(No Model.) 2 Sheets—Sheet 1.

A. T. BEMIS.

HEATING SYSTEM FOR DRYING KILNS.

No. 563,641. Patented July 7, 1896.

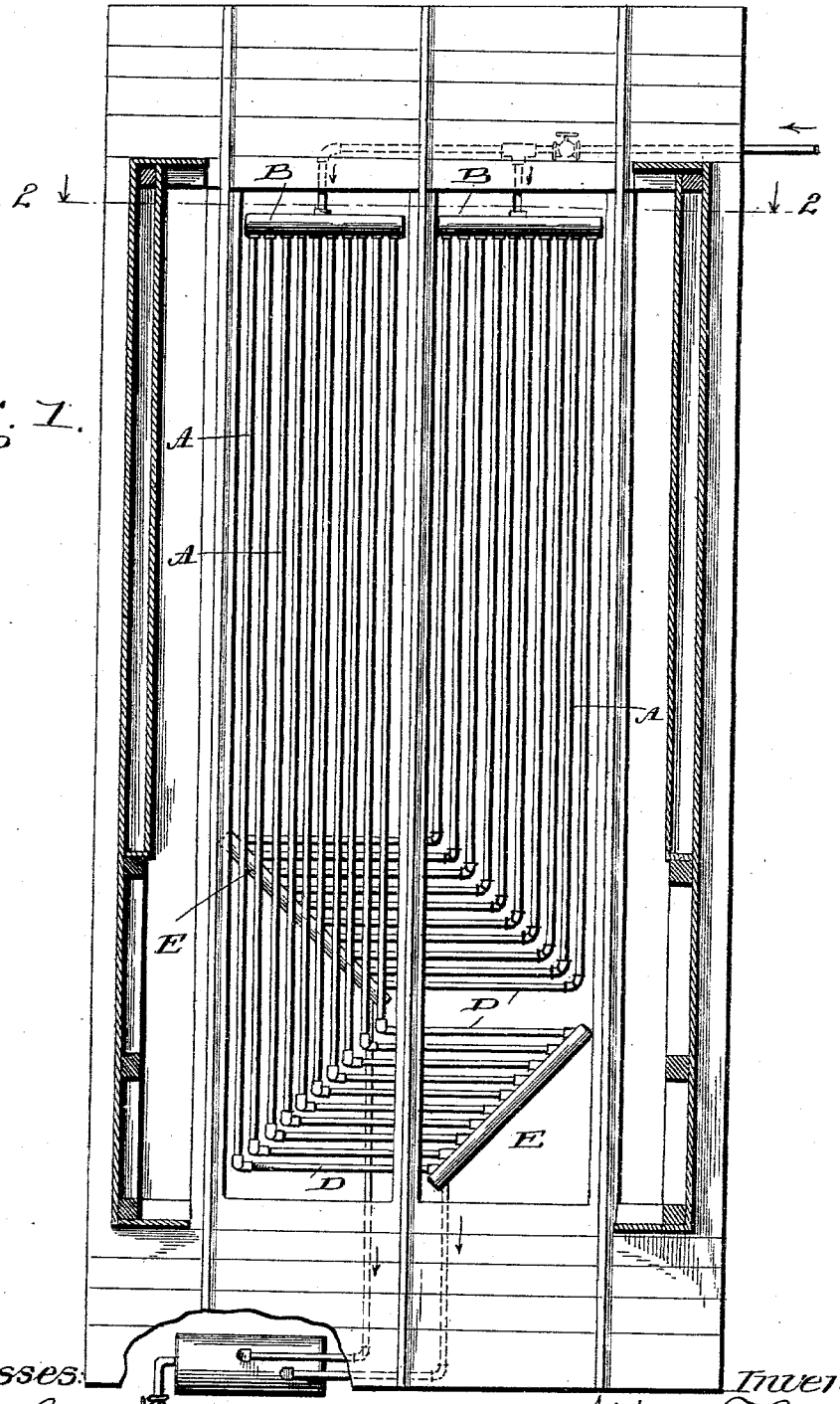


Fig. 1.

Witnesses:
L. C. Hills.
W. VanDoan

Inventor:
Albert T. Bemis,
by Franklin H. Hough
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. T. BEMIS.

HEATING SYSTEM FOR DRYING KILNS.

No. 563,641. Patented July 7, 1896.

Fig. 2.

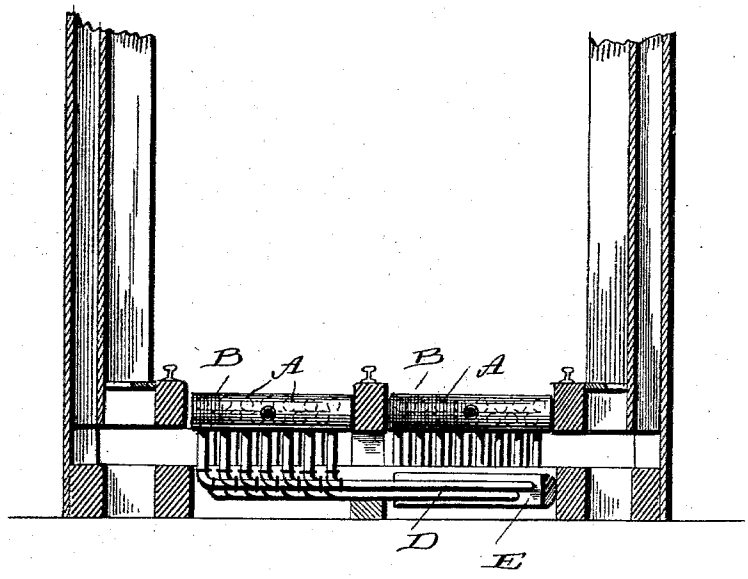
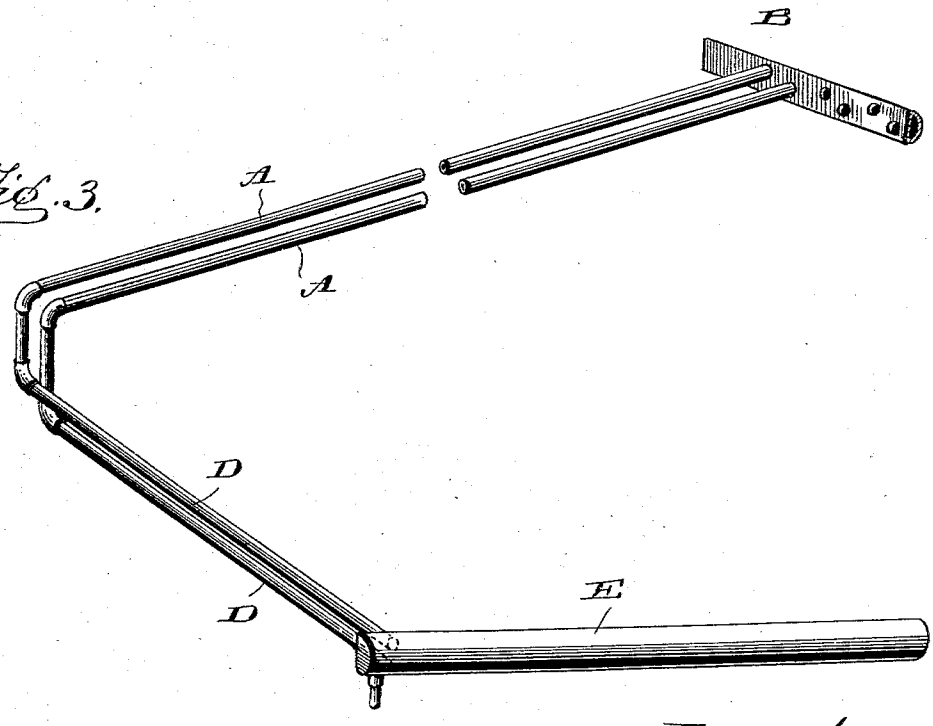


Fig. 3.



Witnesses:
L. C. Hills.
W. E. Van Loan

Inventor:
Albert T. Bemis,
by Franklin H. Hough
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALBERT T. BEMIS, OF INDIANAPOLIS, INDIANA.

HEATING SYSTEM FOR DRYING-KILNS.

SPECIFICATION forming part of Letters Patent No. 563,641, dated July 7, 1896.

Application filed May 2, 1896. Serial No. 590,052. (No model.)

To all whom it may concern:

Be it known that I, ALBERT T. BEMIS, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Heating Systems for Drying-Kilns; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in pipe systems for use in heating dry-kilns and other buildings, either with steam or hot water.

It is well known to those skilled in the art of steam and hot-water heating that, owing to the expansion and contraction of the pipes, due to changes in temperature, the joints are liable to separate or leak. To compensate for differences in length assumed by pipes which are thus used for heating purposes, many expedients have been resorted to, among them being the plan of bending the pipes downward at a point adjacent to one of their ends and then connecting the extreme ends of the pipes thus bent into a header, which is disposed at right angles to the direction of the length of the main pipes. This angle in the pipes permits a limited movement in the direction of the length of the pipe.

It is frequently impracticable, especially in providing systems of heating-pipes for dry-kilns, to excavate below the level of the foundation of the building for a distance sufficient to provide for a sufficient degree of expansion in the pipes. This will be the more readily understood when it is considered that frequently dry-kilns are many feet in length, and the pipes used in heating the kiln are required to be extended substantially the entire length of the building. It is necessary in providing heating appliances for that class of dry-kilns in which the heat is designed to be communicated to the lumber from beneath that the heating-pipes should be placed either at substantially the floor-level or but a short distance beneath the same. Hence the impossibility of raising the pipes to a distance which would be required to permit the elbows of the pipes to be bent downward in order to obviate the necessity of excavating beneath the kiln or building.

Another serious objection to the pipe systems in which the short arc or expansion section of each of the pipes extends at right angles to the main pipe and in a horizontal plane is that it necessitates the cutting of the expansion-pipes into varying lengths. This, in view of the fact that this cutting of pipes is required to be done by handwork in fitting up the system, involves a great expense and delay in time. It has also been discovered that in pipe systems of the character described it is impossible to secure either a uniform degree of heat or of expansion, owing to the varying lengths of the pipes. This uneven expansion of the pipes renders it impossible to at all times maintain perfectly tight joints.

In order to provide perfect drainage of the steam-pipes, it is necessary that there should be a uniform drop or incline of the pipes from one end of the system to the other. Hence in dry-kilns in which the pipes of the system extend from the receiving to the discharge end of the building, it will be seen that in order to provide a sufficient drop or incline and thus insure drainage of the pipes it would be required, in case the elbows of the expansion-pipes extended downward, that in order to insure a sufficient degree of expansion the pipes would be required to be lowered several feet.

The present invention has for its object, among others, the overcoming of the objections to pipe systems such as are above noted, and in the provision of a system in which the expansion-pipes may be cut of a uniform length and the necessity of extending the expansion-pipes vertically downward entirely obviated.

To these ends and to such others as the invention may pertain the same consists in the novel arrangement of the pipes constituting the heating system, all as hereinafter described, shown in the accompanying drawings, and then specifically defined in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the let-

ters of reference marked thereon, form a part of this specification, and in which drawings—

Figure 1 is a top plan view of a pipe system embodying my invention. Fig. 2 is a vertical transverse section through the lower portion of a building provided with the system. Fig. 3 is an enlarged detail in perspective of two of the pipes, showing their connections.

Reference now being had to the details of the drawings by letters, A A designate the main pipes of a system of hot-water or steam heating. In Fig. 1 of the drawings the system is shown as used in connection with a lumber-drying kiln and as being arranged in two independent systems, each having a header B at the receiving end of the kiln, from which header, which is placed in a horizontal plane transversely of the kiln, the pipes A extend longitudinally of the kiln to a point adjacent to the opposite or discharge end of the kiln, where they are connected, by means of expansion-pipes D D, with a header E, said header being extended at an angle of preferably about forty-five degrees to the direction of the pipes A A, and being in the same or substantially the same horizontal plane as the said pipes A.

The pipe systems are provided with the usual and necessary connections whereby the steam may be admitted to the system from any suitable source of steam or hot-water supply, and also the connections required to secure proper drainage at the exhaust end of the system. These connections I have shown in the drawings, but as they are such as are in common use and form no part of the present invention, being merely shown incidentally in connection therewith, a detailed description thereof is deemed to be unnecessary.

While I have illustrated my pipe system as arranged in a horizontal plane, such as would be required in heating a dry-kiln or other building from beneath, still it is at once evident that the system is equally well adapted for use at the side walls of a building, in which instance the main pipes and headers, with their connecting expansion-pipes, would be arranged in the same vertical plane.

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

1. In a system of heating-pipes, the combination with the main pipes of the system, of a header disposed at an oblique angle to the direction of the main pipes, and expansion-pipes connecting the main pipes with the said header, substantially as described.

2. In a system of heating-pipes for dry-kilns or other buildings, the combination with the main pipes of the system, a header either in the same horizontal or vertical plane with the said pipes and disposed at an oblique angle to the length of the pipes, and expansion-pipes connecting the main pipes with the said header, substantially as described.

3. In a pipe system for steam or hot-water heating, a series of pipes, a header placed in the same horizontal plane with the said pipes and disposed at an oblique angle thereto, and expansion-pipes of a uniform length, connecting the main pipes with the said header, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT T. BEMIS.

Witnesses:
W. R. VAN LOAN,
FRANKLIN H. HOUGH.