

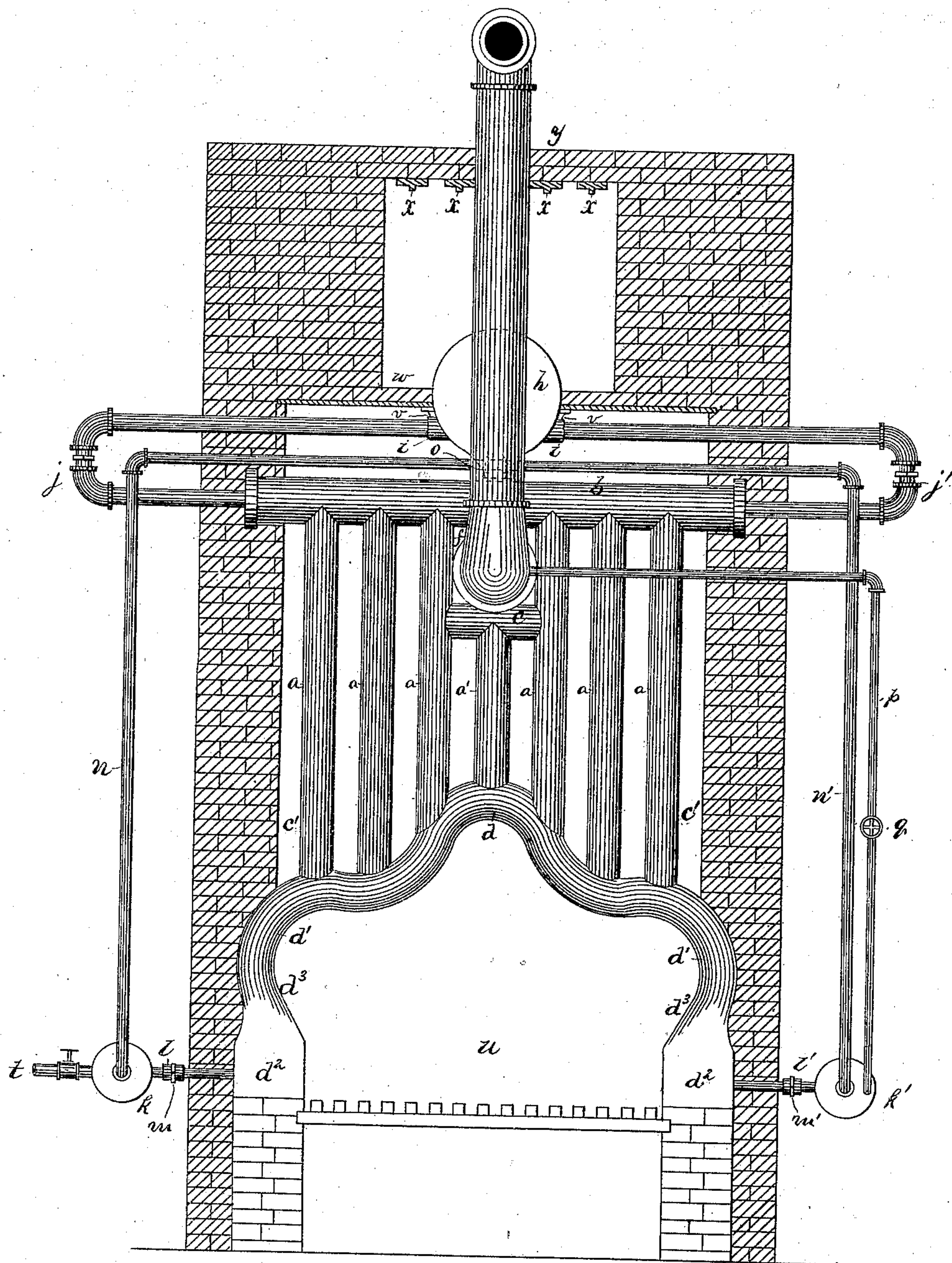
(No Model.)

4 Sheets—Sheet 1.

O. KELSEY.  
STEAM GENERATOR.

No. 335,134.

Patented Feb. 2, 1886.



WITNESSES:

*J. E. Shaw*  
*P. A. Denison*

Fig. 1.

INVENTOR

*Olando Kelsey*



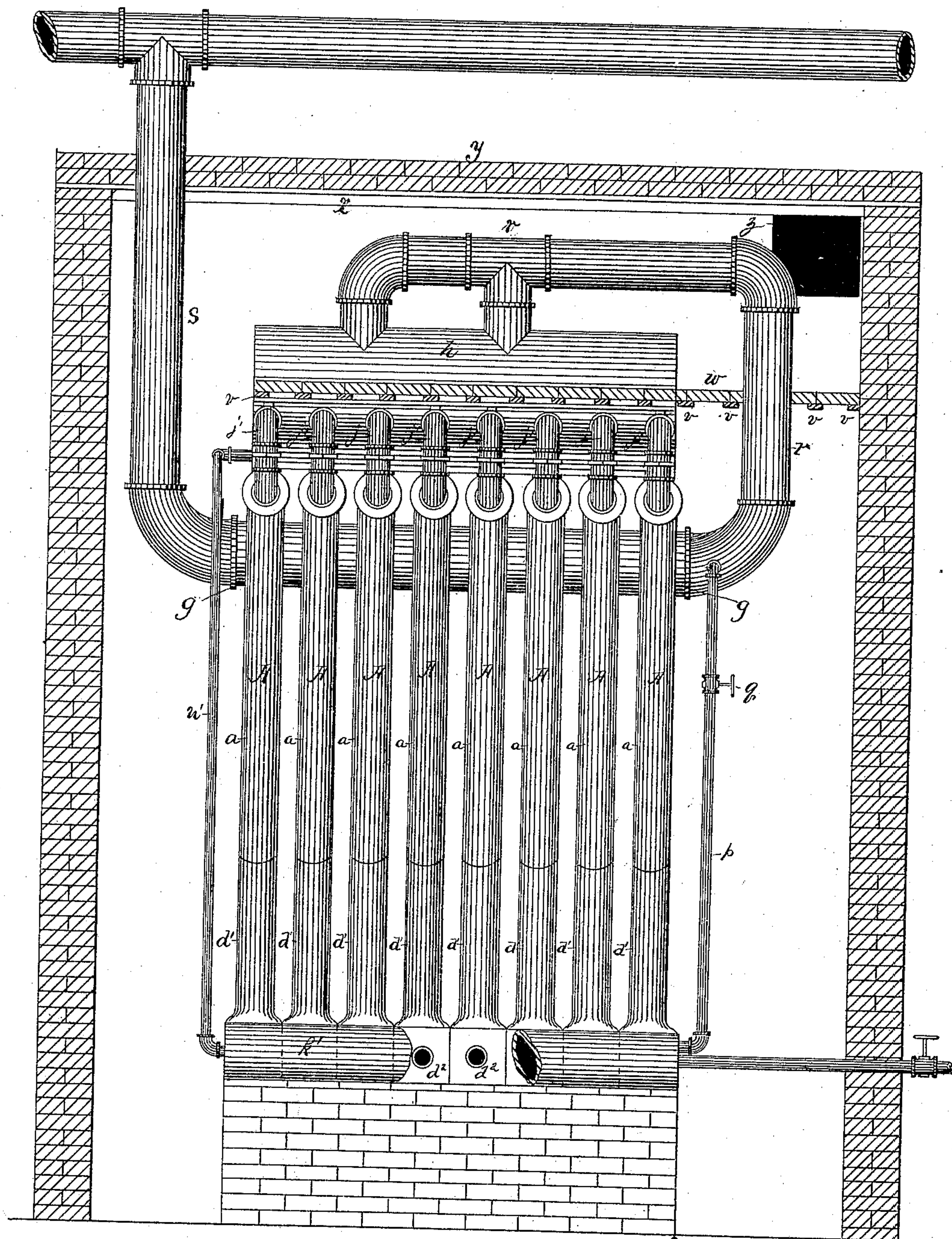
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*J. B. Shaw*  
*R. A. Tenison*

Fig. 2.

INVENTOR

*O. Kelsey*

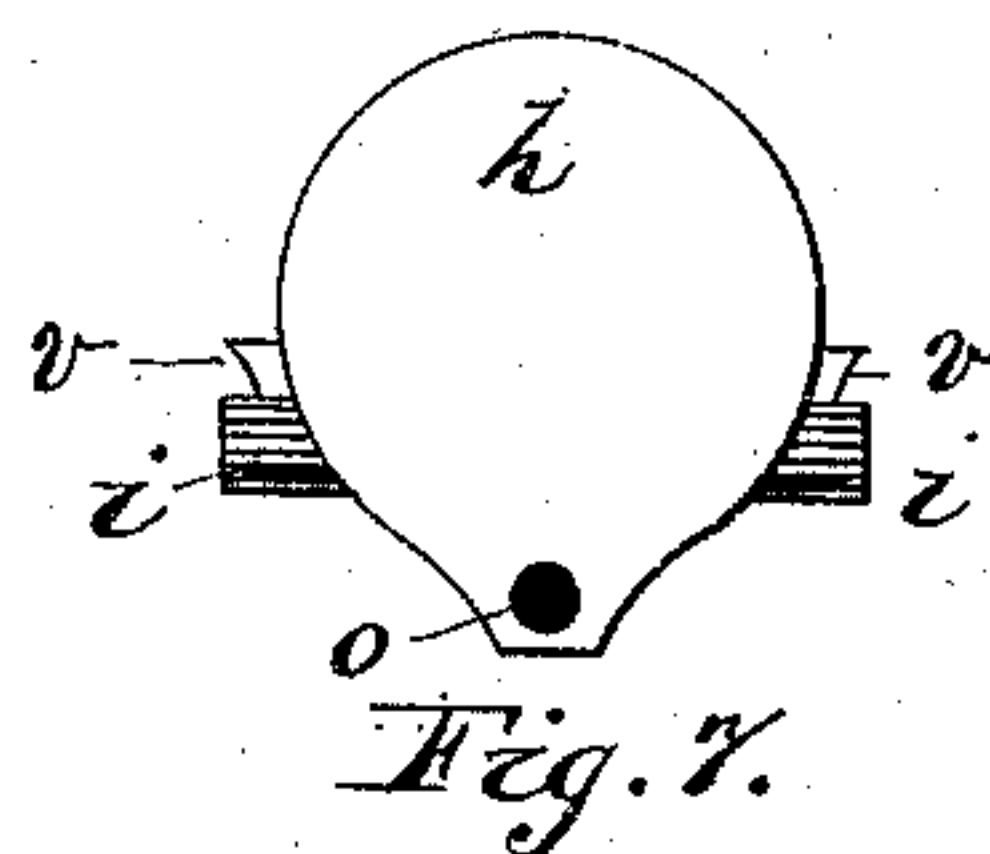
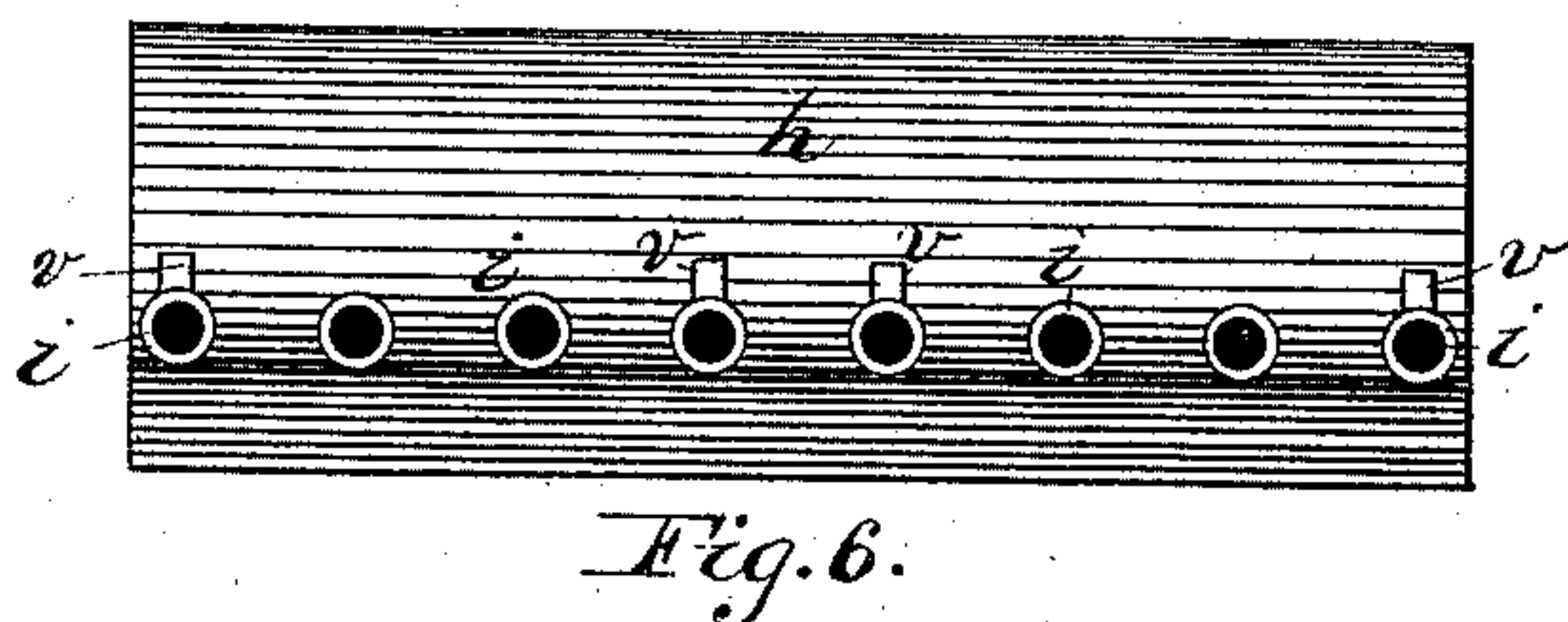
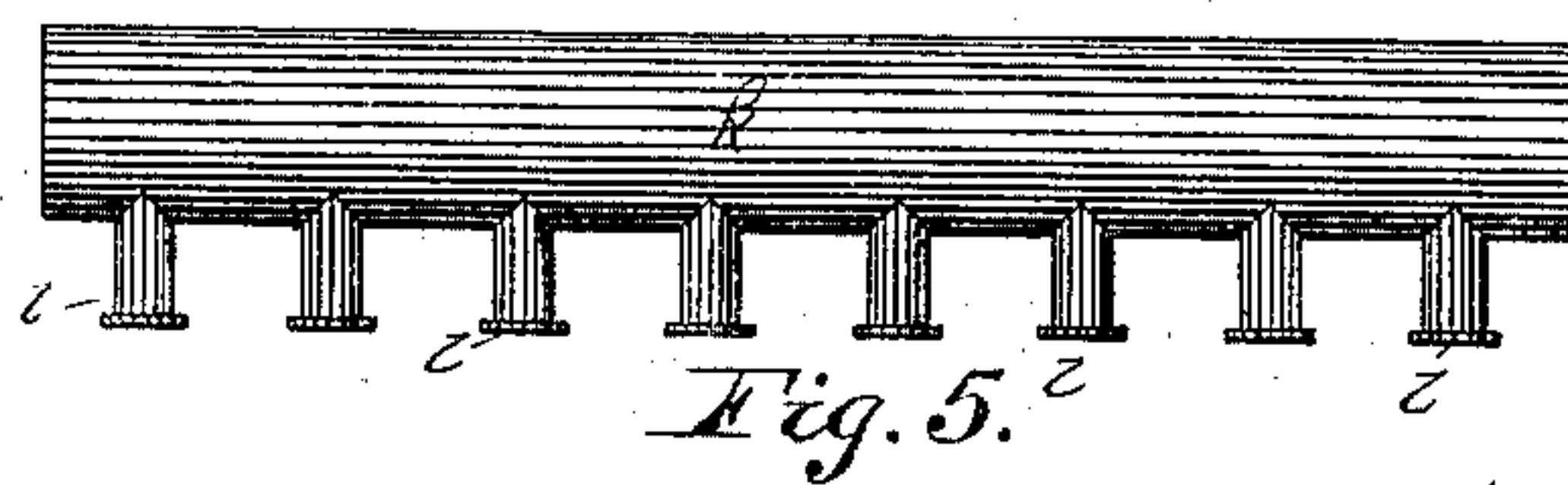
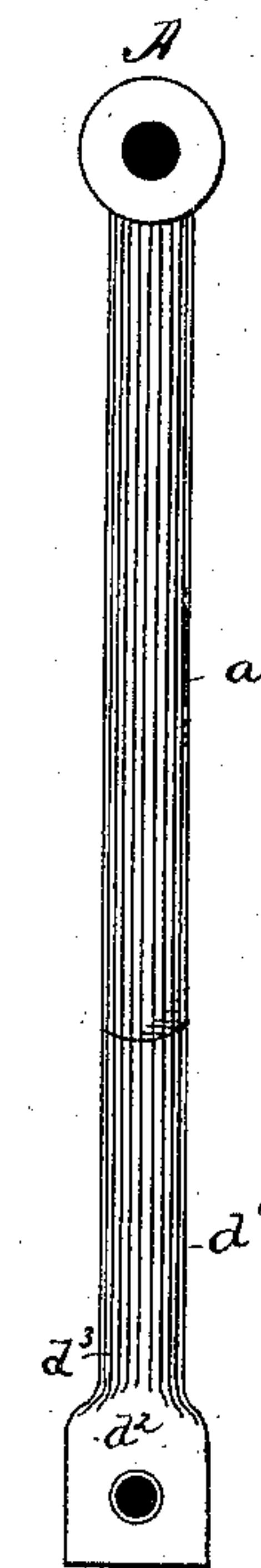
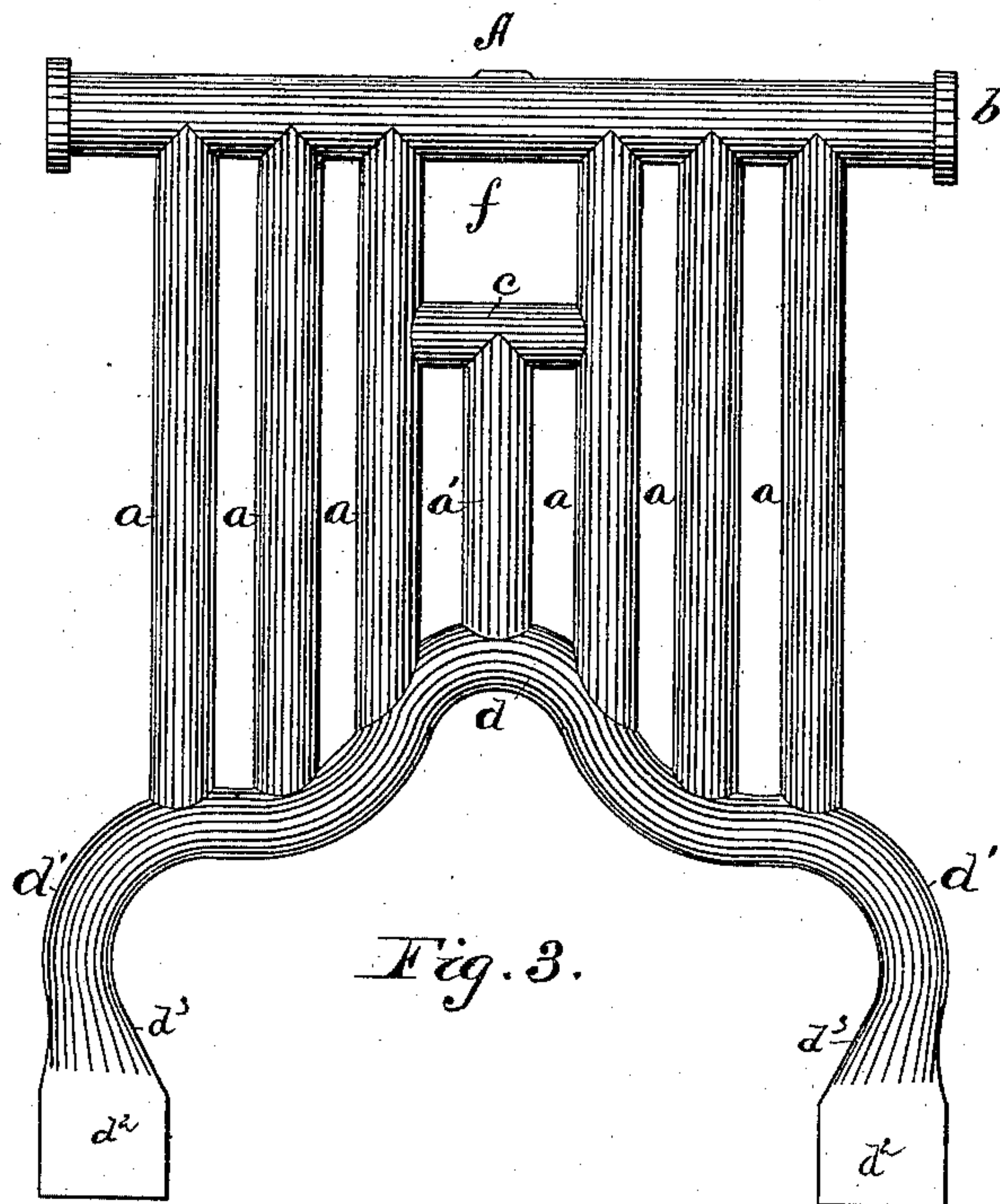
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WITNESSES:

J. E. Shaw.  
O. K. Kelsey.

INVENTOR

Olando Kelsey



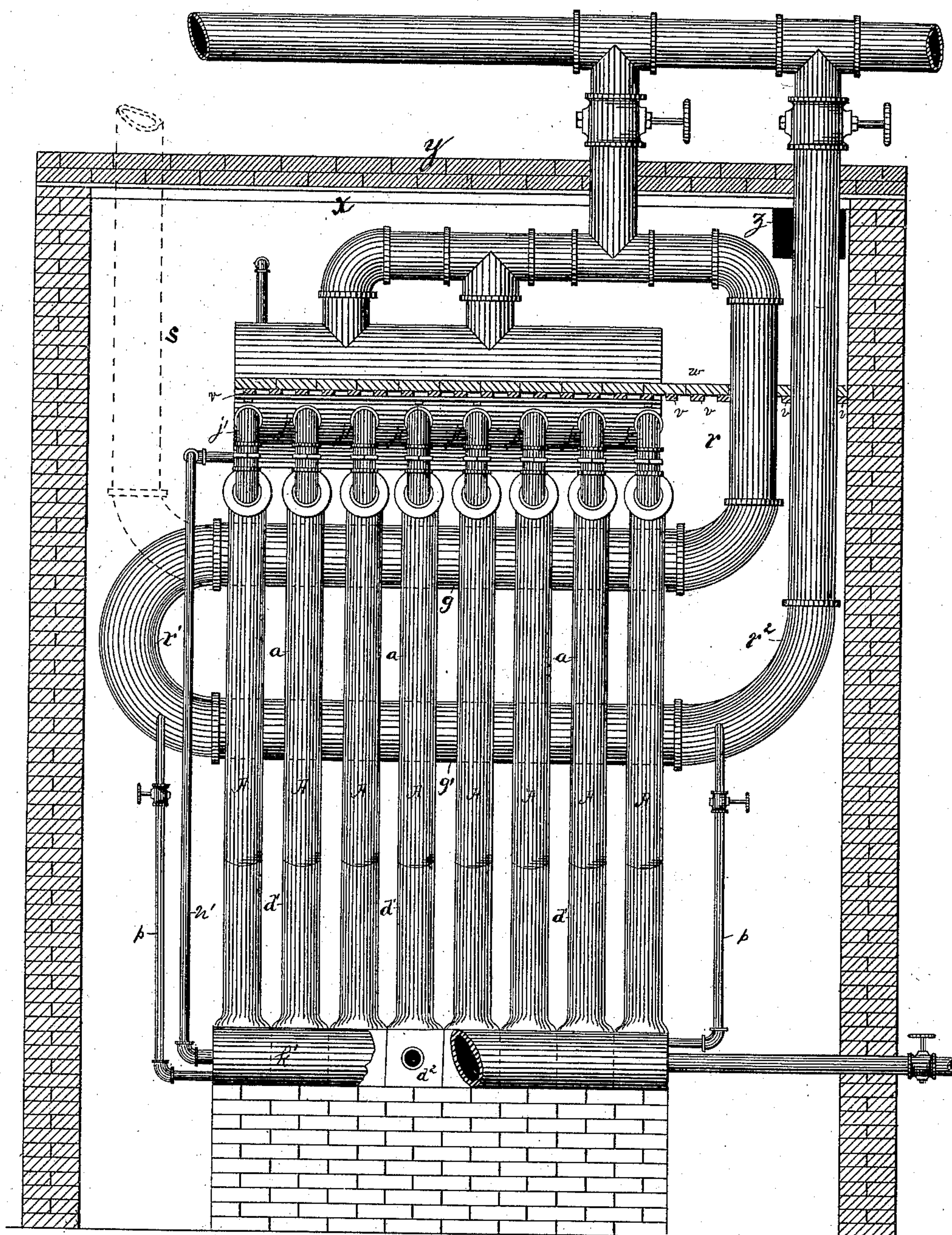
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Fig. 8.

INVENTOR

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# UNITED STATES PATENT OFFICE.

ORLANDO KELSEY, OF PHILADELPHIA, PENNSYLVANIA.

## STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 335,134, dated February 2, 1886.

Application filed November 24, 1885. Serial No. 183,851. (No model.)

*To all whom it may concern:*

Be it known that I, ORLANDO KELSEY, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented a new and useful Improvement in Steam-Generators, of which invention the following is a specification.

This invention relates to sectional steam-generators; and it consists, principally, of an individual section made in a particular form, and in details of construction, all as below specified.

In the annexed drawings, Figure 1 is a front sectional elevation, and Fig. 2 a side elevation, of the generator and inclosing masonry. Fig. 3 is a front elevation, and Fig. 4 a side elevation, of an individual section. Fig. 5 is a side elevation of the manifold. Fig. 6 is a side elevation, and Fig. 7 an end elevation, of the steam-drum. Fig. 8 is a side elevation of the generator modified in respect to the regenerator, which is shown double.

The individual sections each consist of a hollow casting of the form shown in Fig. 3, (marked A,) wherein *a* and *a'* are upright tubes, which open into the cross-tubes *b c d*.

*d'* are water-legs, being turned-down portions of the cross-tubes *d*.

*f* is an open space.

The drawings show a generator composed of eight sections; but any desired number of individual sections can be employed. They are set side by side, as shown in Fig. 2, so that the open spaces *f* coincide and form one continuous open space, which is occupied by the chamber *g*. This chamber I denominate a "regenerator," and it has a double use—to wit, in generating steam and in regenerating the same, as hereinafter specified.

*h* is a steam-drum, which rests upon and across the tops of the several sections A.

*i*, Fig. 1, are short tubes projecting from opposite sides of drum *h*.

*j* and *j'* are tubes connecting the cross-tubes *b* of the several sections with the tubes *i* of the drum *h*.

*k* and *k'* are manifolds connected by tubes *l* and *l'* with the water-legs of each section.

*m* and *m'* are cocks.

*n* and *n'* are tubes connecting the manifolds *k* and *k'* directly with the steam-drum *h* by

means of a l-tube applied to the aperture *o*, Figs. 1 and 7, in the front end of the steam-drum.

*p* is a tube connecting one of the manifolds with the regenerator *g*. The tube *p* is controlled by a cock, *q*.

*r* is a pipe connecting the top of the steam-drum with the regenerator, as shown in Fig. 2, and *s* is a steam-delivery pipe.

*t*, Fig. 1, is a pipe connecting one of the manifolds with a water-supply.

*u* represents the furnace.

*v*, Figs. 1 and 7, are studs forming rests for one end of each of the several iron bars used to support the brick-work *w*.

*x* are iron bars used to support the brick-work *y*.

*z*, Fig. 2, represents a flue for the escape of the products of combustion arising from the furnace.

I make the pipe *r* and the pipe *s*, respectively, less in diameter or cross-sectional area than the diameter or cross-sectional area of the regenerator *g*, for the purpose of breaking the current of steam passing through the regenerator.

I prefer to make the regenerator in cylindrical form of about twice the diameter of the supply-pipe *r*, or of the delivery-pipe *s*, both of these pipes being preferably made to be of the same size.

By this device I am enabled to give increased temperature to the steam, and also to convert into steam any water suspended in the steam coming from the drum.

I prefer to construct the cross connecting-tube *d* with the turned-down portions or water-legs *d'* of the form shown in Figs. 1 and 4—viz., with a bottom portion, *d''*, of greater water capacity than the neck or upper portion, *d'''*, thereof, with the purpose of counteracting the tendency of the water to lift; and I give the neck *d'''* of the water-leg a bend, preferably a curve, as shown, in order that the flames and hot products of combustion from the furnace *u* shall be able to ascend through space *c'*, Fig. 1, between the masonry and the outer column or tube of the several sections. This is an essential matter, as I am thus enabled to utilize all the heating-surface of the sections.

When first starting the fire in the furnace,



the regenerator *g* is partially filled with water through pipe *p*, to keep the regenerator from getting overheated, and to utilize it for generating purposes. The steam formed in the several sections passes from the several cross-tubes *b* through the connecting-pipes *j* and *j'* into the steam-drum *h*. These connecting-pipes are made double, and are made to proceed from the opposite ends of the cross-tubes *b* of the sections for the purpose of preventing the siphoning or lifting of the water into the steam-drum.

The pipes *j* and *j'* are made to extend through the brick-work for the purpose of facilitating the work of disconnecting any individual section for necessary repairs or other purposes without stopping or interfering with the operation of the other sections.

The pipes *n* and *n'* are for the purpose of conducting back into the body of the regenerator any water that may be carried by the steam into the drum.

The modification represented in Fig. 8 consists in making the regenerator double. In such case each of the sections is provided with two spaces, each like the space *f*, Fig. 3, for the accommodation of the two parts *g* and *g'* of the regenerator, and steam coming into the part *g*, instead of being delivered, as above described, through a pipe, *s*, (shown in dotted lines,) passes through the connecting-pipe *r'* into the part *g'* of the regenerator, where it receives increased temperature, and passes thence into the delivery-pipe *r*.

I claim—

1. In a compound steam-generator, an in-

dividual section consisting of upright tubular columns *a a'*, cross connecting-tubes *b c d*, one or more inclosed spaces, *f*, for the regenerator, said cross connecting-tube *d* being provided with turned-down portions or water-legs *d'*, which are bent or curved and have greater water capacity in the bottom portions, *d<sup>2</sup>*, than in the neck portions *d<sup>3</sup>* thereof, substantially as set forth.

2. In a steam-generator composed of individual sections, the combination of such sections with the steam-drum *h*, the connecting-tubes *j* and *j'*, proceeding from opposite sides of the sections and extending outside of the inclosing masonry, the regenerator consisting of the chamber *g* or the connected chambers *g* and *g'*, located within the body of the sections, the supply-pipe *r*, and the delivery-pipe *s*, each of these pipes being less in diameter or cross-sectional area than the chamber or respective chambers of the regenerator, substantially as set forth.

3. In a steam-generator composed of individual sections, the combination, with two or more sections, *A*, of the pipe *p*, controlled by a cock, the manifold *k* or *k'*, and the regenerator consisting of the chamber *g* or connected chambers *g* and *g'*, located within the body of the sections, whereby the regenerator is charged with water and utilized in the generation of steam when the apparatus is first put into operation, substantially as set forth.

ORLANDO KELSEY.

Witnesses:

J. E. SHAW,  
P. A. FENIMORE.