R. A. CHESEBROUGH.

Steam Heater.

No. 90,727. Patented June 1, 1869.

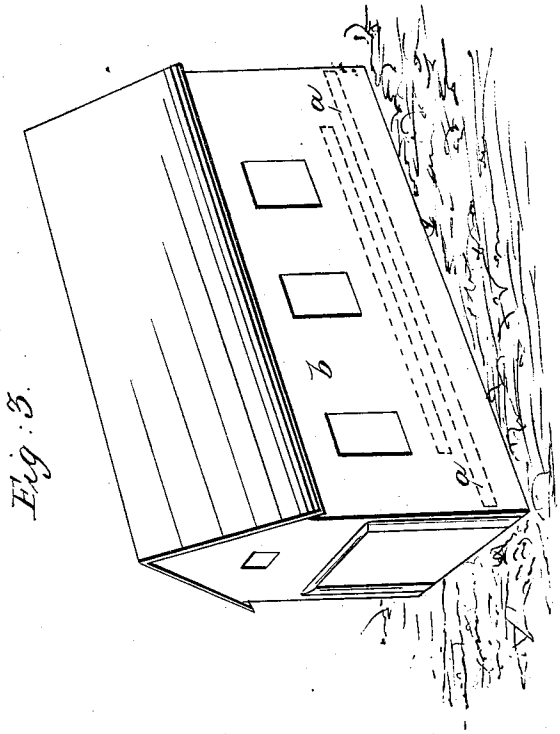


Fig: 3.

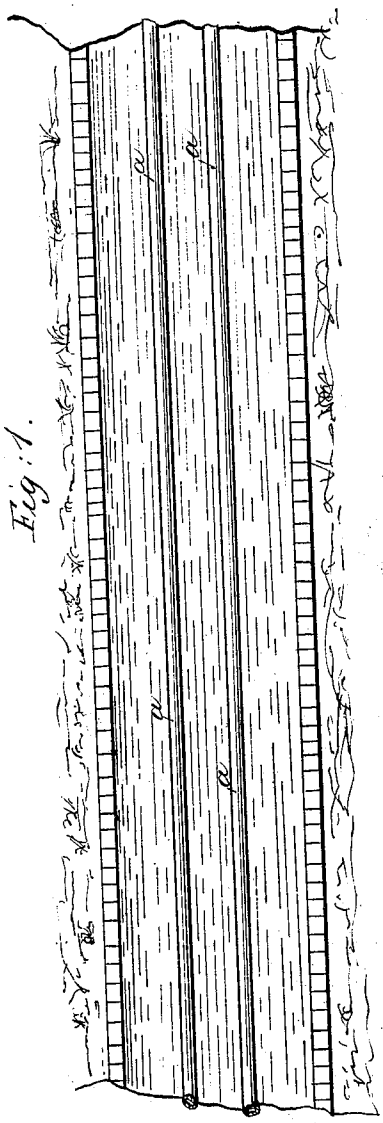


Fig: 1.

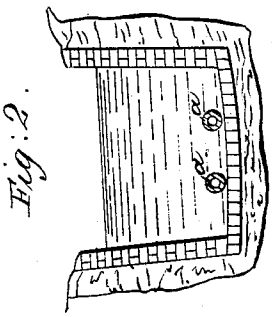


Fig: 2.

Witnesses

Hermann Grox
G. Berg

Inventor

R. A. Chesebrough
By Van Santvoord & Hauff
his attys

N. PETERS, Photo-Lithographer, Washington, D. C.

United States Patent Office.

ROBERT A. CHESEBROUGH, OF NEW YORK, N. Y.

Letters Patent No. 90,727, *dated June* 1, 1869.

MODE OF PREVENTING CANALS, &c., FROM BEING CLOSED BY ICE.

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 A. CHESEBROUGH, of the city of New York, in the county and State of New York, have invented a new and useful Improvement in Preventing Canals or Water-Courses from being Closed by Ice; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which drawing—

Figure 1 is a plan view of a portion of a canal or water-course, to which my improvement is applied.

Figure 2 is a cross-section.

Figure 3 shows an enclosure for covering a lock or other parts of a canal.

The object of this invention is to preserve canals or other water-courses from becoming closed by the formation of ice in cold weather, as, for example, in the winter-season.

I accomplish this object by keeping the water at a temperature above the freezing-point, using steam or other heat, thereby preventing the formation of ice, and keeping the water in a fit state for the purposes of navigation.

In the example of my invention represented in figs. 1 and 2, I have shown two steam-pipes, *a*, placed upon the bottom of a canal, for the purpose of giving out heat to the water and preventing it from becoming cold enough to freeze. Said pipes communicate with a steam-boiler located along the canal, either beneath the surface of one of its banks or elsewhere, at a convenient place.

As the intelligent engineer or mechanic will know how to connect said pipes with a boiler, it is not necessary to give any further explanation thereof.

The pipes are from a quarter of a mile to a half of a mile or more in length, according to the amount of water contained in the canal, or according to the climate where the canal is situated, or the severity of the season.

The ends of the pipes open directly into the water, the pressure of steam being kept at from ten to twenty pounds, or higher, if necessary, to overcome the pressure of the water against the steam in the pipe.

A single steam-pipe may be used, or two, as shown in this example, or a greater number than two, according to the heating-power or heating-surface required, and a single pipe of a considerable diameter may be used, instead of two or more of smaller diameters, according to the judgment or preference of those in charge.

Instead of letting the steam escape at the ends of the pipes, it may be allowed to escape through perforations in the sides of the pipes, throughout their length, in which case their ends may be closed or supplied with valves.

Steam-traps may be used in connection with said pipes, if desired.

Where two steam-pipes are employed, they may each be about two inches in diameter, but I do not wish to limit myself in respect to the size or the numbers of the pipes. They may be laid straight, as here shown, or in serpentine course, the latter method of laying being preferable in locks, and also in basins, and in wide levels between adjacent locks, and in such places a double amount of pipe may be employed, the same being laid in serpentine courses, or made with numerous branches.

I cover or enclose portions of the canal, for example, the locks, and, if necessary, short levels between adjacent locks, with a temporary building, *b*, whose walls or roof may be made in part transparent, as is represented in fig. 3, and its upper end made so as to slide up and down, to allow boats to enter the same. Its lower end may also be made movable vertically, if desired. This shelter aids to keep the temperature of the water above the freezing-point, by shutting off the air immediately about the lock from the outer air.

Additional steam-pipes may, if desired, be placed within the building, along its walls or elsewhere, to keep the air at the required temperature to prevent the formation of ice on the gates and valves of the lock.

The lock-buildings may be extended so as to afford dwelling-room for the lock-tenders and their families, and the portions which cover the locks, that is to say, the upper parts or roofs, may be made removable, so that they can be taken away in warm weather and replaced in cold weather, the side walls being allowed to remain, if it is preferred to make them of a permanent character. This mode of enveloping locks and levels between adjacent locks, affords shelter for the lock-tenders, and prevents the locks and intermediate short levels from being clogged by heavy falls of snow. Instead of steam, hot air can be used, if preferred.

The steam-boilers, or hot-air furnaces, where the latter are used, are placed at proper distances apart throughout the length of the canal or water-course which is to be preserved from ice.

Instead of locating steam-boilers at each half mile, it will be found an economy of fuel to substitute heating-furnaces at more frequent points along the canal, and use only one steam-boiler on each level, or, where the levels are short, one boiler for several levels. In this case the pipe may continue in one unbroken length for a long distance, and issue from the bed of the canal at such frequent points on its banks, as the heating-furnaces may be located at.

The pipe enters the furnace, and connects with a coil or worm therein, which is heated over a hot fire; it then issues from the heating-furnace, descends imme-

diately into the canal, and continues on to the next furnace, where the heating-operation is repeated.

By using a long coil of pipe in the furnace, and a hot fire, the water contained in the pipe may be partially or wholly converted into steam before the pipe again enters the canal.

If air is used, it should be introduced into the pipe under pressure sufficient to keep up its circulation through the entire length, and is heated by passing the pipe containing the air through a number of heating-furnaces located at the proper distances from each other in the manner just described. Air is, however, such a poor conductor of heat, that its use for this purpose may not be found advantageous.

It is not necessary that the heating-pipes should extend throughout the entire length of the canal. Each section of pipe may be connected with its own boiler or furnace, acting independently of the other sections, and intervals, of from one thousand feet to half a mile, may occur in the canal, between the sections, in which no pipe need be laid, the constant flow of water in the canal equalizing and distributing the heat over the entire surface. The lengths of these intervals will depend upon the severity of the climate, and the experience hereafter acquired by the practice of this invention.

The application of this improvement may be varied by increasing the number of independent boilers or furnaces along the route of the canal, and decreasing the length of the pipes used, so that they be barely long enough to convey the heated steam, water, or air under the surface of the water in the canal, so that all the heat may be absorbed in the water, and none of it escape in the air.

In practice, the chief desideratum will be to communicate to the water in a canal the greatest amount of evenly-distributed heat, at the least possible consumption of fuel, and lowest cost of machinery and labor. Experience in the practical working of this invention will determine these points.

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

1. One or more heating-pipes *a*, arranged in sections of convenient length, and connected with boilers or furnaces located at suitable intervals along the line of a canal or water-course, substantially as and for the purpose described.

2. Also, enclosing locks or other portions of a canal or water-course with a shelter, whose walls are in part transparent, and its ends movable vertically, substantially as and for the purpose described.

ROBT. A. CHESEBROUGH.

Witnesses:

GEO. F. SOUTHERN,

J. VAN SANTVOORD.