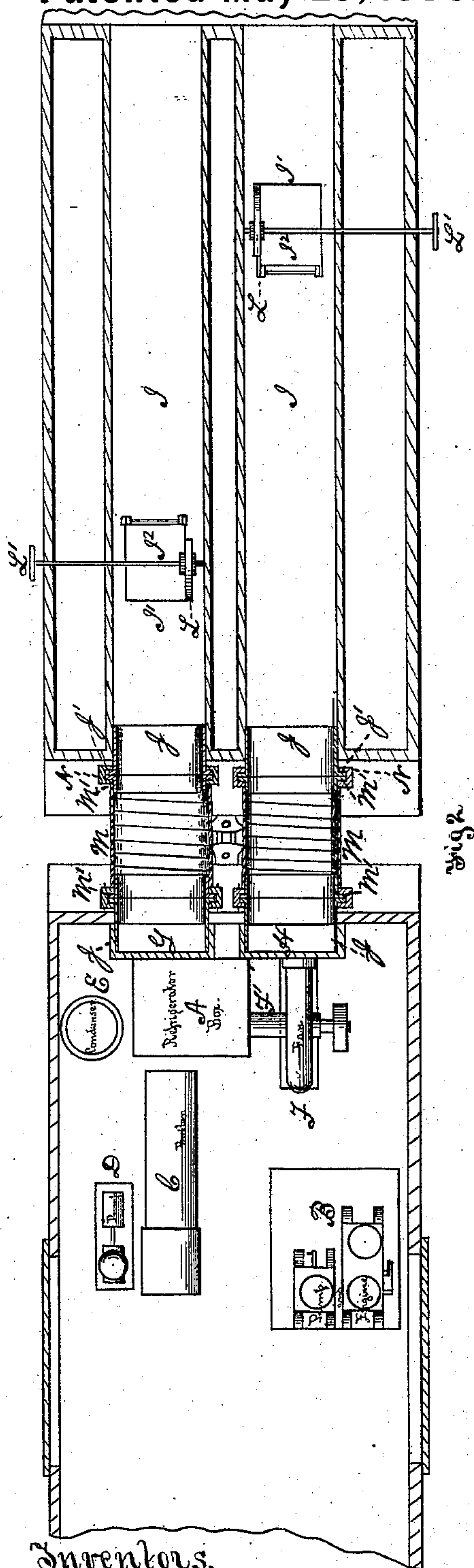
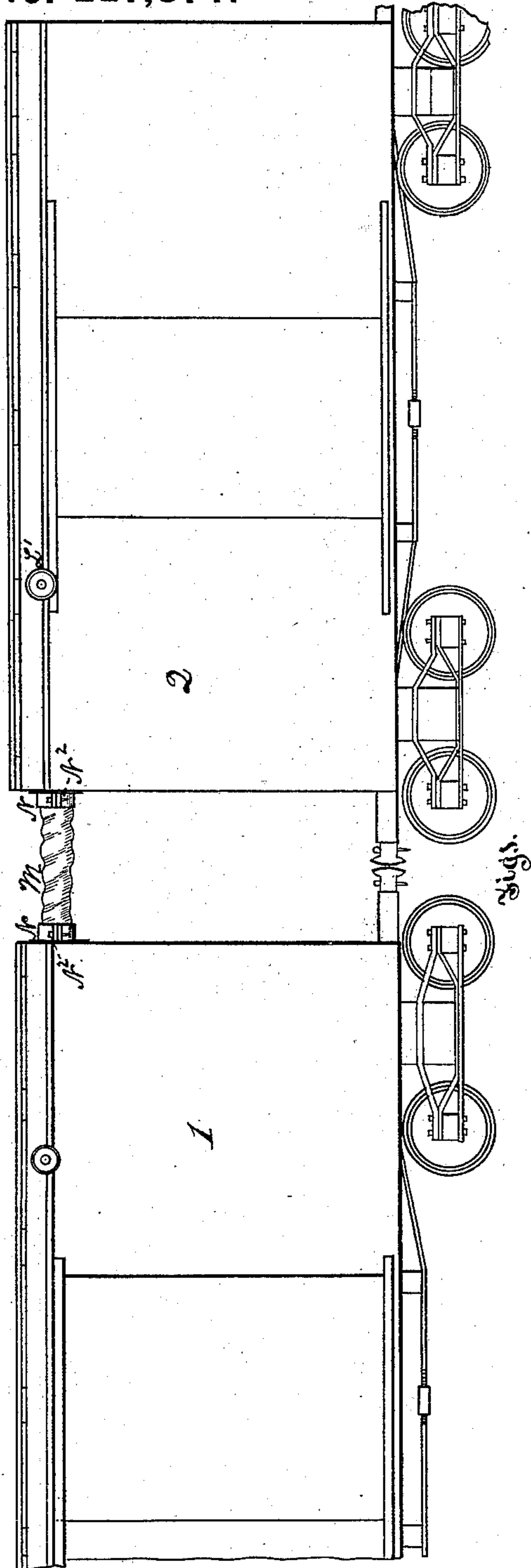


W. M. BABBOTT & D. SMITH.
Refrigerator Car.

No. 227,874.

Patented May 25, 1880.



Witnesses.

John H. Smith

L. C. Fidler.

Inventors.

William M. Babbott

David Smith

by Bakewell & Kent
Attorneys

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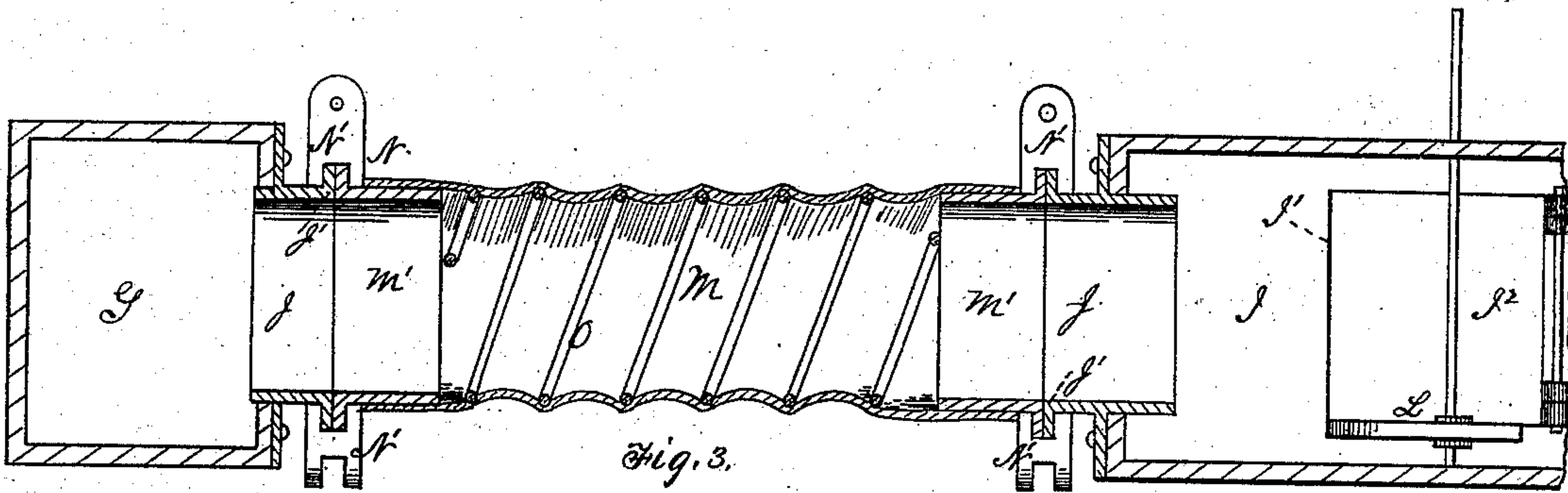


Fig. 3.

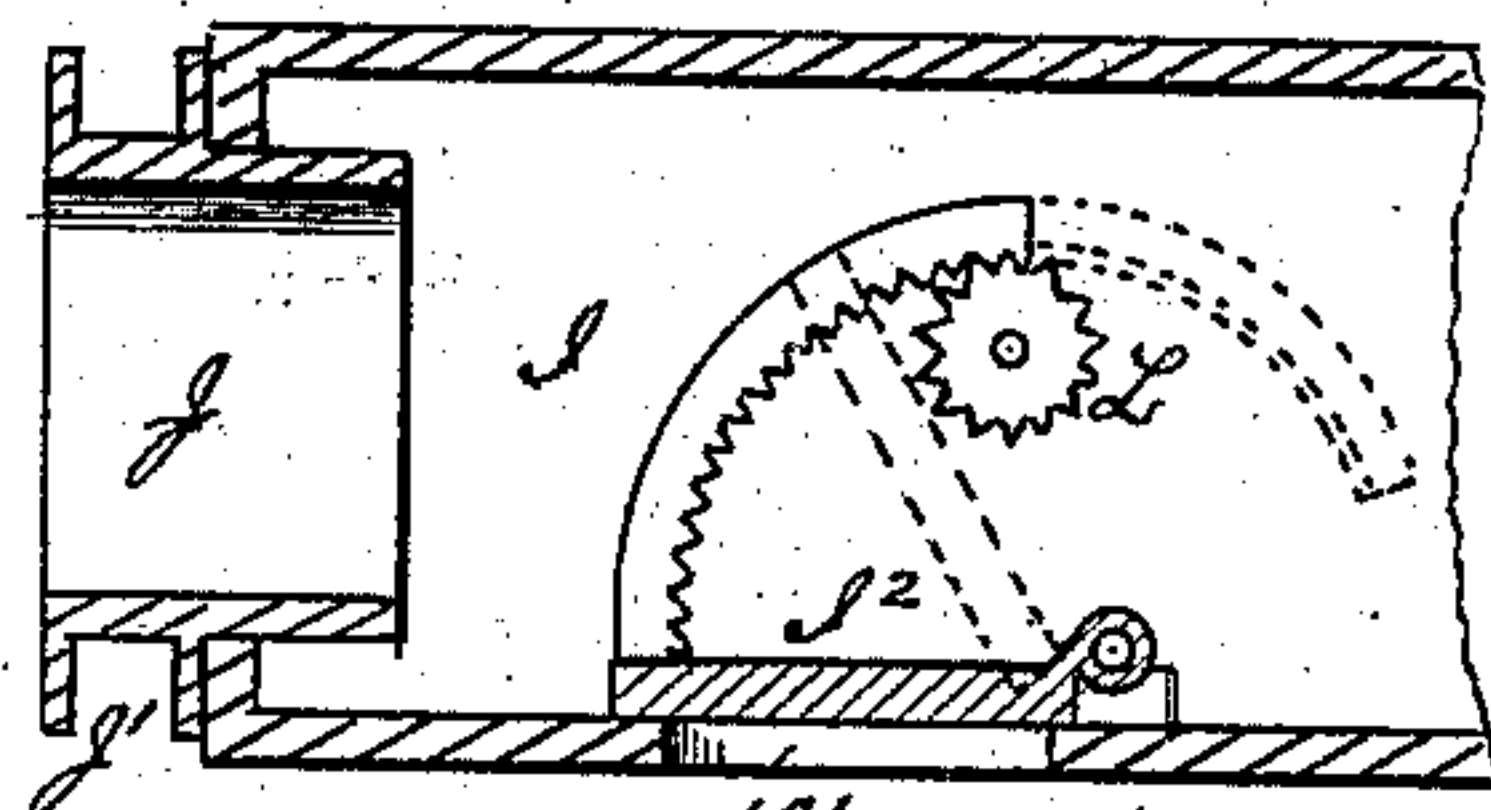


Fig. 5.

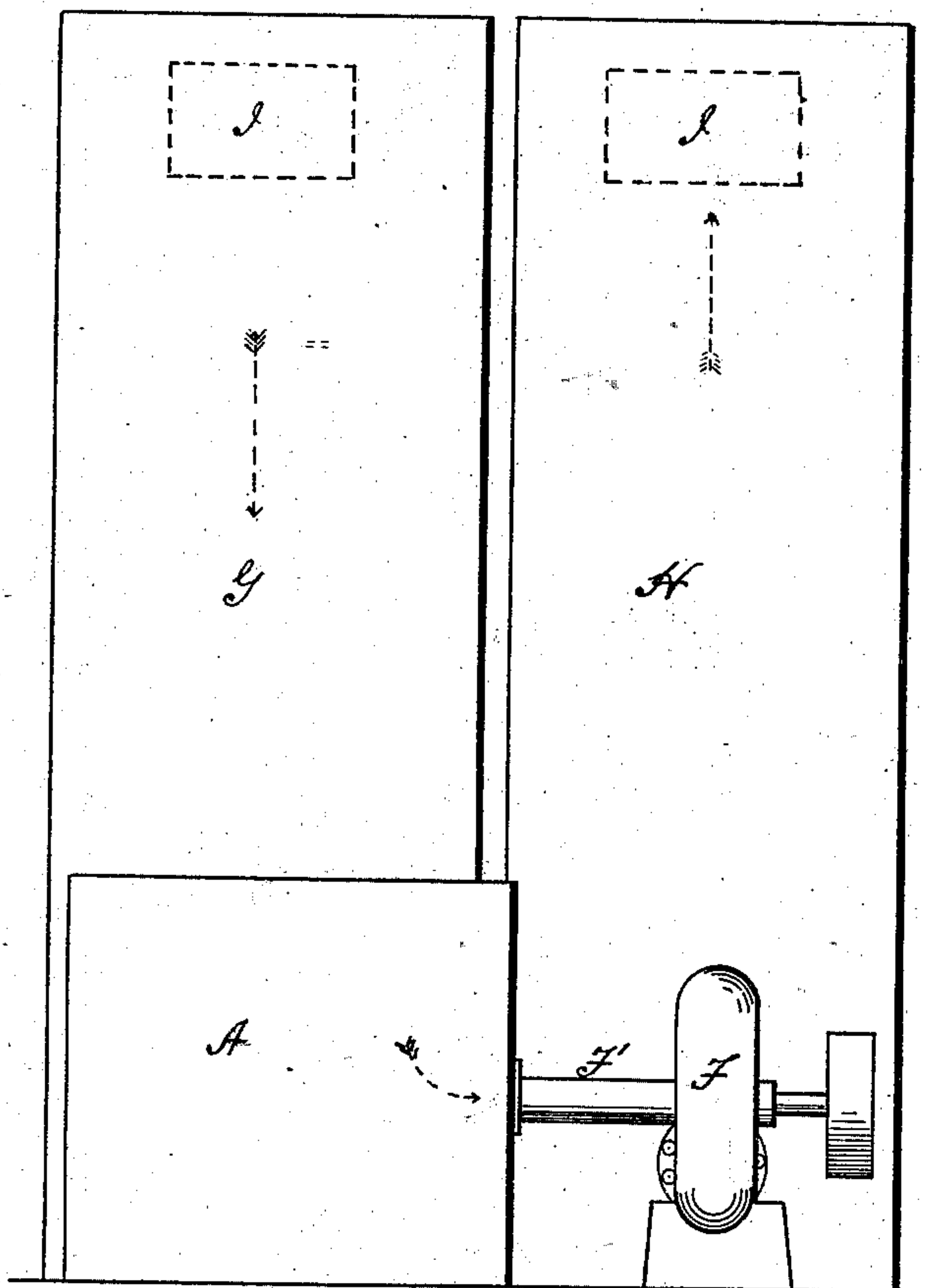


Fig. 4.

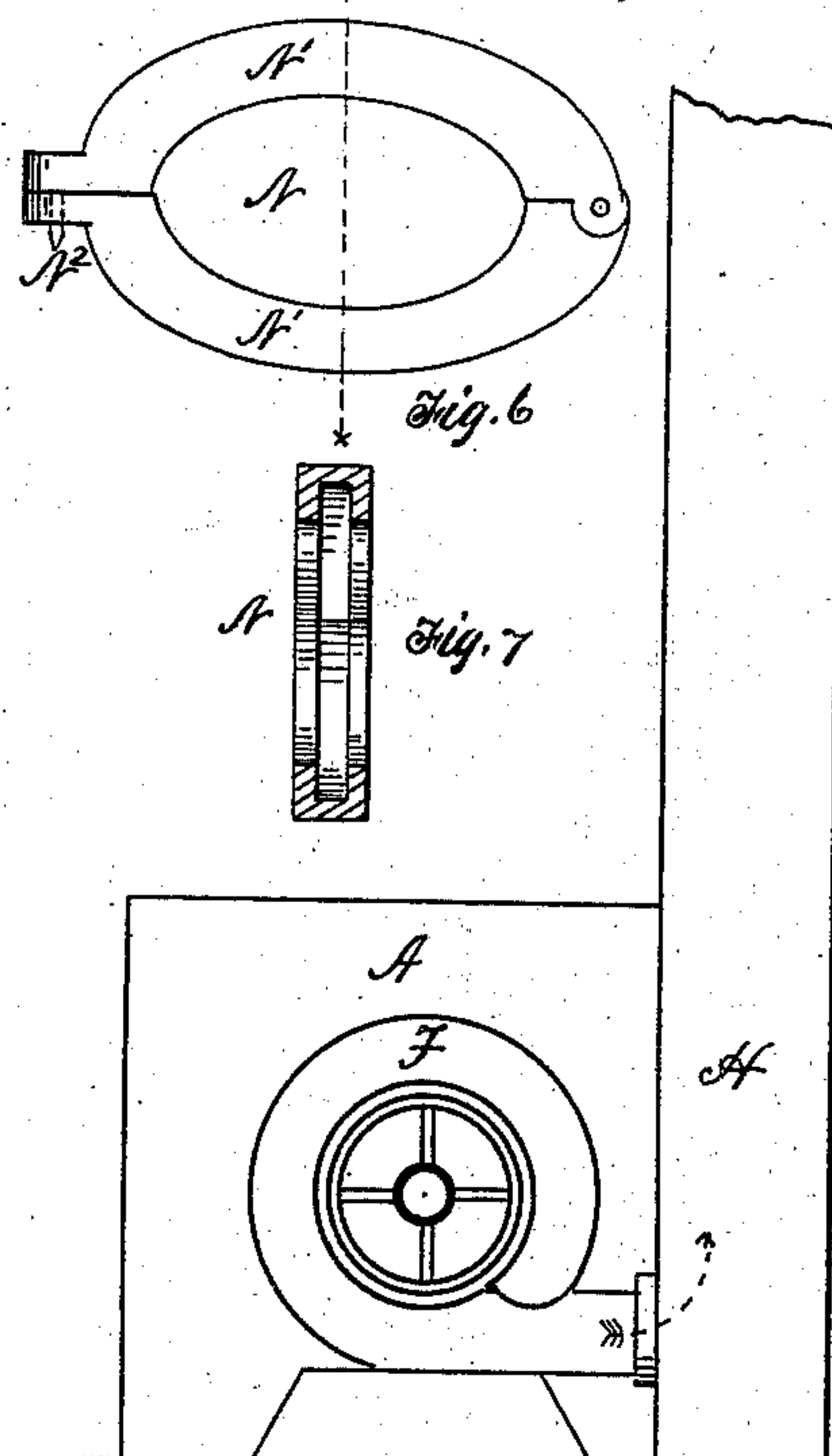


Fig. 6.

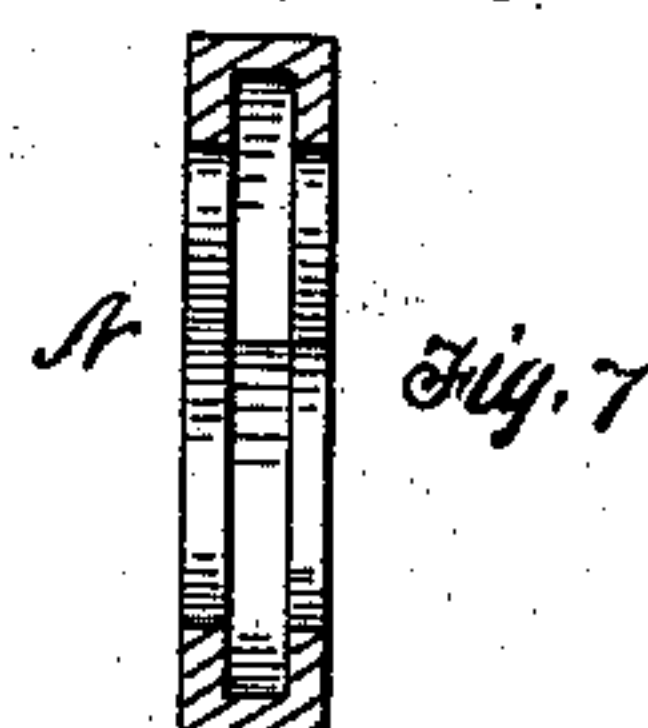


Fig. 7.

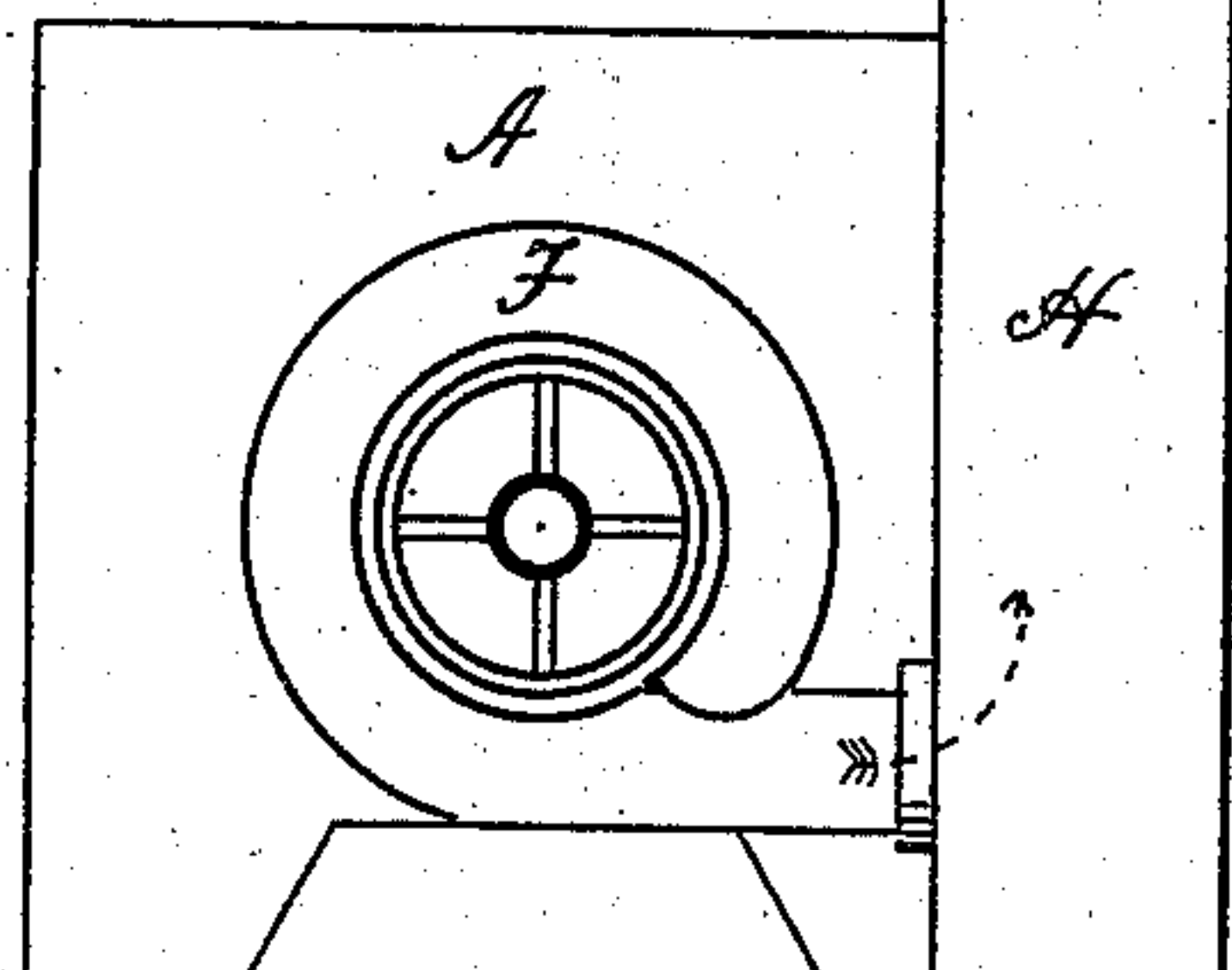


Fig. 8.

Witnesses.
John K. Smith
L. C. Fidler

Inventors
William M. Babbott
David Smith
by Bakewell & Sons
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM M. BABBOTT AND DAVID SMITH, OF NEW YORK, N. Y.

REFRIGERATOR-CAR.

SPECIFICATION forming part of Letters Patent No. 227,874, dated May 25, 1880.

Application filed January 19, 1880.

To all whom it may concern:

Be it known that we, WILLIAM M. BABBOTT and DAVID SMITH, of the city of New York, in the county of New York and State of New York, have invented a new and useful Improved System of Refrigeration for Railroad-Trains; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of portions of two railroad-cars to which our improvement is applied. Fig. 2 is a longitudinal section of the same. Fig. 3 is an enlarged view of the coupling of the air conduits or boxes of two adjacent cars. Fig. 4 is an enlarged view of the refrigerator-blower and the air-trunks extending therefrom. Fig. 5 is a view of the valve by which the admission and escape of the air to and from the car is regulated. Figs. 6 and 7 are views of the coupling-clamp, and Fig. 8 is a side elevation of the blower.

Like letters of reference indicate like parts in each.

Our invention consists of a new system of refrigeration for railway-cars adapted for transporting perishable meats, provisions, &c.

Heretofore, so far as we are informed, the cars used for this purpose have been constructed with each car containing its own refrigerant, and constituting a refrigerator independent of and disconnected from the other cars. The refrigerant used was ice, which, owing to the large quantity required, was not only expensive in first cost, but was also of great weight and bulk, reducing the carrying capacity of the car and increasing its wear and tear. A car required, in a trip from Chicago to New York, from four thousand pounds to ten thousand pounds of ice.

Our invention is designed to obviate the difficulties attendant upon this system; and it consists in a system of refrigeration by supplying cold air to one or more cars of a train, from a refrigerator or refrigerating-machine in a separate car, through conducting pipes or conduits, and also by withdrawing the warm air from the car or cars through conducting pipes or conduits by means of a pump, fan, or other suitable device, causing it to pass through a

refrigerator to be cooled, and then returned to the car or cars containing the articles to be preserved, thus establishing a regular circulation.

To enable others skilled in the art to make and use our invention, we will now describe its construction and manner of use.

We will first state that we prefer to use a chemical refrigerating or ice machine instead of a refrigerator-car of the usual construction for cooling the air, for the reason that we can thereby produce and sustain a greater degree of cold within a smaller compass than it is possible to obtain by passing the currents of air over ice or ice-cooled surfaces. Of these machines now in use there are several which are well adapted for our purpose.

We place such a machine, with its necessary adjuncts, in the car No. 1, which we term the "machine-car," and which need not be larger than is necessary for the accommodation of the machinery alone. The refrigerating-box of the machine is represented at A. The pumps and engine are represented at B, the boiler of the engine at C, the feed-pump of the boiler at D, and the condenser of the ice-machine at E. These parts are old and well known.

At the side of the refrigerator-box A we place a suction-fan, F, the eye of which communicates with the box A by means of a pipe, F'.

At the end of the car are two vertical wind trunks or boxes, G and H, leading up to the top of the car. One of these, G, communicates with the box A at its lower end, and the spout of the fan opens into the other, H.

In the upper part of car 2 are two air boxes or conduits, I, which extend from end to end of the car. They are provided with two or more openings, I', covered by valves I², which are operated by racks and pinions L, by means of hand-wheels L' on the outside of the car.

The ends of the conduits I are provided with flanged metallic sleeves J, which pass through the ends of the car, the flanges J' being on the outside. The wind-trunks G H are provided with similar sleeves J, which open through the ends of the car 1 opposite to the ends of the conduits I of car 2.

The trunks G H are connected with the conduits I by flexible tubes M, made of rubber or other flexible non-heat-conducting sub-

stance, and are preferably corrugated, so that they may easily adapt themselves to the movements of the cars, particularly in passing around curves and starting and stopping, and to different heights of cars. These tubes have flanged metallic ends M', of the same size as the flanges J', and in making the connection between the cars they are secured to the flanges J' by a clamp, N, which is composed of two grooved halves or jaws, N', hinged together, which close over the flanges M' and J', and are fastened together by a pin or key, N².

The construction of the coupling-tubes M and clamps N may be varied, or other forms of detachable tubular coupling-connection, of which there are a number now known, may be used. We prefer to surround these tubes with a covering of larger size, to form a surrounding air-chamber, in order to more perfectly prevent the conduction of heat therethrough.

Inside of the tubes M we have placed a coil of wire, O, to sustain and stiffen the sides; but this does not detract from their required flexibility.

The valves I² should preferably be made to open in the direction of the current of air through the conduits, and as the cars do not always go in the same direction, we prefer to have an equal number of valves in each conduit open in each direction, or to have them all open and close in either direction at will, the latter being a construction easily made.

The construction of the preserving-cars being alike, any desired number may be attached to the train and cooled from the machine-car, the number being limited only by the power or capacity of the refrigerating-machine to supply cold air for preserving purposes.

The operation is as follows: The cars having been coupled together and the valves all set in the proper direction, the machinery is set in motion. The fan F draws the cold air from the refrigerator A, and forces it up through the pipe H into the outgoing conduit I, from which it passes through the openings I' into the cars, displacing the warm air therein, which, being drawn by the suction-fan F, enters the other conduit I through the open-

ings I', and passes to the refrigerator A, where it is cooled and again sent on the circuit through the fan. Thus a constant circulation is maintained, and the air in the cars is gradually brought down to and maintained at the desired temperature. The valves of the conduit in the first car should be but slightly opened, owing to the lower temperature of the air when it first enters the conduit, while those of each succeeding car should be opened a little more than those of the preceding car.

We prefer to have the machine-car at the front of the train. The conduits and the coupling-pipes constitute two continuous air-passages, extending entirely through the train.

Our invention can be applied to the cars now in use with comparatively small expense.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with a car provided with a refrigerating-box, fan-blower, and education-conduit, of one or more cars having an air-duct or air-ducts for conducting the cooled air from the refrigerator-car to and through the independent cars, and a flexible tube or tubes for connecting the air-conduits, substantially as and for the purpose specified.

2. In combination with a refrigerator-car, a refrigerating-box placed therein, the eduction air-conduit H, the induction air-conduit G, and a fan-blower, whereby the air from one or more independent cars may be cooled and caused to circulate, substantially as and for the purpose specified.

3. The refrigerating-car provided with the refrigerating-box, fan-blower, and air induction and eduction conduits, in combination with a car having two air boxes or conduits extending the length of said car and provided with valves, substantially as and for the purpose specified.

In testimony whereof we, the said WILLIAM M. BABBOTT and DAVID SMITH, have hereunto set our hands.

WILLIAM MILLER BABBOTT.
DAVID SMITH.

Witnesses:

HARRY FISKE,
FRANK L. BABBOTT.