

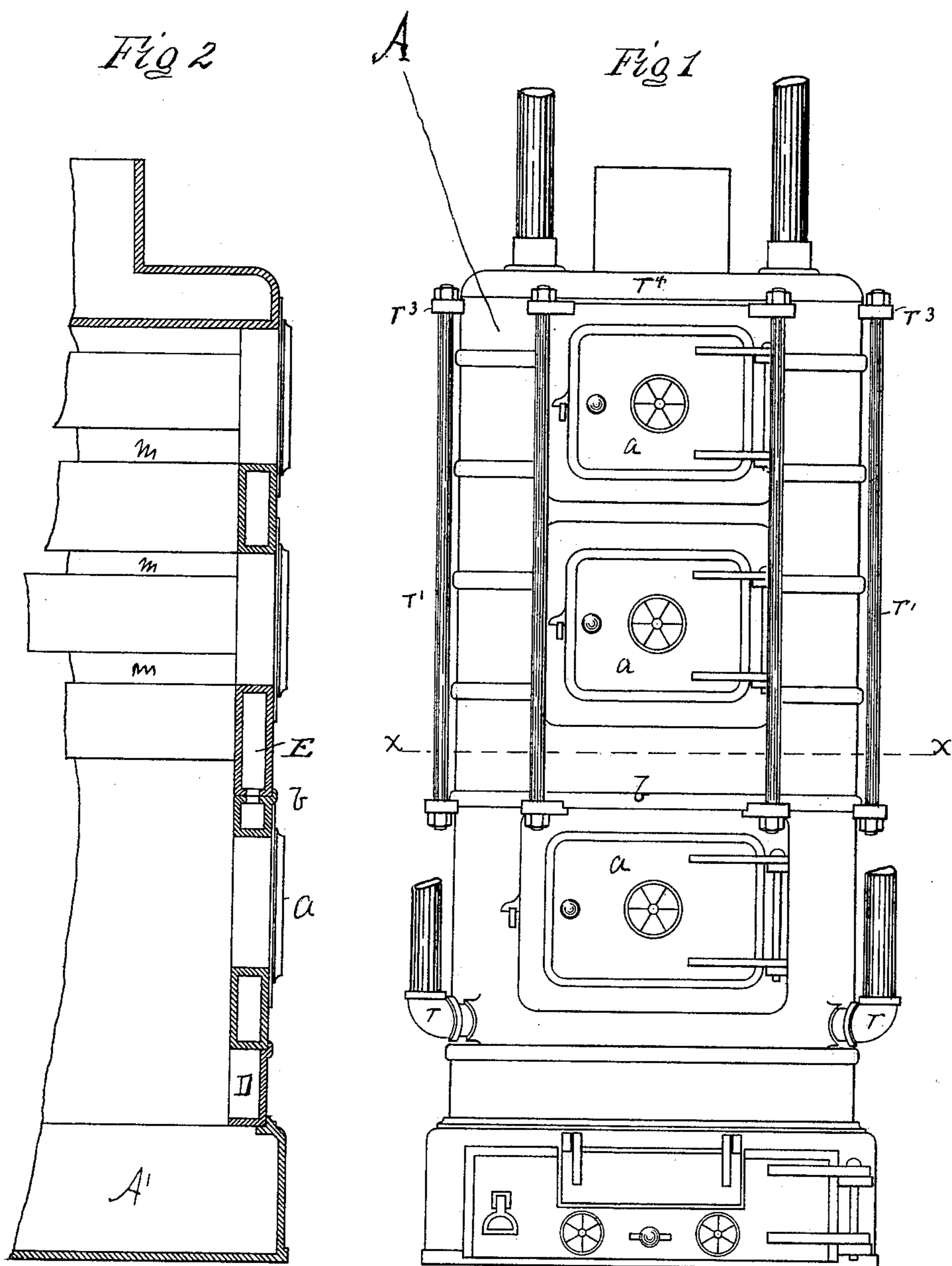
(No Model.)

3 Sheets—Sheet 1.

N. P. ANDRUS.
WATER HEATER.

No. 410,529.

Patented Sept. 3, 1889.



Witnesses

Alfred B. Watson
Robert J. Kelsey

Inventor

Newell P. Andrus
John S. Smith atty

(No Model.)

3 Sheets—Sheet 2.

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Fig 3

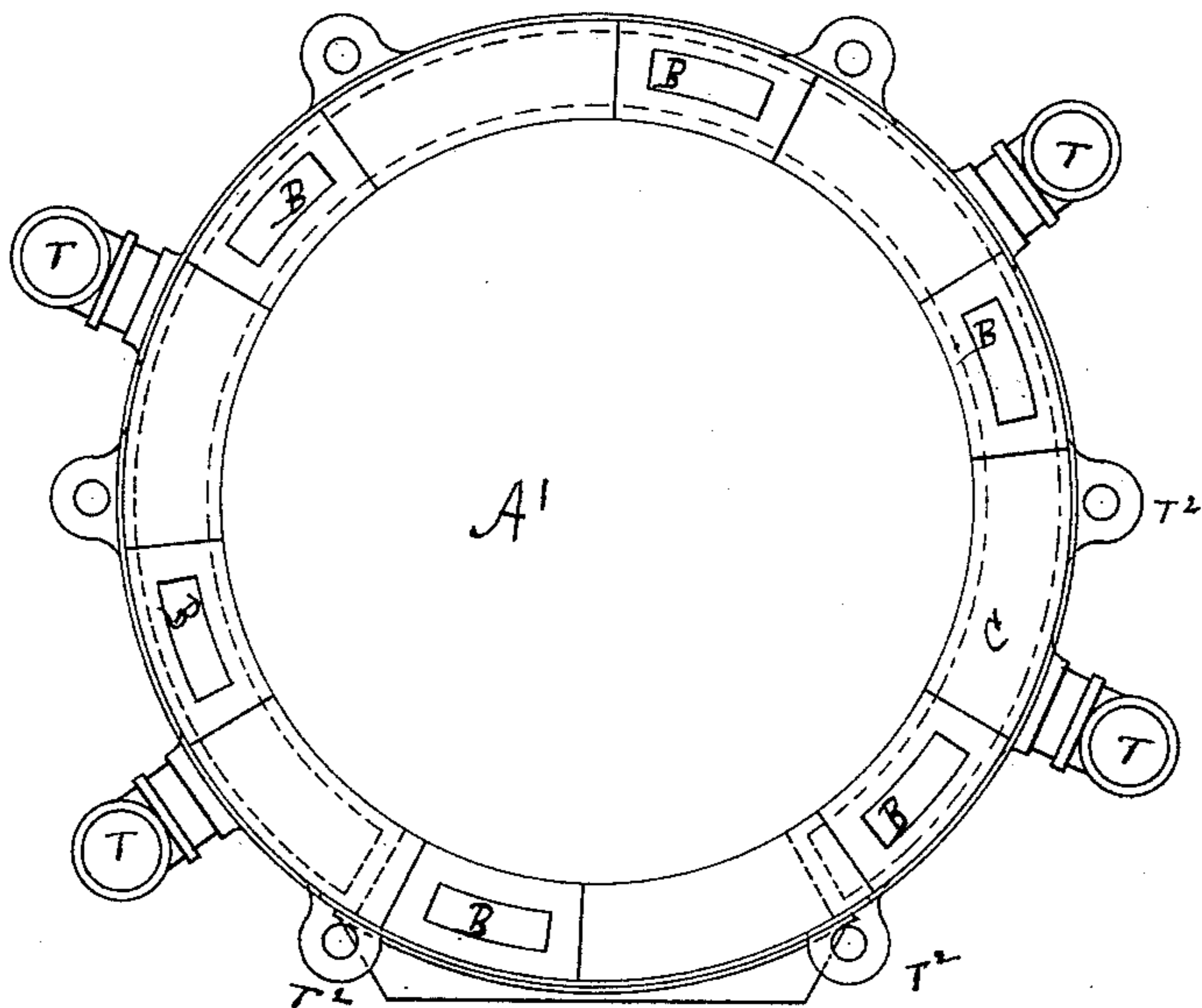
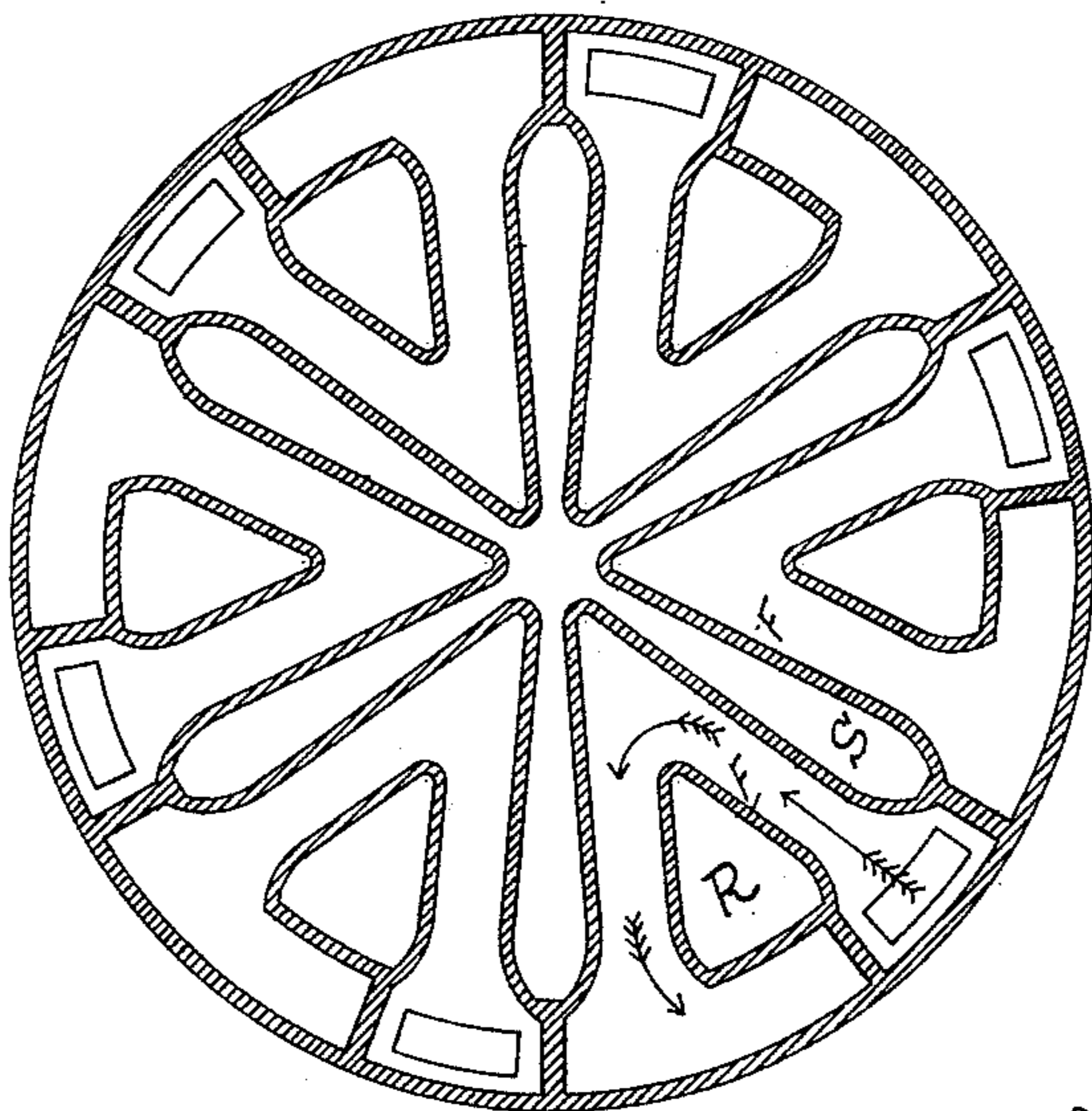


Fig 4



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(No Model.)

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Fig 5

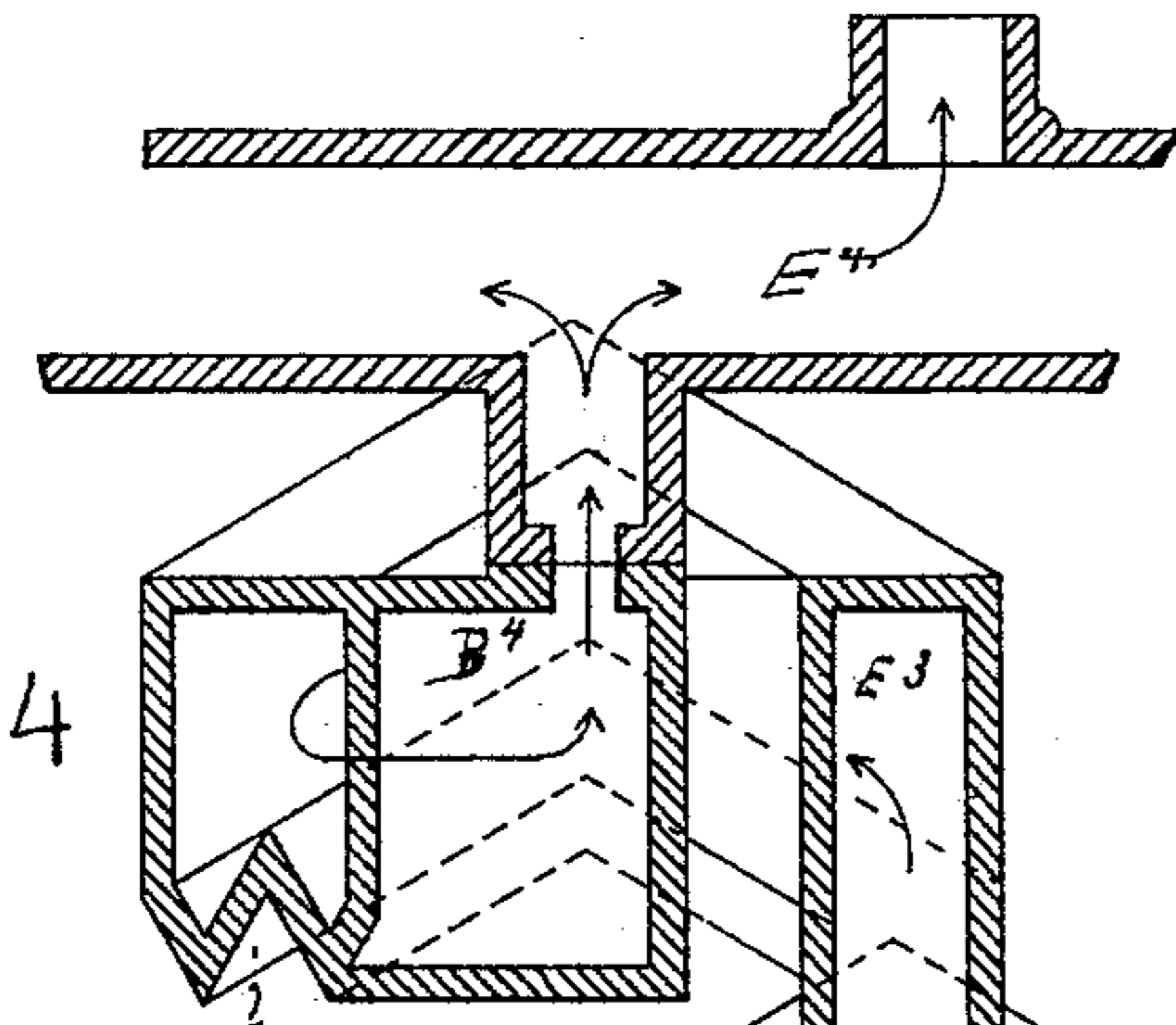


Fig 6

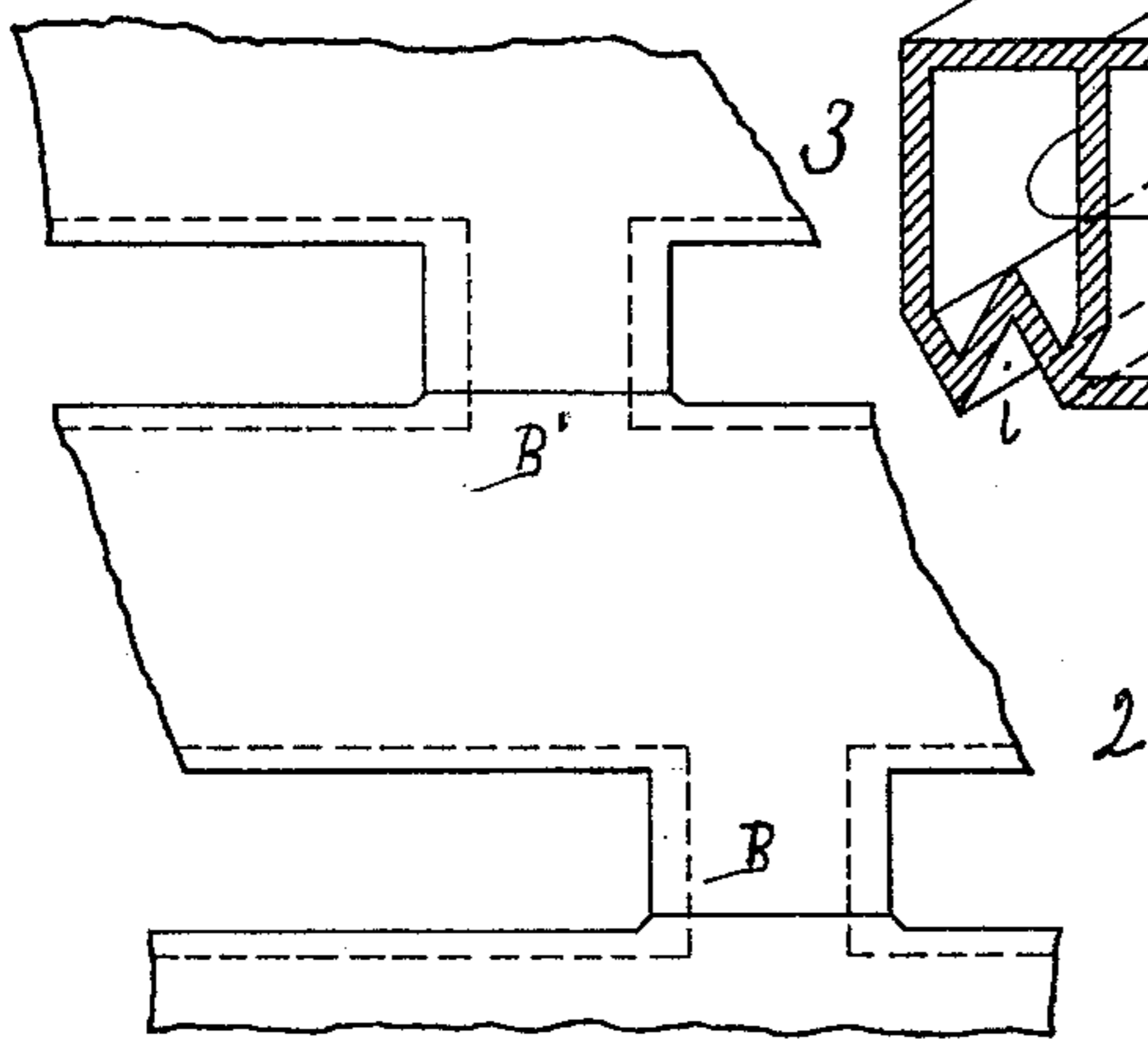
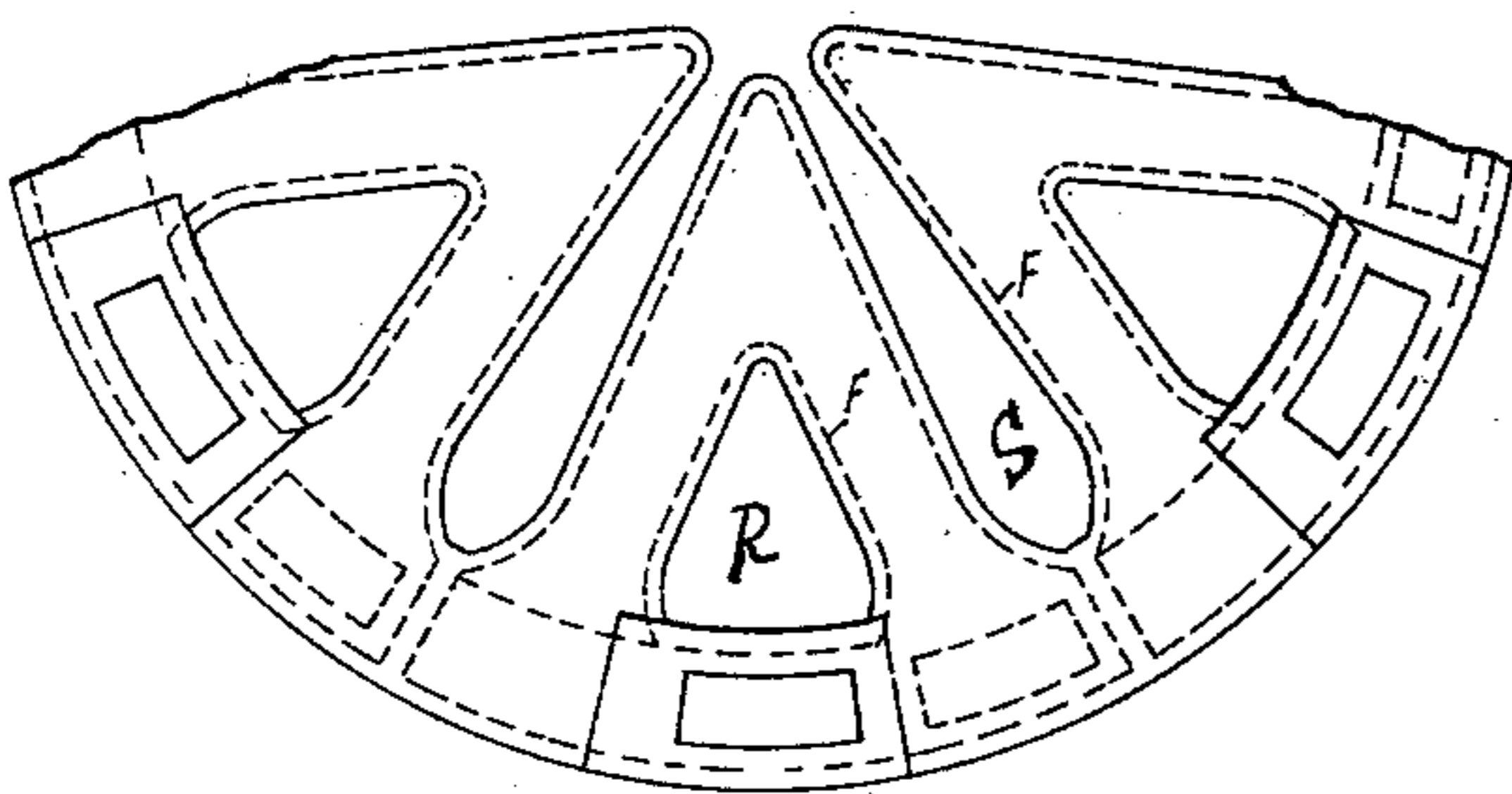
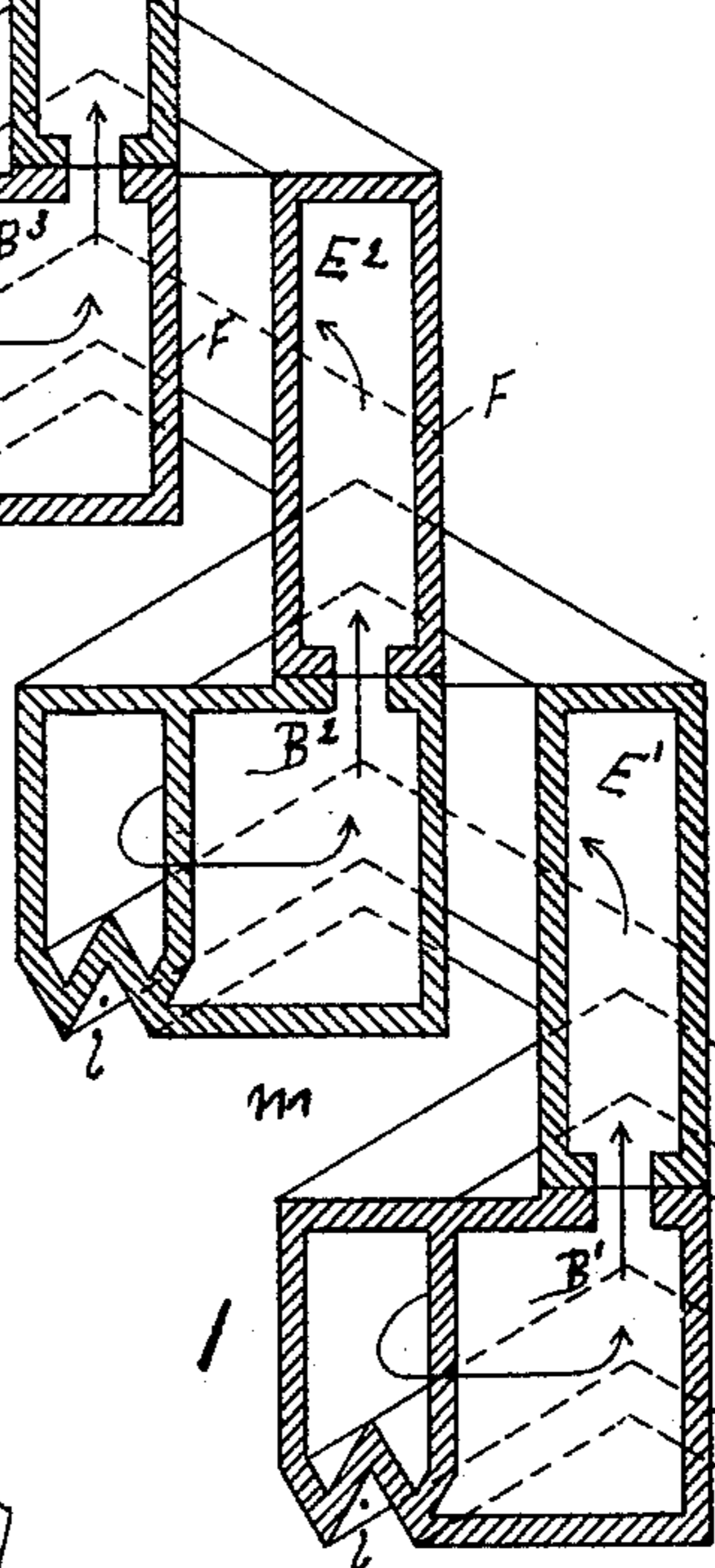


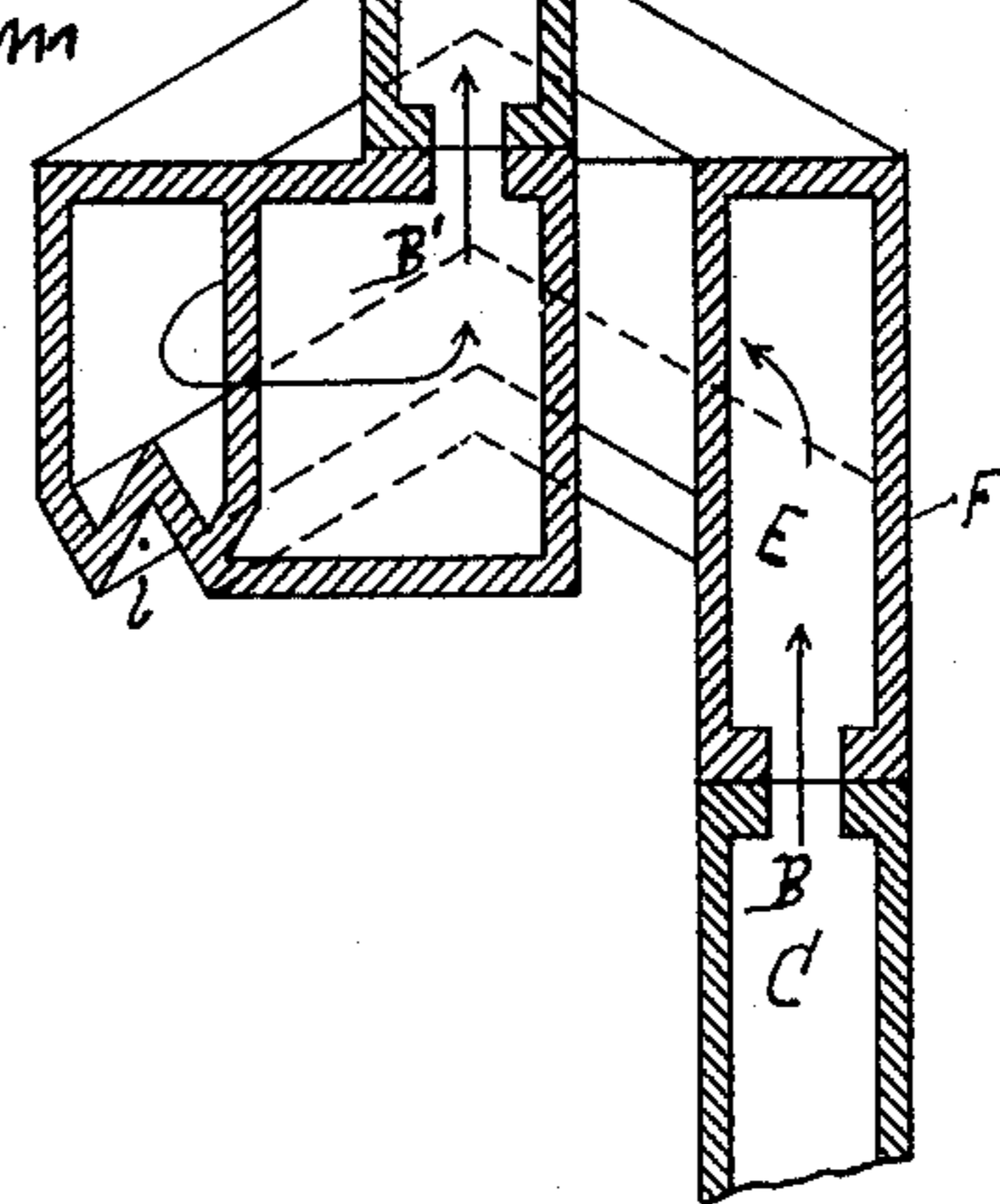
Fig 7



2



1



Witnesses

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UNITED STATES PATENT OFFICE.

NEWELL P. ANDRUS, OF BROOKLYN, ASSIGNOR OF ONE-HALF TO ROBERT J. HAXBY, OF NEW BRIGHTON, NEW YORK.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 410,529, dated September 3, 1889.

Application filed June 19, 1889. Serial No. 314,831. (No model.)

To all whom it may concern:

Be it known that I, NEWELL P. ANDRUS, a citizen of the United States, residing at Brooklyn, Kings county, State of New York, have invented a new and useful Improvement in Water-Heaters, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The object of my invention is to produce a water-heater of new construction wherein is secured increased heating-surface, a more general distribution of hot air around the water-chambers, and an improved system of water-circulation through the heater.

With these ends in view my invention consists in devices that are illustrated in the accompanying drawings, which will be hereinafter fully described and claimed.

In the drawings, Figure 1 is a front elevation of the heater. Fig. 2 is a vertical section of the same. Fig. 3 is a plan of top of the fire-pot and seat of first section. Fig. 4 is a sectional plan taken on line $x x$ of Fig. 1. Fig. 5 is an isometric sectional elevation of one circulating system. Fig. 6 is a part elevation showing position of ports, &c.; and Fig. 7 is a part plan of one section, showing location of ports, &c.

A represents a water-heater, in the fire-pot A' of which is arranged a series of ports B, as shown. Each one of the ports B (of the series of ports arranged in the rim of the fire-pot A' of the water-heater A) connects with a water-chamber C, (formed in the fire-pot A' above the grate and fire-brick D, where combustion takes place,) and forms the basis of one of the circulating systems of the heater, more particularly referred to and described hereinafter.

The heated water passing from the chamber C in the fire-pot A' (up through the port B of its connections and system, as indicated by arrows) enters a water-chamber E, formed by walls F, above the door a and connecting-lip b , which chamber E is arranged in section 1 of the circulating system. In its upward tendency the heated water enters chamber E' in section 2 of the circulating system through port B' next above, which last-mentioned chamber and port are arranged at a suitable distance above and at the left-hand side of

chamber E and port B of section 1 next below of the system, as shown in Fig. 6, and as are all the remaining chambers and ports of the system, hereinafter referred to, Fig. 5. The heated water enters chamber E² of section 3 of the system through port B², and from thence the water passes up through port B³ and enters chamber E³, the uppermost one of the system in section 4 of the same. The water, having circulated through the several sections of the circulating system, as stated, passes a port B⁴, as indicated, and enters a water-receptacle E⁴ at the top of the heater for general distribution and to be returned to chamber C through return-pipes I to be reheated, &c. The heat passes from the fire-pot A' of the heater up to and through flues R and S, which flues are cast in sections and formed between the outsides of the walls F, which form the water-chambers E E' E² E³ of the water-circulating system hereinbefore described.

The flues of the different sections are held in position in connection with top T⁴ by bolts T', the said bolts connecting with lugs T² in the fire-pot A' and lugs T³ on top T⁴, as shown.

The course of the hot air and gases from the fire-pot A', while the same are circulating through the flues RS and spaces m under the bottom of chambers E E' E² E³ of sections 1 2 3 4 of the water-circulating system, is indirect, and is obstructed by the arrangement of chambers, ports, and flues, each one of which is above and out of a direct line with the other. This causes a deflection of the heat in each section to reach the port to enter the section next above, while the recesses, grooves, or niches i in the bottom of the chambers retain a large proportion of the gases until the same are consumed, while the doors a of the sections are arranged to facilitate cleaning, &c.

One of the circulating systems of the heater having been described herein, no further description is deemed necessary, as all the other circulating systems of the heater are identical with the one described above.

By my invention a large increase of heating-surface with a more general distribution of heat around the chambers is secured, while the water-circulation is more perfect and com-

plete in the heater than any of the circulating systems now in use.

Any practical number of circulating systems commensurate with the size of the heater may be employed therein.

What I claim is—

1. In a water-heater, the combination of a series of superposed chambers each provided with a series of irregular water-passages formed by their internal walls, said passages having separate inlets and outlets arranged equidistant around the chambers and having their respective consecutive water-connections arranged spirally, and the heat-flues R and S, formed between the external walls of said chambers and passing vertically through them, substantially as and for the purpose set forth.

2. In a water-heater, the combination of a series of superposed chambers provided with irregular water-passages formed by their internal walls and having their consecutive water-connections arranged spirally, said chambers being separated by horizontal spaces *m* and provided with grooves *i* in their under sides, and the heat-passages R and S, formed between the external walls of said chambers and passing vertically through them, substantially as and for the purpose set forth.

NEWELL P. ANDRUS.

Witnesses:

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JOHN INGLIS.