

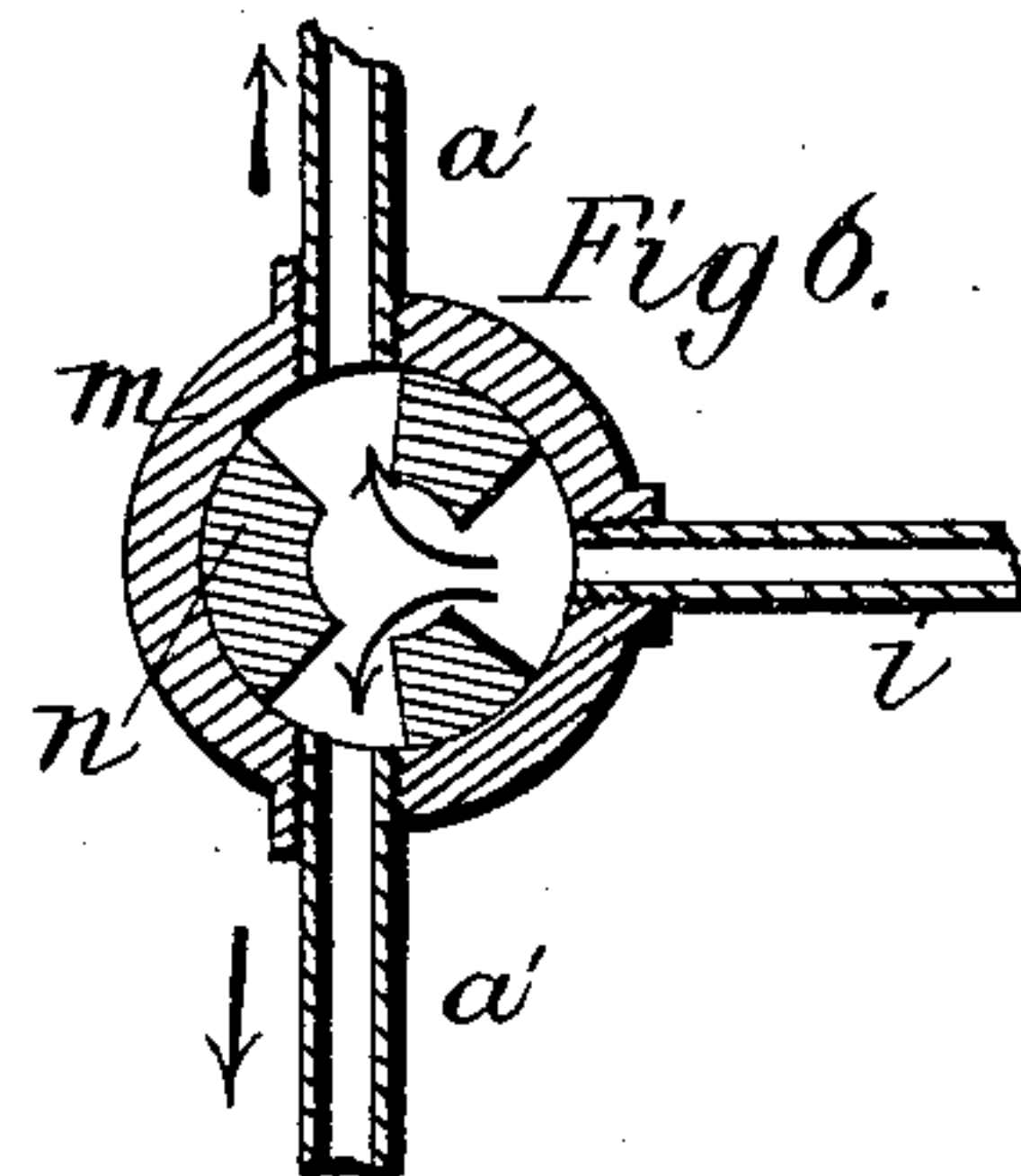
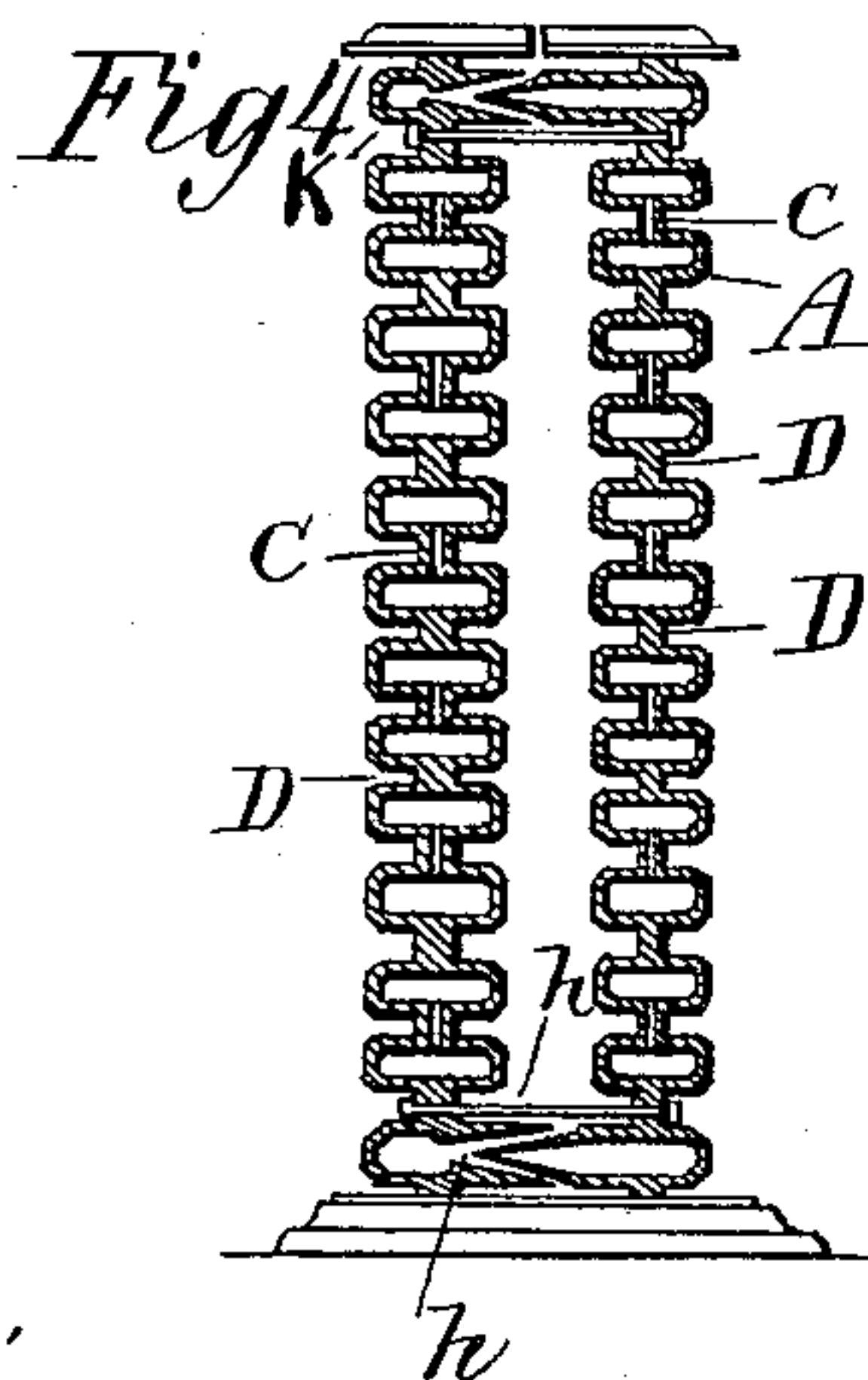
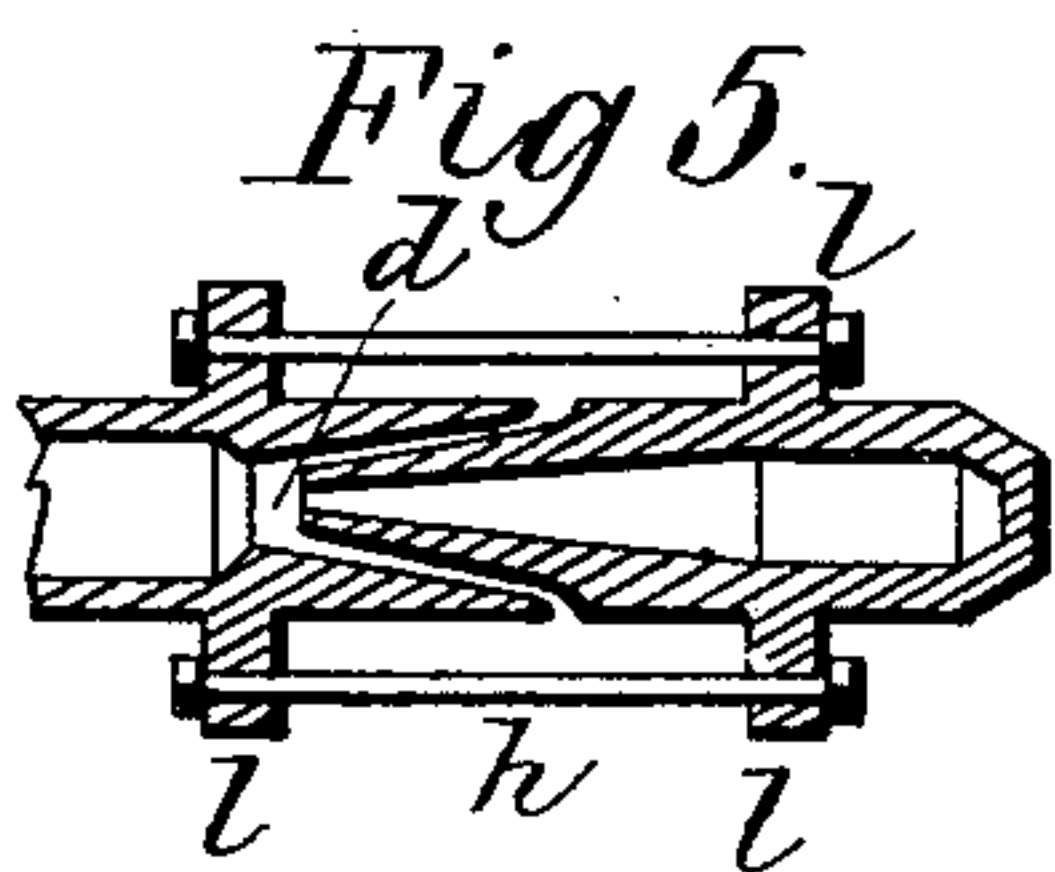
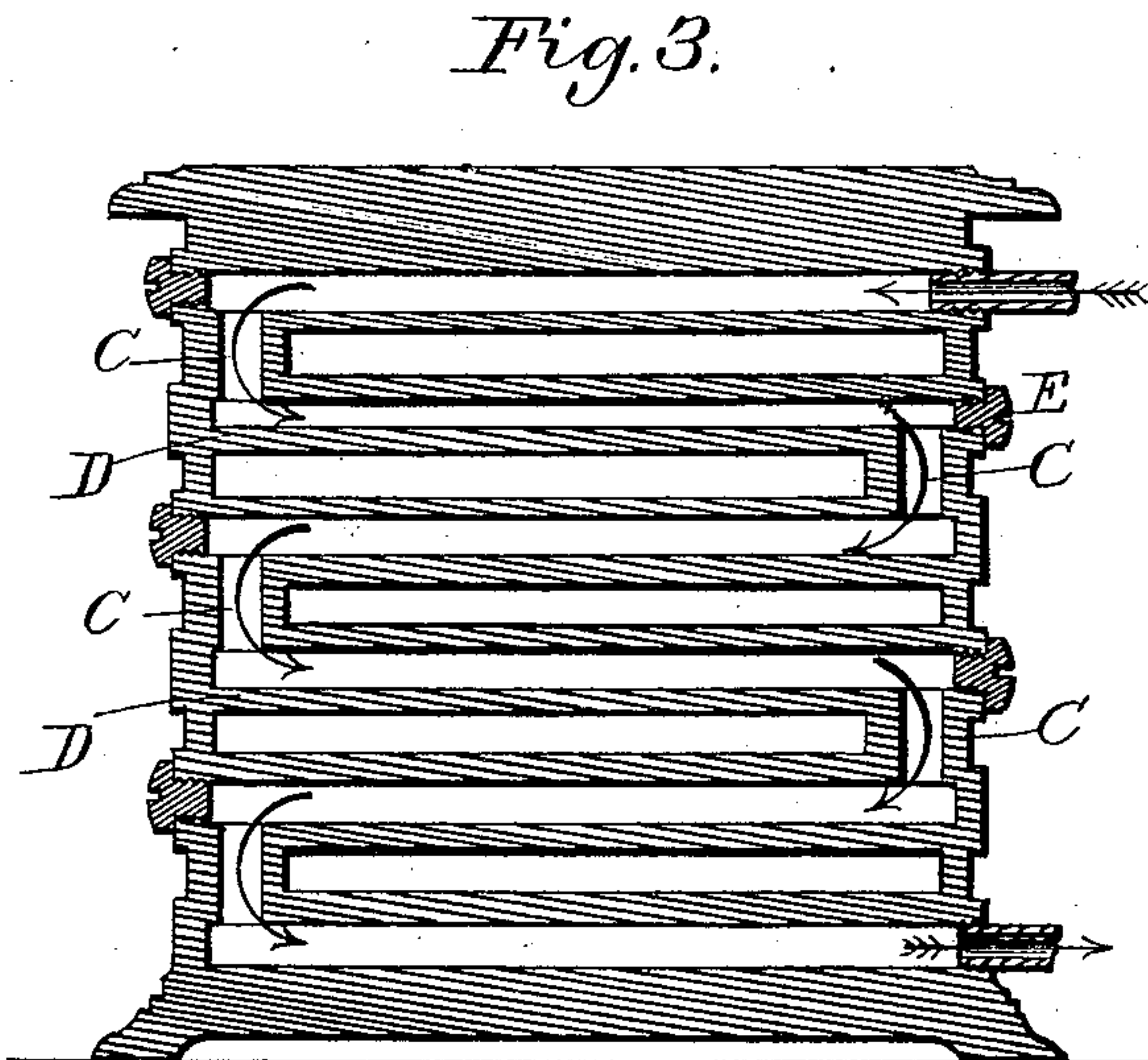
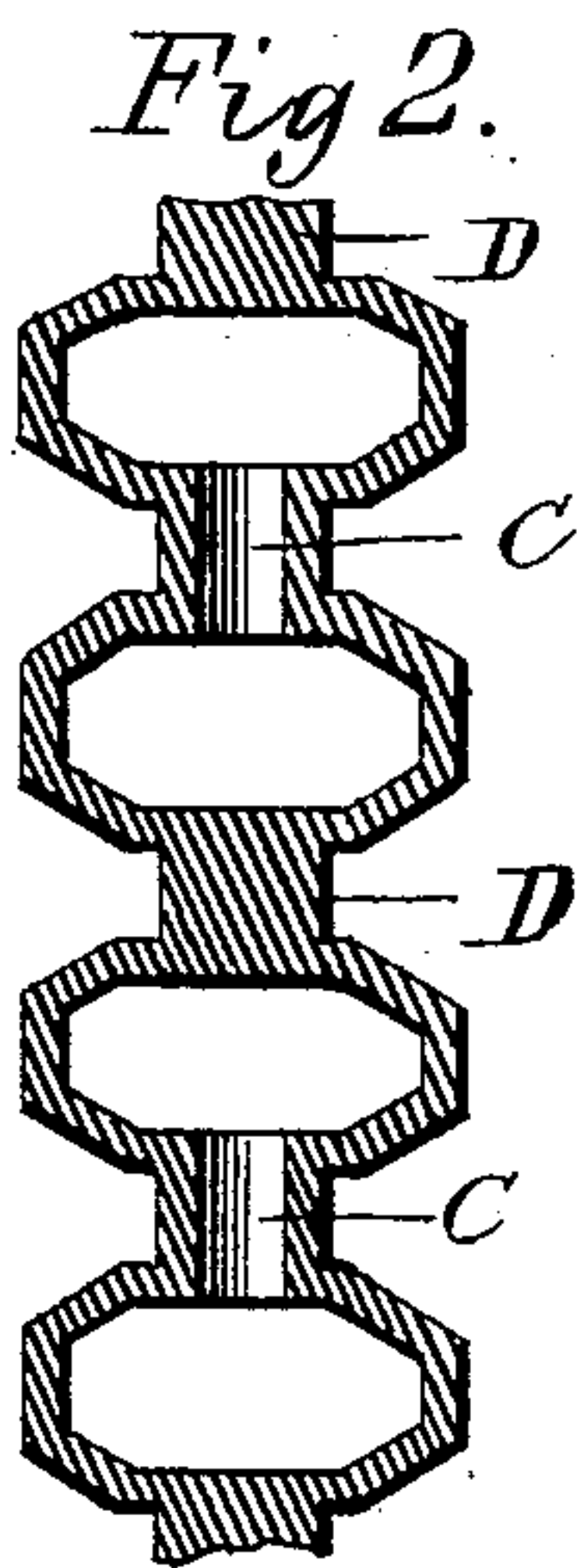
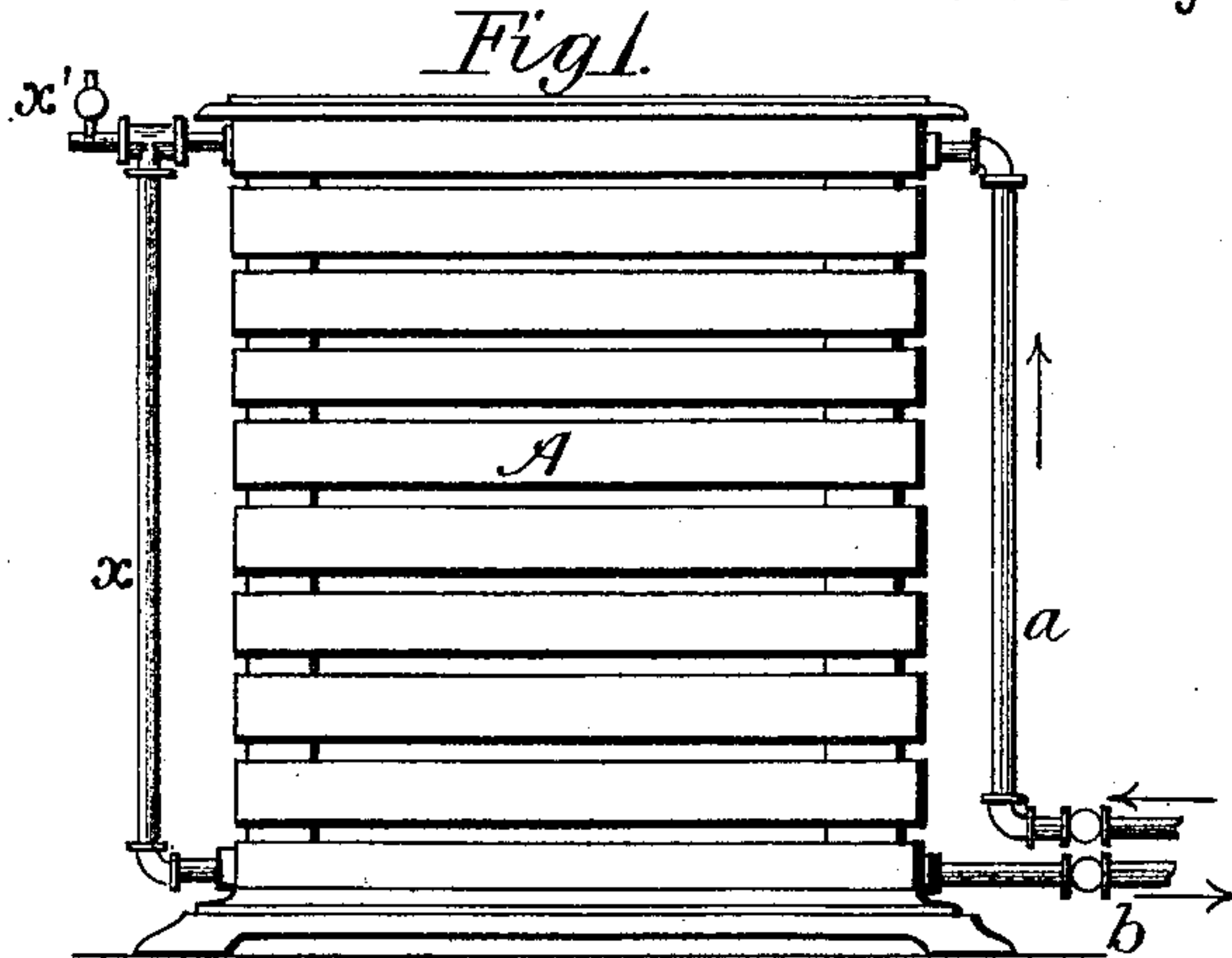
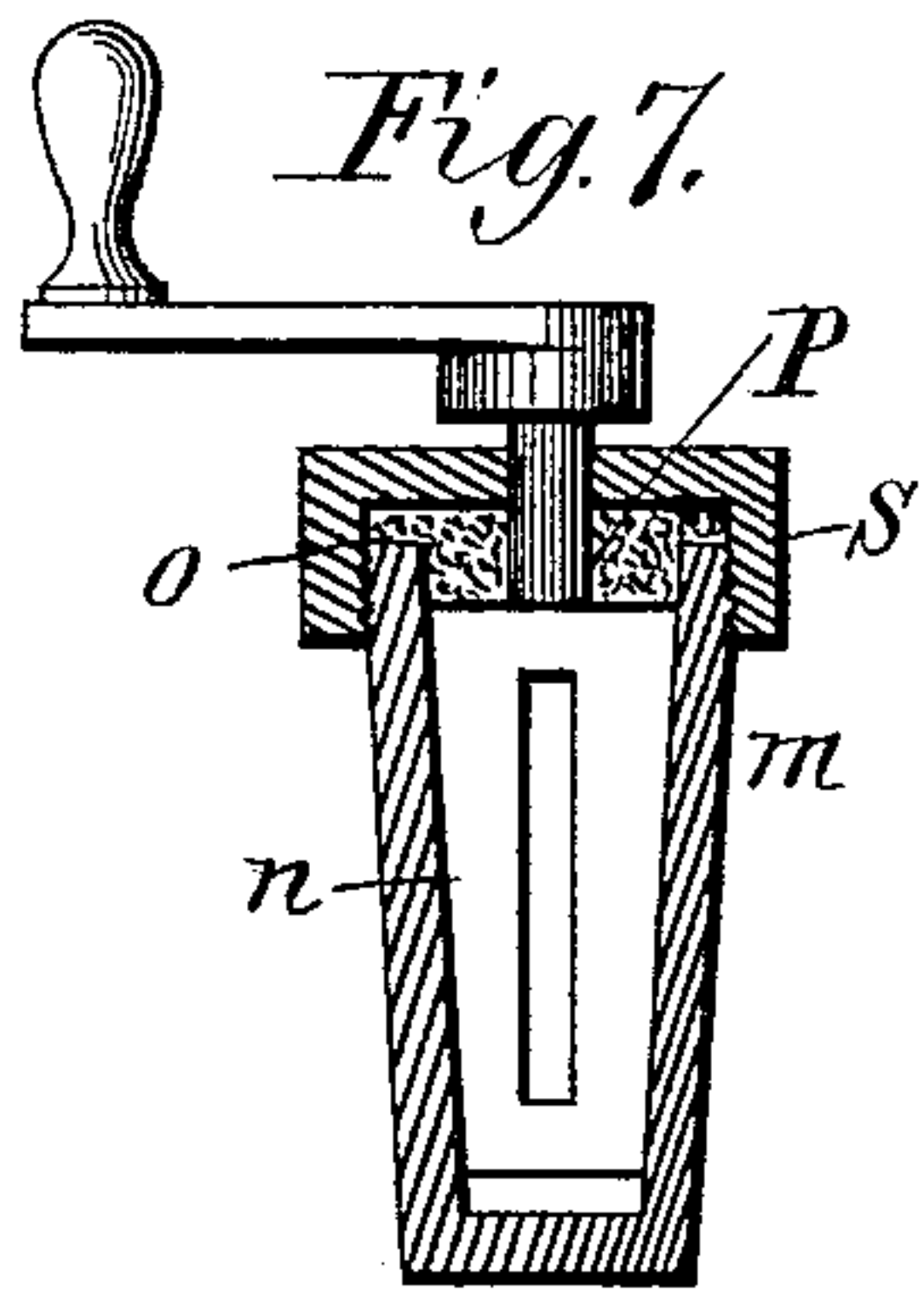
(No Model.)

2 Sheets—Sheet 1.

W. E. PRALL.
RADIATOR.

No. 386,556.

Patented July 24, 1888.



Witnesses,
G. F. Simpson,
J. C. Knaak,

Inventor,
Wm E. Prall,
By W. W. Canfield,
att'y.

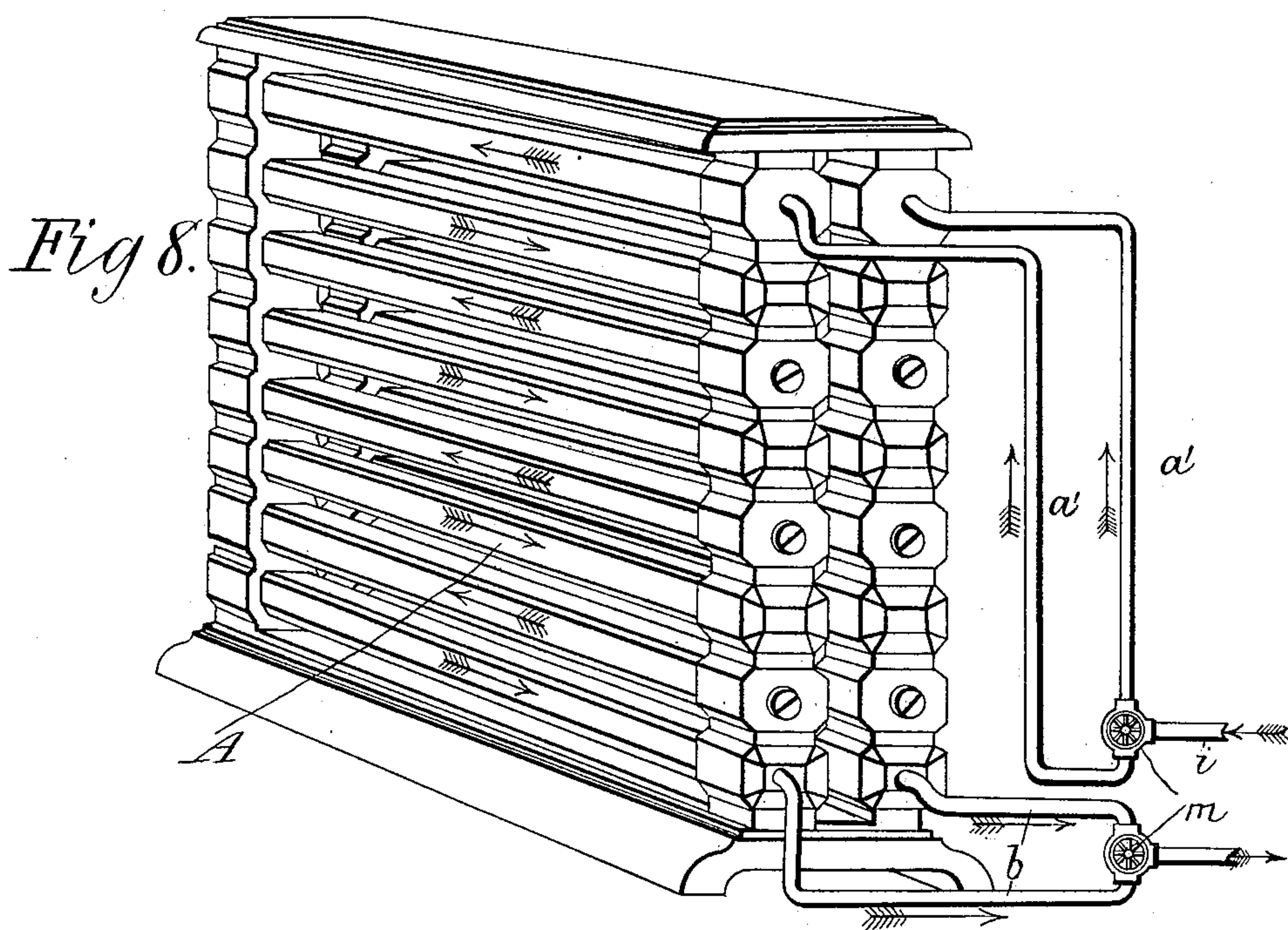
(No Model.)

2 Sheets—Sheet 2.

W. E. PRALL.
RADIATOR.

No. 386,556.

Patented July 24, 1888.



Witnesses:
G. F. Simpson.
F. C. Knaak.

Inventor
Wm E. Prall.
By W. W. Canfield.
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UNITED STATES PATENT OFFICE.

WILLIAM E. PRALL, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR,
BY MESNE ASSIGNMENTS, TO THE NATIONAL HEATING COMPANY, OF
NEW YORK, N. Y.

RADIATOR.

SPECIFICATION forming part of Letters Patent No. 386,556, dated July 24, 1888.

Application filed October 7, 1887. Serial No. 251,779. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. PRALL, a citizen of the United States, and a resident of Washington, in the District of Columbia, have
5 invented certain new and useful Improvements in Radiators, of which the following is a specification.

My invention is an improvement in heat-radiators adapted to the use of either steam or
10 hot water, and is fully disclosed in the following specification, reference being had to the accompanying drawings, forming part of this specification, in which the same letters of reference indicate like or equivalent parts wherever found throughout the several views.

Figure 1 is a front elevation of my improved radiator; Fig. 2, a section of one end of the single radiator. Fig. 3 is a longitudinal vertical section thereof. Fig. 4 is a section of the end
15 of the double radiator. Fig. 5 is a section of a socket-joint by which two or more radiators are connected. Figs. 6 and 7 are sectional views of a detail; and Fig. 8 is a perspective view of a series of radiators provided with
20 means for admitting the heating medium—steam or hot water—to either or all of the radiators of a series, as may be desired.

In the construction of this radiator I have endeavored to keep in view the advantage of
30 producing one capable of being used for both steam and hot water and having as few joints as possible, such being always liable to break, and also adding much to the cost of construction. I therefore cast my radiator complete
35 in sections of any number of hollow bars connected at each end, as at C and D, and provided with communicating ports at alternate ends, as shown in Figs. 2, 3, and 4, in such a
40 manner as to cause the steam or water to pass through the entire length of each and every separate hollow bar constituting the section. The top and bottom of the section may also be cast, attached to, or integral with the section, and each may have a passage therein which
45 will communicate with the passages in the hollow bars at the point of junction therewith, if desired. The bars may also have a slight inclination toward the lower end or bottom of the radiator, so as to secure perfect and rapid

circulation. Small holes will be cast at alternate ends, through which the sand core may
50 be removed, and these openings may be closed by ornamental screw-plugs E, and thus one complete connection established. These openings will afterward serve as means by which
55 the hollow bars may be cleaned and any deposits that may collect therein removed therefrom.

The heating medium—steam or hot water—will be admitted to the radiator by a supply-
60 pipe, *a*, and escape by means of return-pipe *b*. When it is desired to construct a double radiator, the sections may be attached at the lower and upper sides in any manner preferred; but I propose to have it done by means of a ground
65 socket-joint, as shown at *d*, Figs. 4 and 5. Said joints are to be held together by means of screw-bolts *h*, passed through lugs *l*, cast on each section, or through the socket-joint, which will draw them tightly together. As great con-
70 venience would result from having the sections so constructed as to be capable of separate or joint use, as the conditions might require, I propose in some cases to have them constructed separately and attached only by
75 means of the pipe-connections, as at K, Fig. 4, which are to be provided with cocks or valves, which may be regulated at pleasure, and thus either one may be heated indepen-
80 dently, or both together, as required. The separate bars of the radiator may be cast in any ornamental style or shape preferred. Perhaps the diamond shape shown in the drawings would be as desirable as any, that being,
85 however, a matter of choice.

In horizontal radiators composed of a continuous tube of considerable length, or a casting having a continuous passage through which the hot water or steam passes, it is necessary to provide ample means for the dis-
90 charge of the air contained therein. If an outlet is provided at the top only, the hot water or steam will drive the air below the outlet down into the lower tubes or passages, and if there is no means provided at the bottom of
95 the radiator for its egress it will be driven into the return water tube or pipe, and in addition to the usual "hammering" so common in ra-

diators the perfect circulation of the heating medium is seriously interfered with. The air is also lighter than saturated steam, and in this case the steam would have to force its way down through the air unless some ready means for its egress from the tubes or passages of the radiator were provided, which would also impede circulation. It is also well known that air is continually evolved from hot water, the tendency of which is to work its way upward toward the top of the vessel in which the water is placed, and it is therefore necessary to provide means at the top of the vessel by which the air may be discharged. I have therefore, in order to secure perfect circulation in all cases and under all circumstances, provided a pipe, x , which connects with the top and bottom bars of the radiator, and this pipe is provided with an escape valve, x' , by means of which the air is drawn off from both the top and bottom of the radiator and perfect and unobstructed circulation is secured.

In Figs. 6 and 7 is shown a three-way cock, which is arranged at the junction of the branch pipe i in Fig. 6, leading to the different sections of the radiator, when two or more sections are used, and by means of which the steam or hot water may be admitted into one section and excluded from the other; or it may be turned into position to admit the heating medium to both by turning the plug n in the barrel m , so that all the ports are open. A graduated disk over which the handle of the cock moves would indicate to the operator what position the handle should assume in controlling the flow of the heating medium.

In Fig. 8, Sheet 2, I have shown two radiators, constructed as herein described, united and provided with this means for supplying hot water or steam to either or both. The pipe i is in communication with the source of supply of the heating medium—steam or hot water—and is provided with a three-way cock, (shown in Fig. 6,) from which pipes a' communicate with the top of the radiators. The return-pipes are shown at b , and are also provided with a three-way cock or valve and a single pipe by which the water of condensation is conveyed from the radiator.

The difficulty of controlling steam by the ordinary cocks or valves now in use is well known, the radiators being either too hot or too cold, which is very annoying and impossible to regulate. By this double radiator the heat may be increased or diminished to suit the varying weather. The packing o , Fig. 7, is to prevent the escape of steam around the stem P of the valve, by means of which the plug is turned. The cap S is for the purpose of forcing the packing against the plug and holding the same in position.

Having fully described my invention, its construction and operation, I claim and desire to secure by Letters Patent the following:

1. The combination, with a radiator consisting of a number of hollow bars, the passages therein communicating at the alternate ends of the bars, as shown and described, of the air-pipe x , connected with the outer or top and bottom bars of the radiator, and provided with the air valve or vent x' , substantially as shown and described.

2. The combination, with a radiator cast in a single piece consisting of separate hollow bars, the passage therein communicating at the alternate ends of the bars, as shown and described, of the air-pipe x , connected with the outer or top and bottom bars of the radiator, and provided with the air valve or vent x' , substantially as shown and described.

3. The combination of a series of radiators and a supply and return pipe, each of said pipes being provided with a cock or valve having a series of passage-ways and a series of branch pipes, whereby the heating medium may be supplied to either or all of the radiators and conveyed therefrom, substantially as shown and described.

Signed at the city of New York, in the county of New York and State of New York, this 5th day of October, A. D. 1887.

WILLIAM E. PRALL.

Witnesses:

DANIEL E. DELAVAN,
FRANK C. F. KNAAK.