

No. 682,649.

Patented Sept. 17, 1901.

H. W. STRUSS.  
RADIATOR.

(Application filed Dec. 24, 1900.)

(No Model.)

Fig. 1.

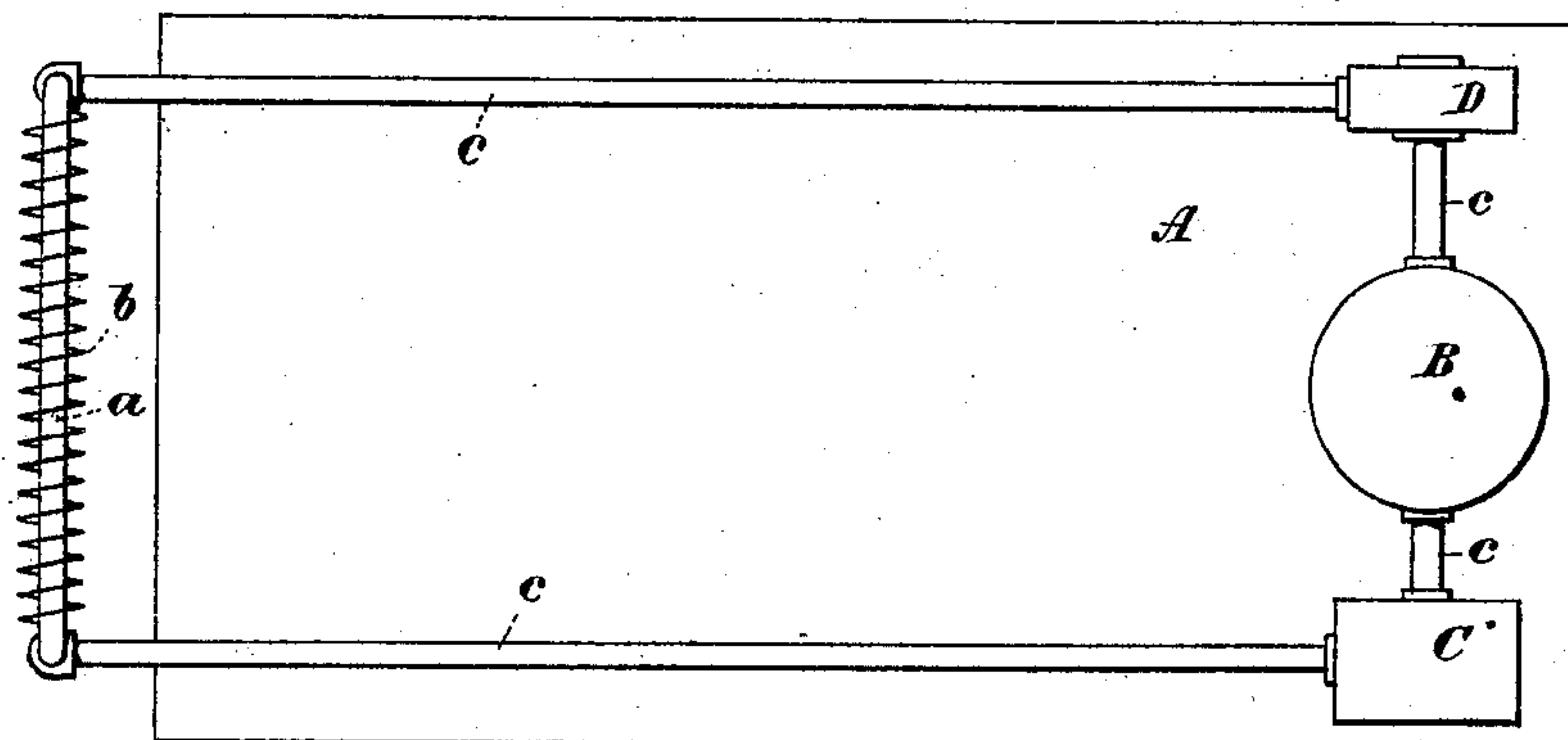


Fig. 2.

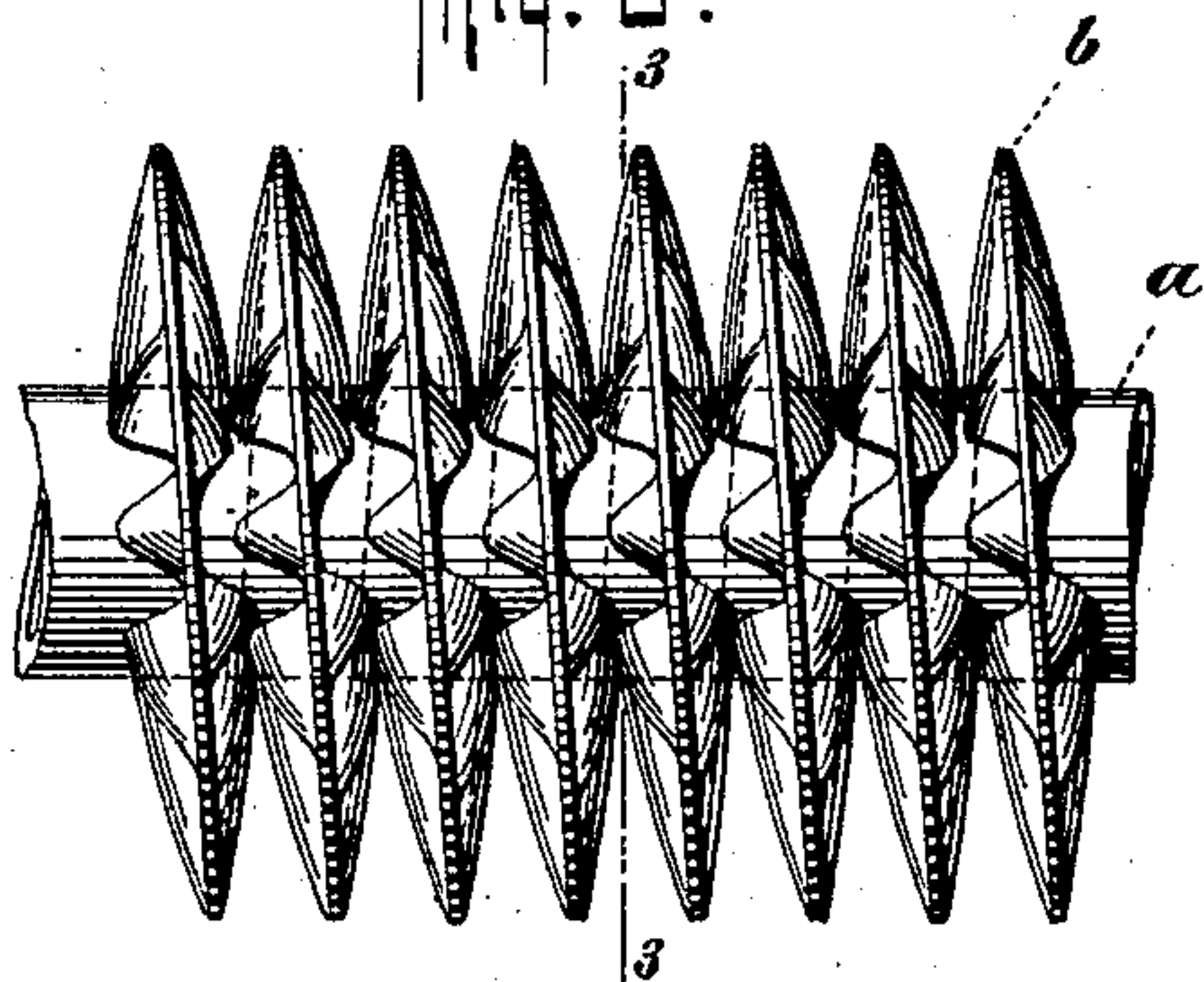


Fig. 3.

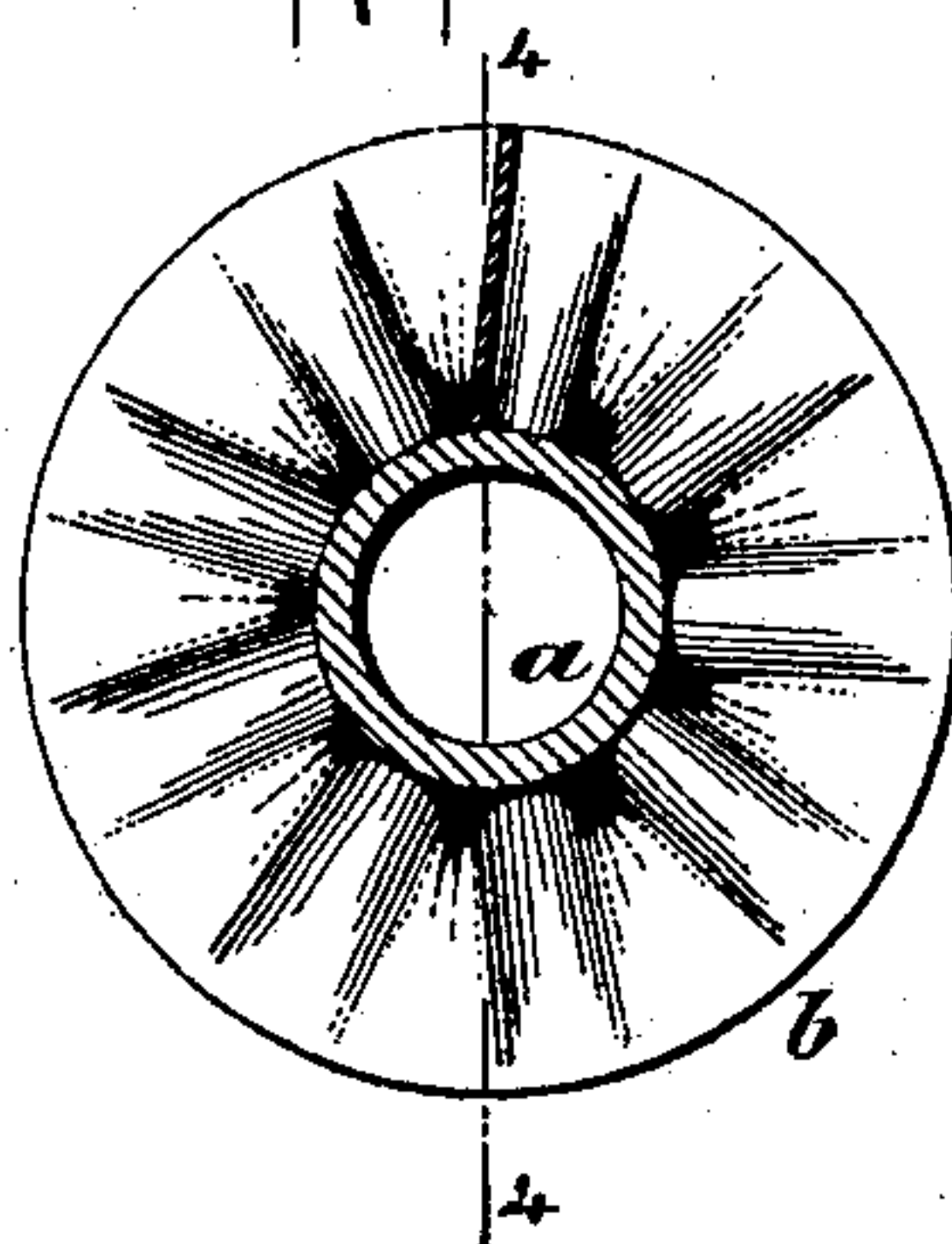


Fig. 4.

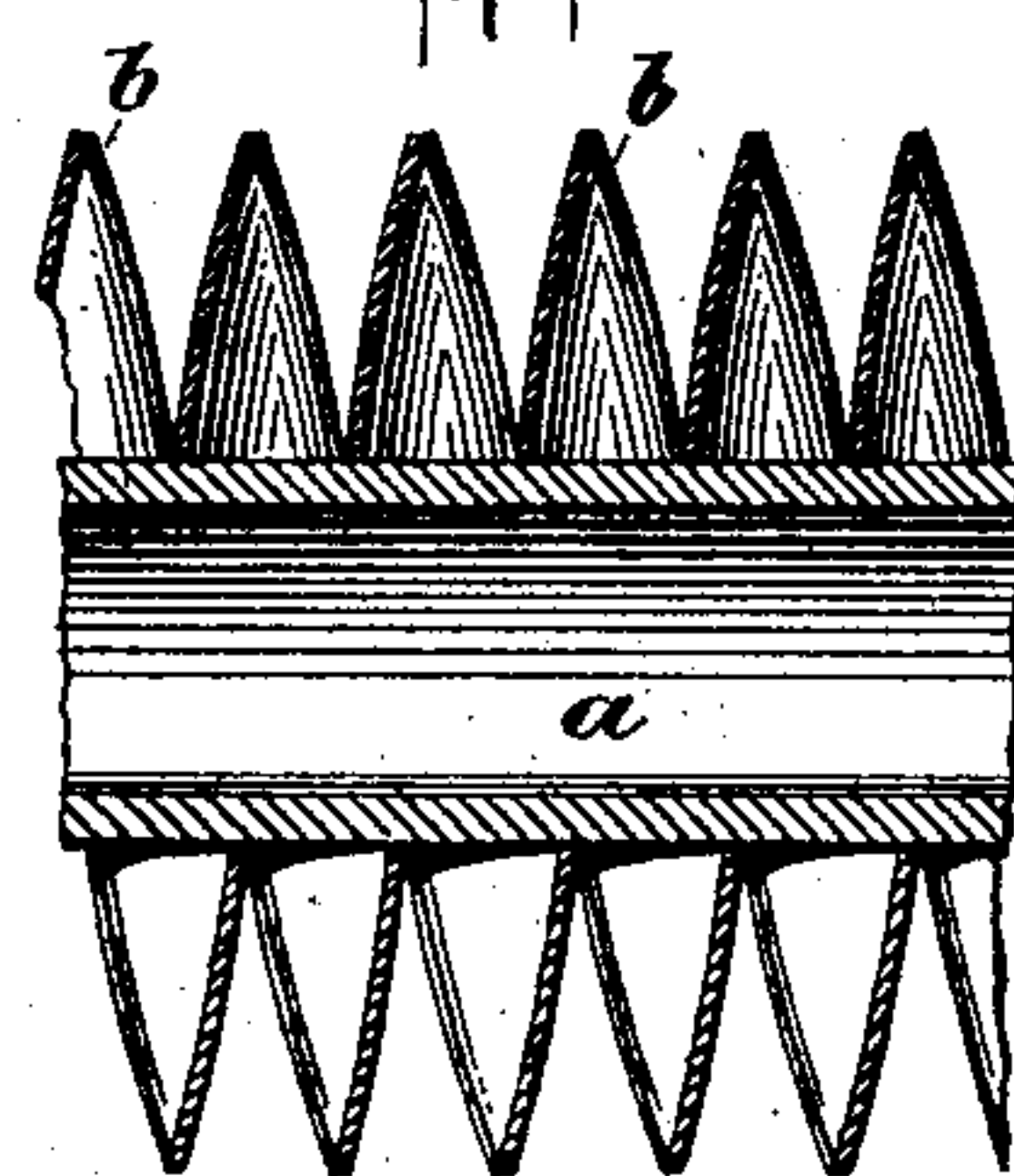


Fig. 5.

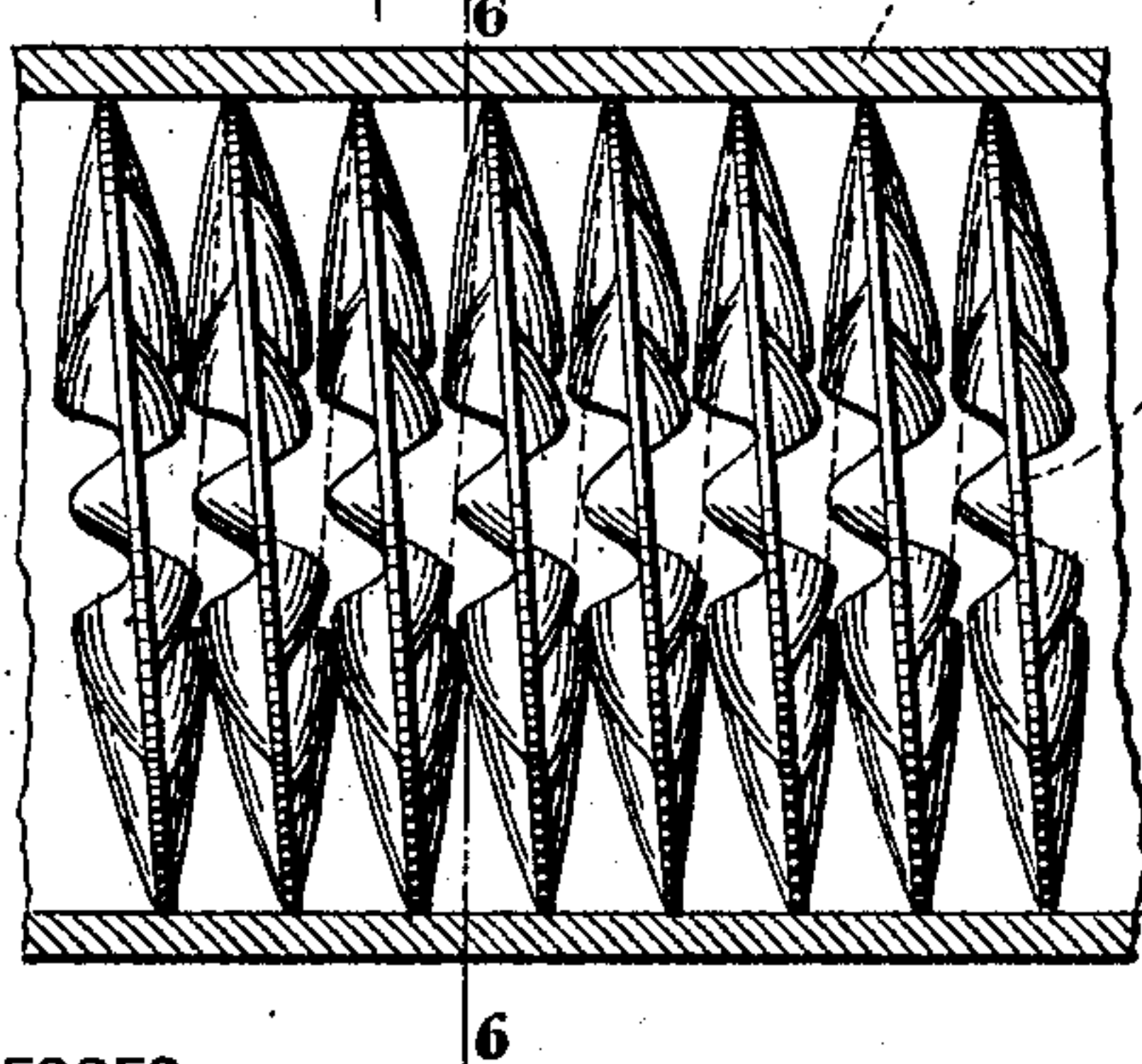
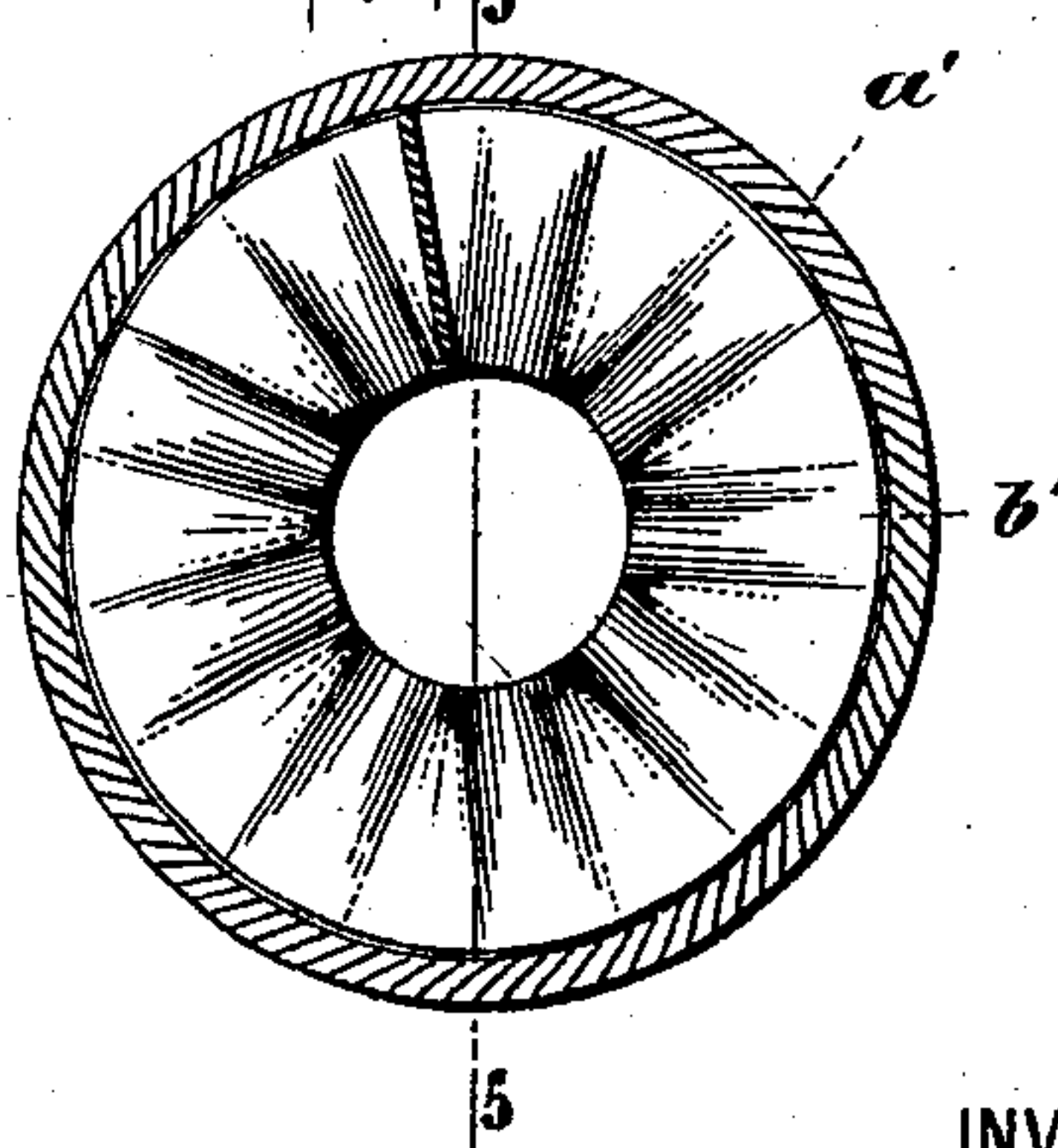


Fig. 6.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## RADIATOR.

SPECIFICATION forming part of Letters Patent No. 682,649, dated September 17, 1901.

Application filed December 24, 1900. Serial No. 40,872. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY W. STRUSS, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Radiators, of which the following is a specification.

My invention relates to "radiators," so called, and has for its principal object to produce a construction having a large radiating-surface for the purpose of conducting away heat.

Constructions embodying my invention find their special application in the liquid-circuit of internal-combustion engines wherein the cylinders are cooled by a liquid-circulating system. It will be obvious, however, that the principle may be applied to refrigerating-machines and the like, as will be herein-after explained.

In the accompanying drawings, Figure 1 is a plan view, more or less diagrammatic, showing my invention in its application to an automobile. Fig. 2 is a side view of a radiator embodying my invention. Fig. 3 is a section on line 3 3 of Fig. 2. Fig. 4 is a section on line 4 4 of Fig. 3. Fig. 5 is a sectional view of a modified form of construction embodying my invention, and Fig. 6 is a section on line 6 6 of Fig. 5. This figure also shows the line 5 5, on which the section through the casing is taken in Fig. 5.

The fundamental idea of the invention is the employment of a waved rib or ribs, either internal or external, to afford a large radiating-surface for radiating or conducting away heat.

In the construction shown in Figs. 2, 3, and 4, *a* is a pipe for conducting water or other cooling fluid. This pipe is shown in the present instance as surrounded by a spiral rib *b*, whose outer edge is preferably straight, or substantially so, and whose inner edge is waved or undulated. In constructing this form of my invention I take a strip of metal fluted or undulated transversely and bend the same around the pipe *a*, preferably in a spiral line. In this manner the undulations at one edge of the strip become deeper and

those at the outer edge are substantially straightened out, so that the spiral rib will have the appearance shown in Figs. 2 to 4 of the drawings. I then flow solder on the pipe *a*, so as to secure the rib firmly thereto. This structure is capable of various applications, and in Fig. 1 I have shown the invention as applied to an automobile. In this figure, *A* represents an automobile; *B*, the water-jacket of the internal-combustion cylinder; *C*, the water-tank; *D*, the water-circulating pump, and *c* the pipes for conducting the water. In the liquid-circuit constituted by the pipes *c*, the pump *D*, the water-jacket *B*, and water-reservoir *C*, I interpolate one or more radiators, as shown in Fig. 1, so that the cooling-water of the circuit which has been heated by its passage around the cylinder of the internal-combustion engine will be cooled in its passage through the radiator.

In Figs. 5 and 6 I have shown a modification of my invention wherein a pipe *a'* conducts liquid and is provided internally with a rib *b'*, whose outer edge is preferably substantially straight and whose inner edge is undulated or waved, the depth of the undulations being greatest at the inner edge and tapering toward the outer edge, as shown. The construction shown in Figs. 5 and 6 is most suitable as a refrigerating device.

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

1. In a radiator, the combination of a liquid-conduit and a rib running spirally with respect to the axial line of said pipe and in heat-conducting communication therewith, the inner edge only of the said rib being waved, the outer portion of said rib being substantially unaffected by the undulations.

2. In a radiator, the combination of a pipe *a* and a rib *b* wound thereon in heat-conducting communication with the outside surface of the pipe or conduit, the said rib having waves or undulations at its inner edge only.

HENRY W. STRUSS.

Witnesses:

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OTTO V. SCHRENK.