2 Sheets. Sheet 1

R. Morton
Liquid Cooler

No. 75044 Patented Mar. 3, 1868

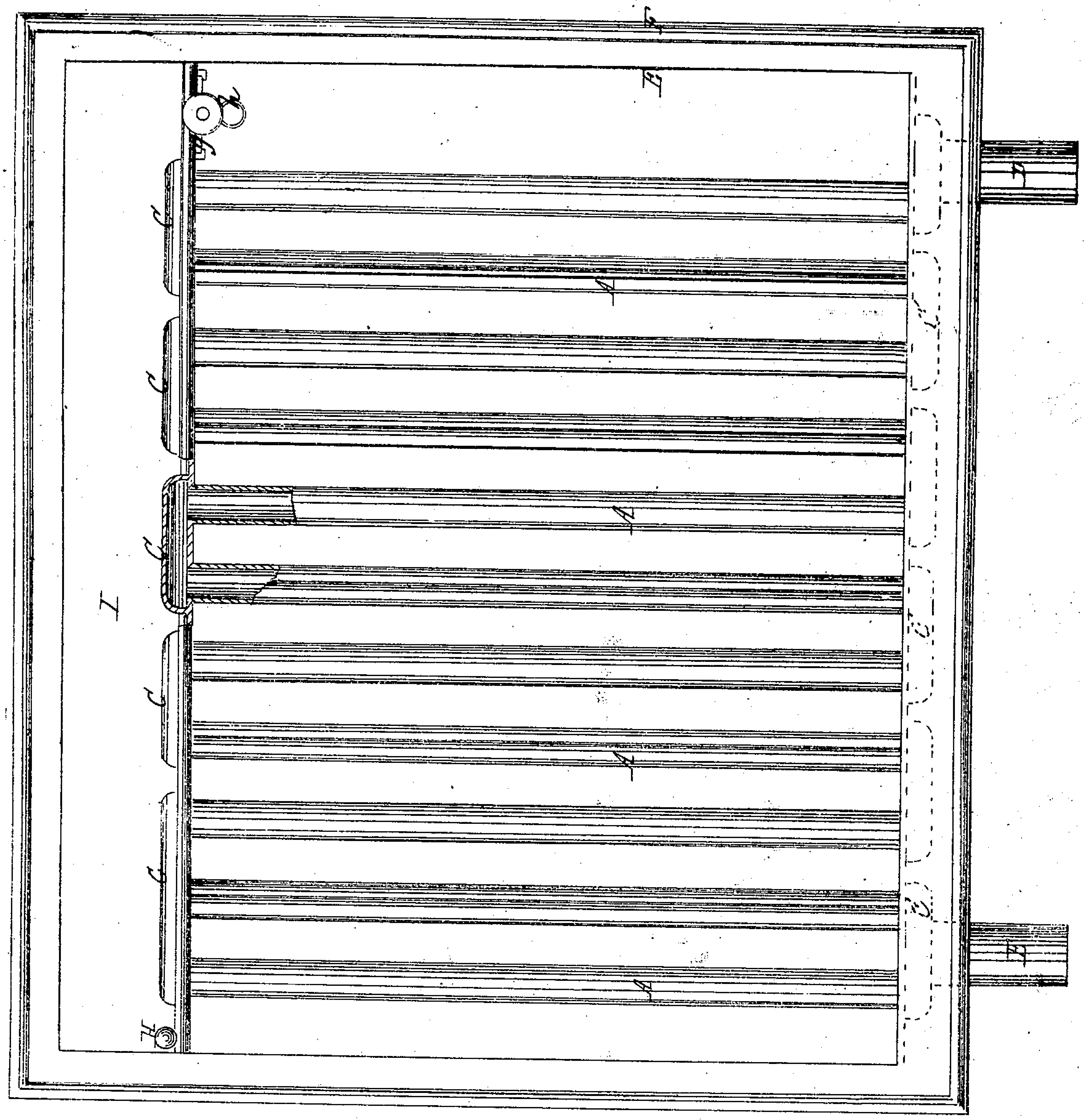

Fig. 1

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Wm. Trewin

Inventor:
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Per Munn & Co
Attorneys

2 Sheets.
Sheet 2

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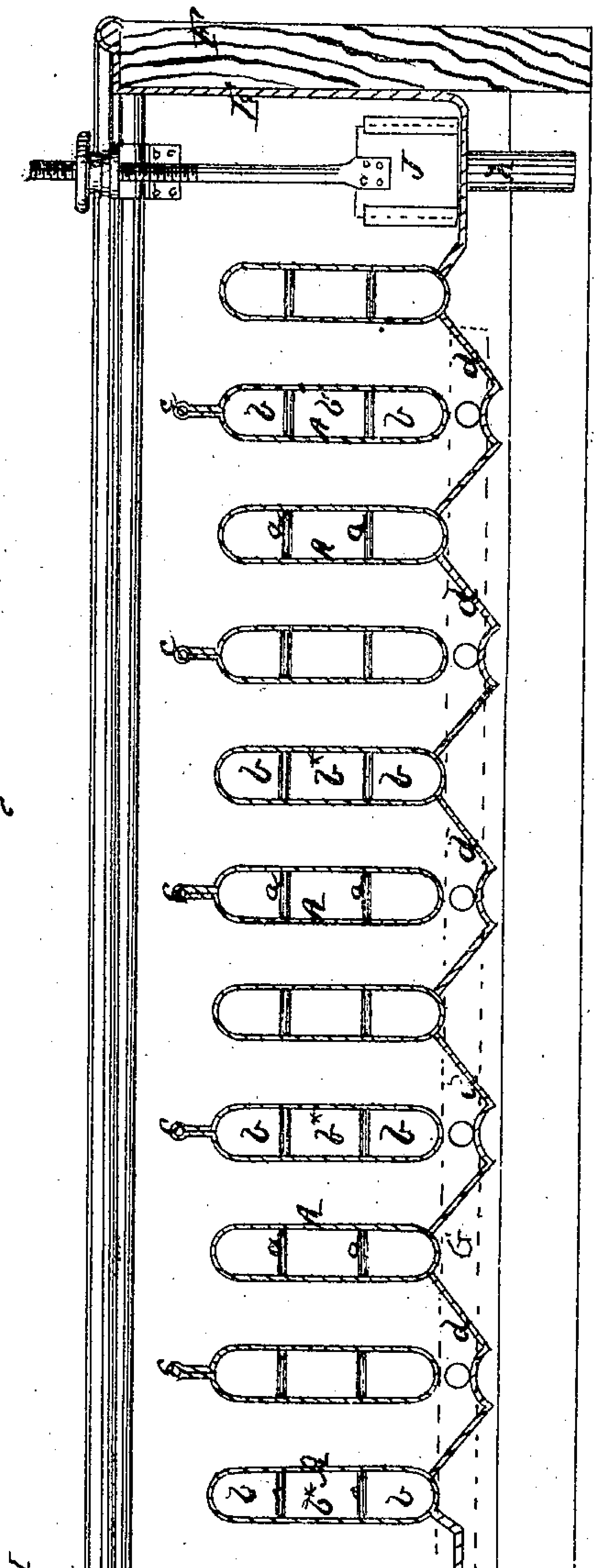
Fig. 2:



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ROBERT MORTON, OF STOCKTON-ON-TEES, ENGLAND.

Letters Patent No. 75,044, *dated March* 3, 1868.

IMPROVED LIQUID-COOLER.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ROBERT MORTON, of Stockton-on-Tees, England, have invented a new and improved Liquid-Cooler; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a plan or top view of this invention, partly in section.

Figure 2 is a longitudinal vertical section of the same.

Similar letters of reference indicate like parts.

This invention relates to certain improvements in that class of refrigerators in which flattened or other shaped tubes are used for the purpose of cooling worts or other liquids or fluids, the liquid to be cooled being passed through the chambers between said tubes in one direction, while the cooling-liquid passes through the tubes in the opposite direction.

In constructing my refrigerator, I use a series of flattened tubes, A, made of copper thoroughly tinned, or of other suitable metal. The tubes are strengthened internally with a sufficient number of stays, *a*, and they are constructed as follows: I take strips of copper, turn them over, and braze them, to form a circular pipe, *b b**. I then draw them in the usual way of forming drawn pipe, and then I take three or more of these pipes, which have been previously well tinned within and without, and roll one, marked *b**, (if only three pipes are used, or two or more, if four or more pipes are used,) perfectly square, or nearly so, while the two others, which are marked *b*, are rolled so as to form an arch with a flat bottom. I then solder the three pipes *b b b** together longitudinally, keeping the circular faces of the pipes *b* outside, by which arrangement tubes are obtained the cross-section of which is such as shown in fig. 2 of the drawing. These tubes I insert, at each end, into strong plates, B, of copper or other metal, perforated at proper distances to receive the tubes, which are then connected alternately by hollow caps, C, of copper or other metal, secured to the plates B, and extending over the ends of two or more tubes, as shown in fig. 1. The first one of the caps C connects with the supply-pipe D, and the last with the discharge-pipe E, and a current of water or other liquid admitted through the supply-pipe is compelled to pass in a zigzag course through all the pipes before it reaches the discharge-pipe.

The caps C may be attached to the tubes by means of flanges in various ways, screwed together, or united in any other convenient manner. A longitudinal rib, *c*, is fixed at the top of each alternative tube, of sufficient depth; and the bottoms of the alternative tubes are also connected by a corrugated strip, *d*, of copper or other metal, thereby forming a series of cells or compartments between the tubes, causing a continuous flow of hot worts or other liquids alternately under and over the external surfaces of the tubes, the hot liquid and cold water thus flowing in opposite directions, and being discharged at opposite ends.

The apparatus is fixed to a case, E, of copper or other metal, and secured in a strong wooden or other suitable frame, F; and it can be used with an open top, or closed to prevent any atmospheric action on the worts. If desired, however, the action of the apparatus can be reversed, the worts flowing inside the tubes, and the water outside; but I prefer the former mode.

A refrigerator of this kind possesses great cooling-power, and requires a small proportionate quantity of water. It can be placed in any position, either upright, sloping, or horizontal, occupying little room; and, from its simplicity of construction, it is easily cleaned, and can be manufactured at a reasonable cost.

In order to discharge the wort from each compartment, and to facilitate the operation of cleaning, a slide-valve, G, is applied, which is operated by a hand-lever, H. Said slide is provided with a series of holes, which can be made to coincide with similar holes in one of the plates B, leading to the several compartments of the refrigerator.

By means of the hand-lever and slide, all the holes in the plate B can be opened simultaneously, and the wort from the several compartments of the refrigerator discharges in the compartment I, which communicates, through the gate J, with the discharge-opening *h*.

It must be remarked that this apparatus might also be used with advantage for distillation, evaporation, and other similar operations.

What I claim as new, and desire to secure by Letters Patent, is—

The arrangement of a series of flat tubes, A, which are alternately provided with longitudinal ribs, *c*, and connected by corrugated strips, *d*, substantially as and for the purpose set forth.

Also, the caps C, in combination with the tubes A, ribs *c*, and connecting-strips *d*, constructed and operating substantially as and for the purpose described.

ROBERT MORTON. [L. S.]

Witnesses:

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JOHN HAMILTON REDMOND, *Secretary to the above William Walker.*