

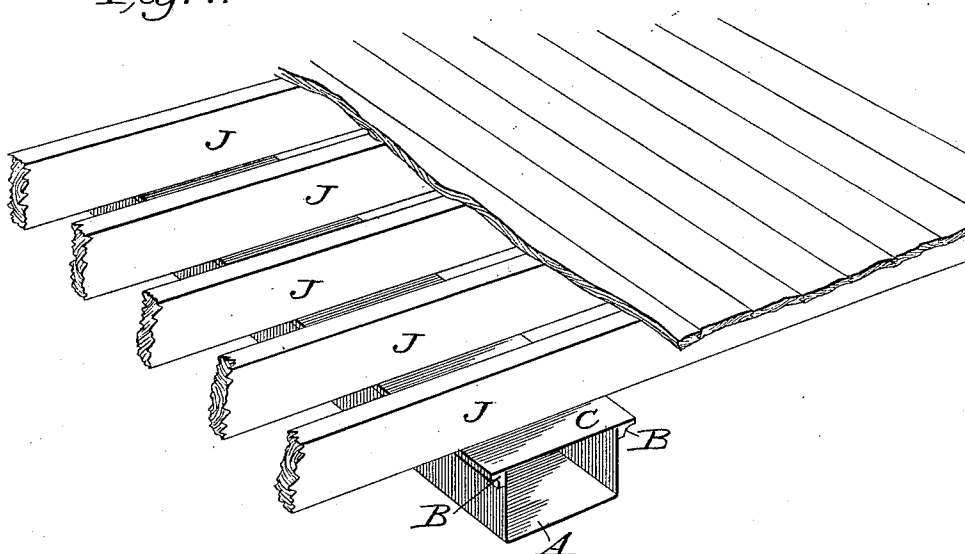
(No Model.)

J. N. LAKE.  
SHEET METAL AIR DUCT.

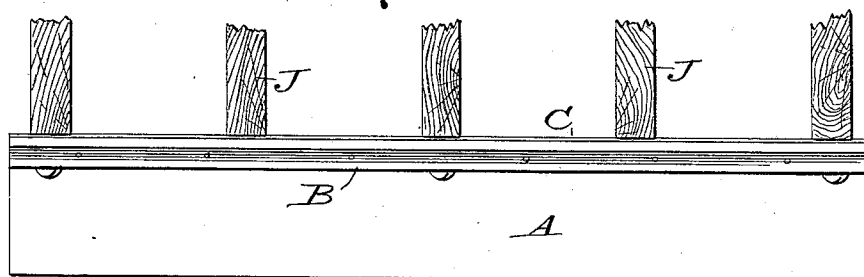
No. 481,620.

Patented Aug. 30, 1892.

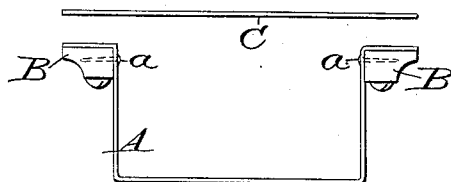
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses

James F. Duhamel  
Horace A. Dodge.

Inventor;

J. N. Lake  
by Dodgson & Sons  
Atty.

# UNITED STATES PATENT OFFICE.

JUDSON N. LAKE, OF ELMIRA, NEW YORK, ASSIGNOR TO T. C. NORTHCOTT,  
OF SAME PLACE.

## SHEET-METAL AIR-DUCT.

SPECIFICATION forming part of Letters Patent No. 481,620, dated August 30, 1892.

Application filed May 26, 1892. Serial No. 434,435. (No model.)

*To all whom it may concern:*

Be it known that I, JUDSON N. LAKE, a citizen of the United States, residing at Elmira, in the county of Chemung and State of New York, have invented certain new and useful Improvements in Sheet-Metal Air-Ducts, of which the following is a specification.

This invention relates to ducts for conducting air in buildings for heating and ventilating the same; and the invention consists in a novel construction of sheet-metal ducts and in the manner of applying or securing the ducts in place, as hereinafter more fully described.

Figure 1 is a perspective view of a portion of a floor of a building with the duct applied to the under side of the floor-joists. Fig. 2 is a side elevation of the same; and Fig. 3 is an end view of the duct, showing its construction ready to be put up.

In the warming and ventilating of school-houses and other buildings by the Ruttan-Smead system, which is now extensively used, it is necessary to convey large volumes of air to and from the various rooms of the building to and from the heating apparatus, and where the dry closets are used to them also. This necessitates the construction and use of numerous large ducts, which have to be arranged in a great variety of positions both vertically and horizontally and not unfrequently diagonally across the ceilings of basements or other rooms in order to convey the air to the points desired. When this system is applied to new buildings, the vertical ducts are usually built in the walls of brick; but even in such cases it is often necessary to use horizontal ducts also, and sometimes to provide vertical ducts where there are no brick walls in the interior of the building.

In applying the system to old buildings it is necessary to provide the entire system of ducts for the building, and as their construction of brick is expensive and in some positions impossible—as, for instance, in the case of horizontal ducts—it has become the practice to construct them of sheet metal in the form of large pipes and otherwise. As these have to be made at the factories and shipped long distances, they are expensive and on account of their great bulk very inconvenient

to transport, and, moreover, are liable to be bent, bruised, and got out of shape, giving much trouble to put them together, besides injuring their appearance when in position.

It is to remedy these various difficulties that my invention is designed; and to that end it consists in a novel method of constructing the duct and in the method or manner of securing it in position.

To accomplish these objects I take large sheets of sheet-iron or other metal, either plain or galvanized, as may be preferred, and cut them into strips or sheets of a width corresponding to the size of the duct required. These sheets I bend at a right angle at two points lengthwise, so that they will each form three sides or walls of a trough or duct, which shall be rectangular in cross-section, A in the several figures representing the sheet thus bent. I then provide strips of wooden molding B of lengths to correspond and secure one strip at each side along the edges, as shown in Fig. 3, they being fastened by nails or screws at frequent intervals to the sheet metal, thus keeping the edges and sides of the duct true and straight and preventing them from being bent, jammed, or bruised in handling and transportation. I then provide a flat sheet C of a width equal to that of the duct with the side pieces B attached, said sheet C being shown detached in Fig. 3.

In putting up the ducts the flat sheet C is first placed in position against the joists, ceiling, or wall, as the case may be, the part A then being placed against the part C, when both are fastened together and in place by means of nails or screws, which are put through the strips or moldings B and sheets C into the joists, studding, or wall.

In constructing the sections one end will be made slightly smaller than the other, so that when put up they will lap joints. If desired, the ends may be provided with holes for the reception of rivets or small bolts with nuts, by which the sections may be secured one to the other; but with proper care this will not be necessary, as the sections are formed with such accuracy as to fit snugly together and form tight joints, they usually being painted, and, if necessary, the joints may have a thin layer of stove-cement, thick paint,

or thin putty, or a thin strip of felt or cloth, preferably coated with paint, cement, or glue, inserted when the duct is put up, though, as a general rule, I have not found this necessary in practice.

By means of a machine devised for the purpose the sections are formed with great accuracy, perfectly true and straight, so that when the duct is properly put up it has a very neat appearance and a great saving in time and labor is effected. One great advantage of this construction is that the sections A can be nested or placed one inside of another to the extent of half a dozen or more when shipped, thus occupying far less space and being much less liable to being jammed, bruised, or bent out of shape. So, too, the flat sheets C can be bundled, and being perfectly flat can be shipped much more conveniently, with a great saving of space and cost as compared with the tubes or ducts heretofore used. Another advantage of this plan is that the ducts can all be made up in sections at the factory, and on account of their greater convenience of shipment, as above described, can be sent wherever needed, no matter what the distance, thereby avoiding the necessity, which frequently occurs, of having them made where used by tinnerns or others who, not having the necessary machines or facilities for such work, produce an inferior article and generally at a higher cost. By this improvement all these and similar difficulties are overcome, the cost reduced, and a much better and neater appearing article produced.

It is obvious that, if desired, the upper edges of the part A may be bent out at a right angle, thus forming a flange along each edge, and the strips B be applied when the duct is placed in position, the strips B in such case being made longer than the sections, this modification being shown by the dotted lines in Fig. 3. In that case of course the strips B need not be nailed to the sides of the part A, as the screws or nails used to fasten the duct in place will

pass through the strips B, the flanges of A, and the sheet C, thus uniting the whole. It is simply a matter of choice, the flanges requiring a little more metal, which in turn is compensated for by the saving of the nails and labor required to fasten the strips to the sides of the part A in advance. So, too, it is obvious that, instead of bending the sheet so as to form a duct that is rectangular in cross-section, it may be bent so as to form a semicircle or a half-oval, or it may be bent to form a series of lesser angles, and thus produce a duct that will be polygonal on its exterior, thus producing a more ornamental exterior, which may be desirable in some cases—as, for instance, where the duct has to be located in an occupied room—or it may be formed with longitudinal grooves or corrugations, so that when placed upright against the wall of a room it will have the appearance of a fluted pilaster or column, in which case it may be provided with an ornamental sheet-metal base and cap, if desired.

Having thus described my invention, what I claim is—

1. A sheet-metal duct composed of the part A, bent to the form necessary to form the body of the duct, (of any preferred form in cross-section,) and the plain sheet C, with the strips B, all combined substantially as shown and described.

2. The improvement in the construction of air-ducts, which consists in forming the body of the duct of a sheet of metal bent into a trough-like form, closing its open side by a flat sheet of metal, and securing the whole in place by means of the side strips B, substantially as herein set forth.

In witness whereof I hereunto set my hand in the presence of two witnesses.

JUDSON N. LAKE.

Witnesses:

L. D. SHOEMAKER,  
A. R. PRAY.