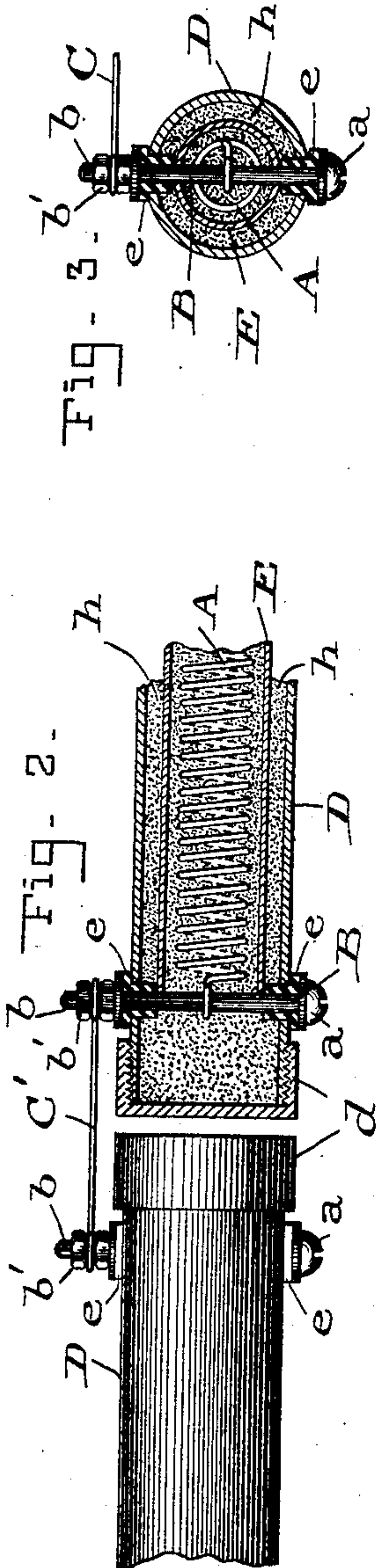


Fig. 2.

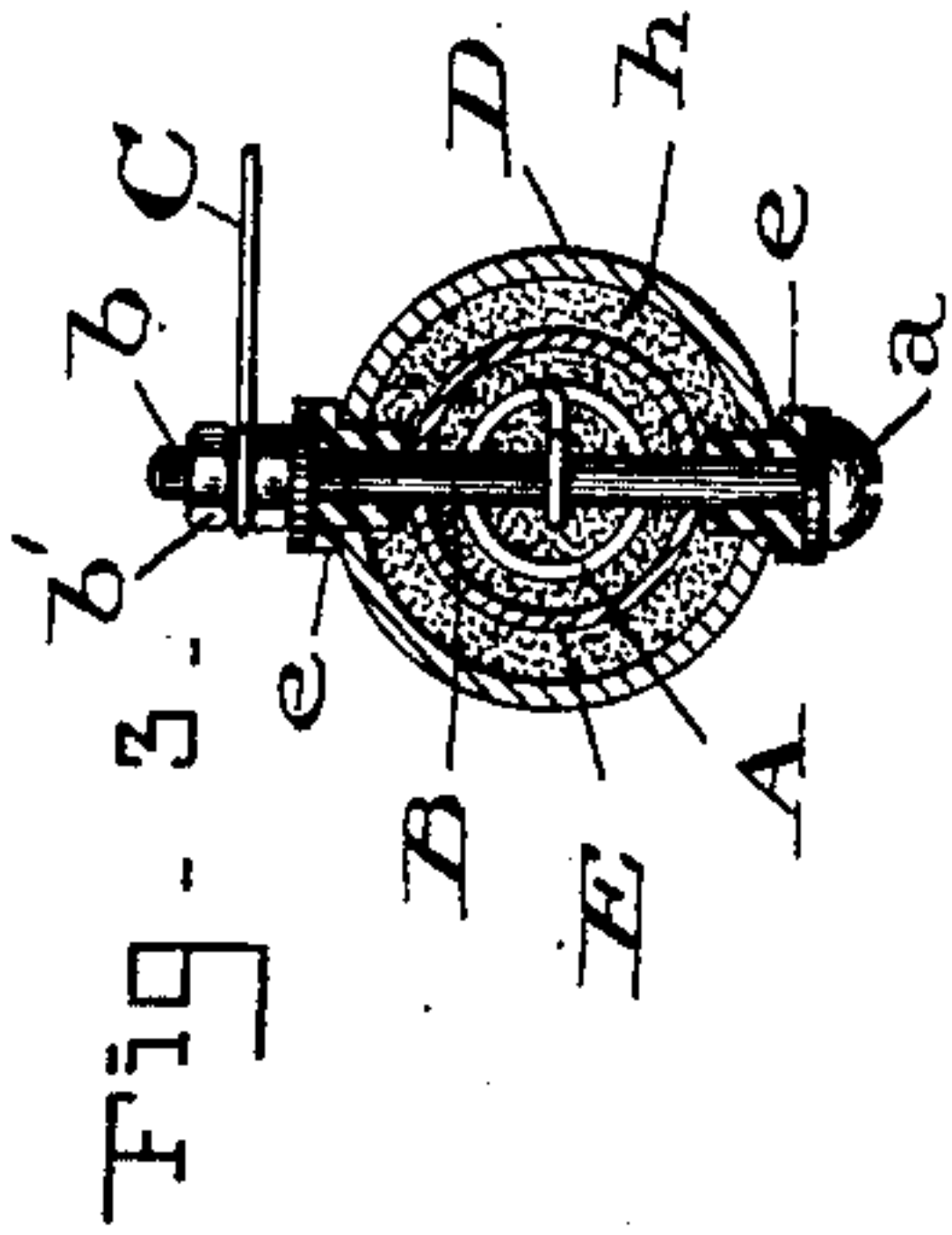


Fig. 3.

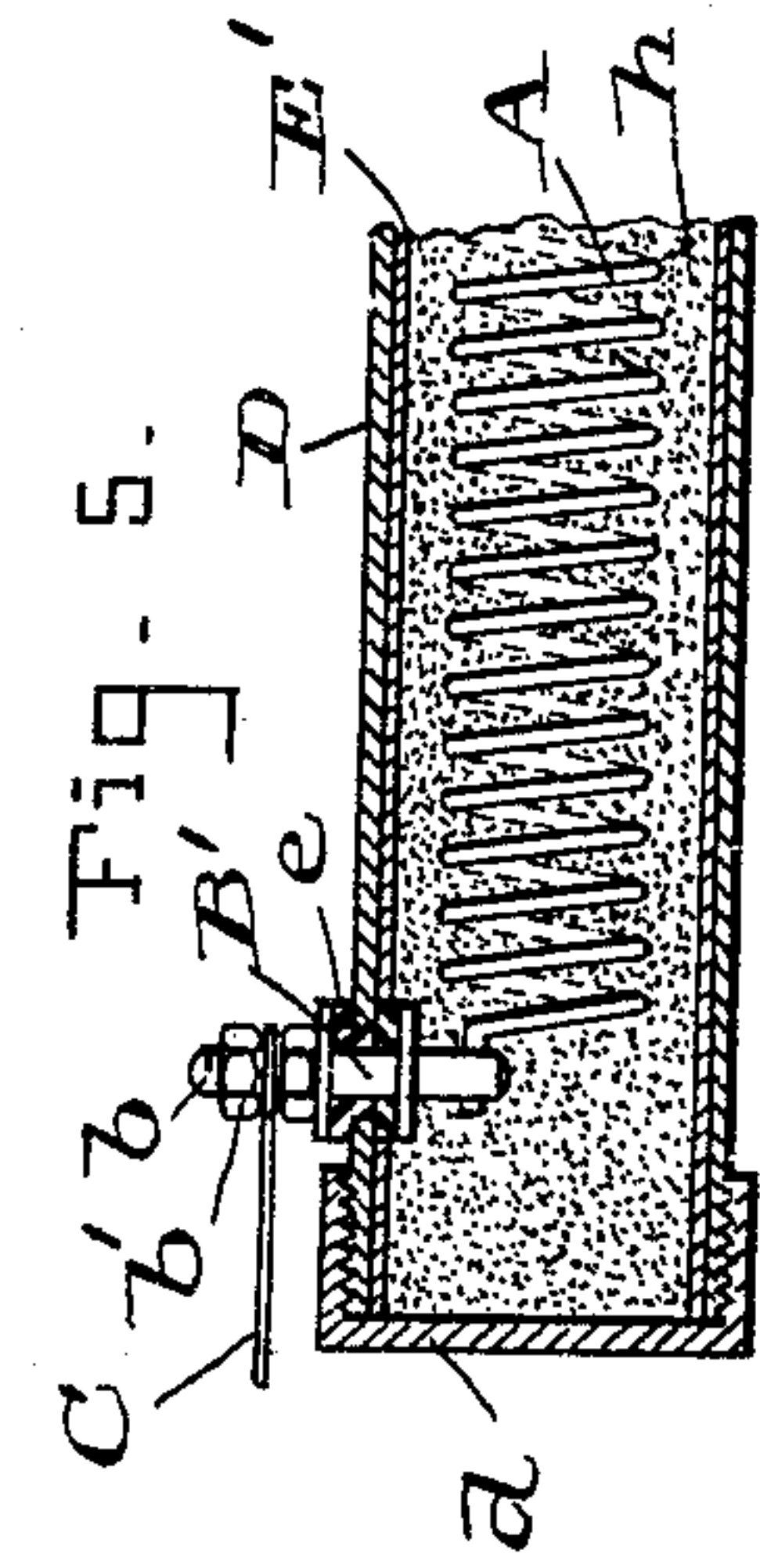


Fig. 4.

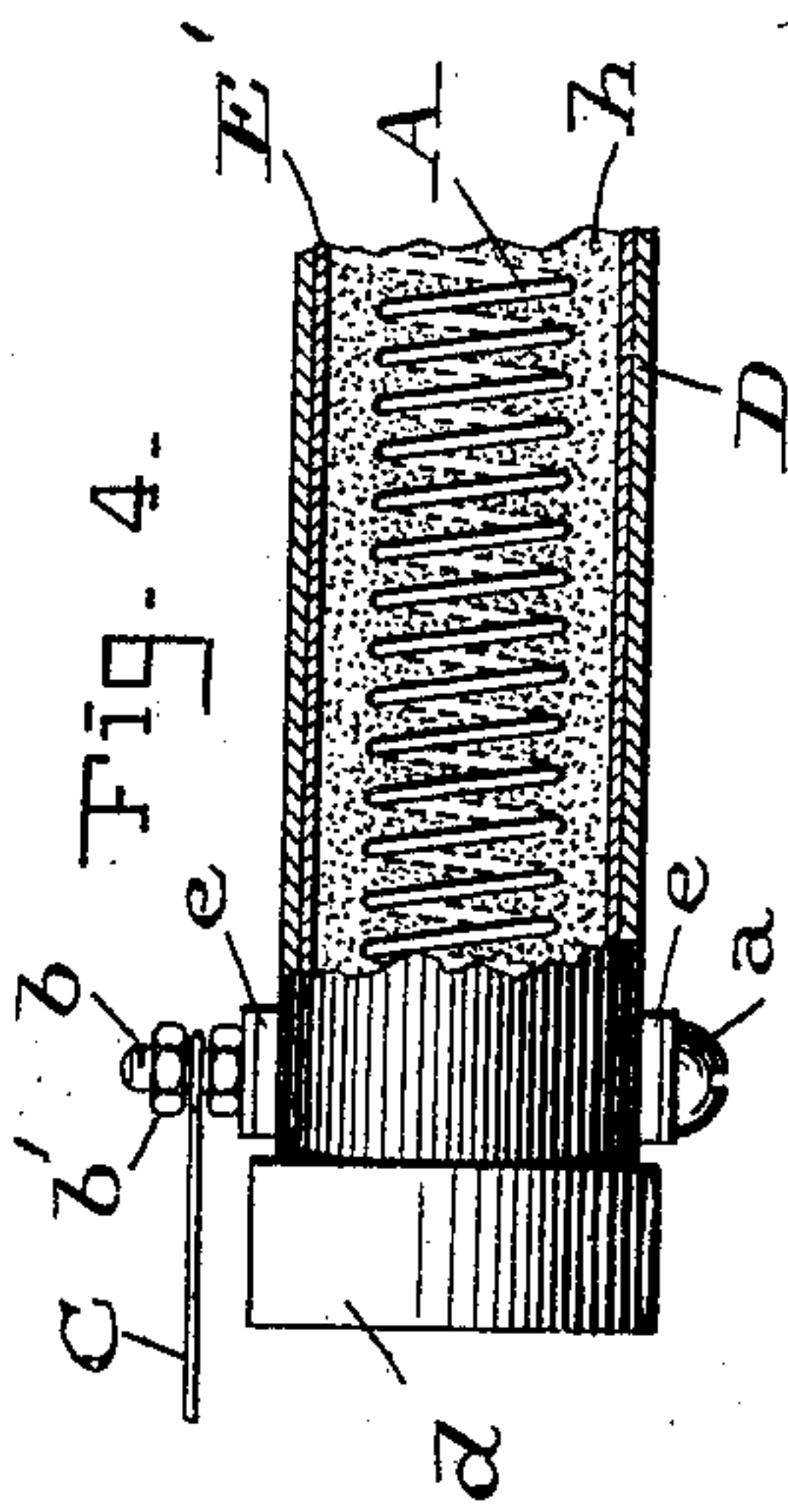


Fig. 5.

WITNESSES : -

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UNITED STATES PATENT OFFICE.

GEORGE HERBERT WHITTINGHAM, OF BALTIMORE, MARYLAND, ASSIGNOR
TO THE WHITTINGHAM ELECTRIC CAR HEATING COMPANY, OF SAME
PLACE.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 547,979, dated October 15, 1895.

Application filed July 15, 1895. Serial No. 556,046. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HERBERT WHITTINGHAM, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Electric Heaters, of which the following is a specification.

This invention relates to an improvement in electric heaters, and provides for a pipe-constructed electric heater for cars and buildings, in which the binding-posts are independent of the caps which close the pipe ends, whereby access may be had to the interior of a pipe without disturbing the binding-posts or other connections.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the tubular heater complete. Fig. 2 shows the adjoining or abutting ends of two tubular heaters electrically connected, being a side view of one heater and a sectional view of the other. Fig. 3 is a cross-section of a tubular heater, taken on the line of the binding-post. Fig. 4 shows one end of a tubular heater in section, being a modification of the internal construction seen in Fig. 2. Fig. 5 is a sectional view of a tubular heater, showing a modification in the binding-post.

I employ pipes or tubes D of small diameter and of iron or like material suitable for rapidly radiating heat. These pipes contain a resistance-wire A, which passes through the pipe and has its ends connected with binding-posts B, which extend crosswise diametrically through the pipe or tube. The crosswise binding-posts B have at one end a head *a* and at the other end a screw-thread *b*. Two insulating collars or bushings *e* surround each binding-post and insulate the post from the pipe, and nuts *b'* on the screw-threaded end serve to confine the bolt and also retain the end of a conducting-wire C. Each end of the pipe is closed by a screw-cap *d*, which is independent of the crosswise binding-post, and said cap may be put on or taken off without disturbing the binding-post, the resistance-wire, or the conducting-wire. Suitable electric insulation is placed in the radiating-pipe and interposed between the resistance-wire A and the inner surface of said pipe. The insulating material *h*, which may be clear loose sand,

pulverized quartz, or some other highly-efficient conductor of heat, completely surrounds the resistance-wire A and is filled in between the resistance-wire and the inner surface of radiating-pipe. It is a desideratum that the loose granular packing shall be in immediate contact with the inner surface of the radiating-pipe and that it shall also intimately surround the resistance-wire, and further it is necessary that the coils of the resistance-wire shall be prevented from sagging or getting out of line and coming in contact with the inner surface of the radiating-pipe. In order to prevent the possibility of contact between the resistance-wire A and the inner surface of the radiating-pipe D previous to or while the pipe is being filled with the loose granular packing, an insulating-tube E, of glass or mica, is employed in the said pipe. This glass or mica tube surrounds the resistance-wire and extends lengthwise of the pipe D. The heat-conducting medium or packing *h* completely fills the radiating-tube D and surrounds the resistance-wire A and is on both sides of the glass or mica tube E and is packed tightly so as the better to serve as a heat-conductor from said wire A to the pipe D. Instead of the glass or mica tube the inner surface of the radiating-pipe D may be coated with an insulating-enamel E', as represented in Figs. 4 and 5. By this construction the heat of the wire A is rapidly conducted to the wall of the radiating-pipe D and therefrom readily delivered to the atmosphere.

Fig. 1 shows the radiating-pipes connected together to form a complete tubular heater. In this instance the heater consists of two sections of pipes; but any number of sections may be employed. The pipes are supported by blocks I, suitably constructed to receive and hold the ends of the pipes, which are placed parallel—two, three, or more in a section. Each supporting-block has screw-holes *k*, so that the heater may be attached to the seat-risers of a street-car or to the woodwork along the wall of a building.

The electric wire C is connected with a crosswise binding-post B at the end of the pipe D. The cap end of said pipe and the cap end of another pipe abut, as in Fig. 2, and have their crosswise binding-posts connected by a wire C'. This manner of connecting the resist-

ance-wires of the radiating-pipe can go on indefinitely, thus enabling the radiating-pipes to be placed or arranged in a car or building to the best advantage. The supporting-block I covers and shields the pipe ends, binding-

5 posts, and electric conducting-wire C'.

Fig. 5 shows a modification in which the binding-post B' of each radiating-pipe D, instead of extending entirely crosswise through
10 the pipe, as in Figs. 2 and 3, has one end only projecting from the side of the pipe, and the other end *m* within the pipe, and to which the end of the resistance-wire A is connected. Otherwise the two constructions are the same.

15 It is evident that the resistance-wires of this heater may carry an electric current which will maintain the wires at such a comparatively-low temperature as to avoid injury to the resistance-wire.

20 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An electric heater comprising a radiating pipe; a resistance wire extending through the

pipe; a heat-conducting medium completely surrounding the resistance wire and filling the pipe; means in the pipe and independent of the said heat-conducting medium for sustaining the resistance wire; a crosswise binding post projecting from the sides of the pipe and connected with the resistance wire; and a cap closing the end of the pipe and independent of the said binding post.

2. An electric heater comprising a radiating pipe; a resistance wire extending through the pipe; an electric insulating, heat-conducting packing completely surrounding the resistance wire and filling the pipe; a binding post projecting from the side of the pipe and connected with the resistance wire; and a cap closing the end of the pipe and independent of the binding post.

In testimony whereof I affix my signature in the presence of two witnesses.

GEORGE HERBERT WHITTINGHAM.

Witnesses:

CHARLES B. MANN, Jr.,
C. CALVERT HINES.