No. 883,951. PATENTED APR. 7, 1908.

F. W. GREEN.

APPARATUS FOR HEATING AIR.

APPLICATION FILED JULY 13, 1904.

Fig. 1.

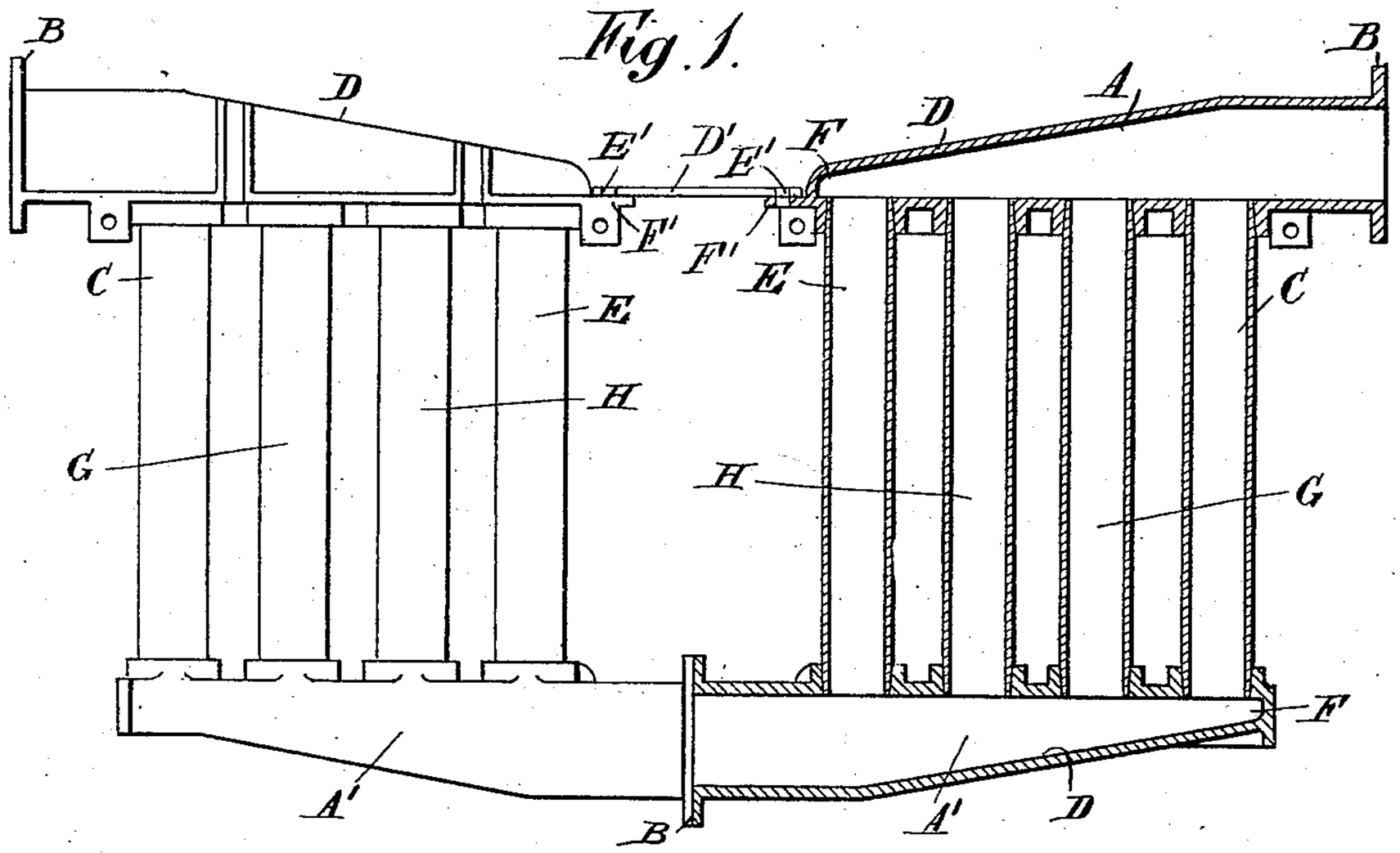
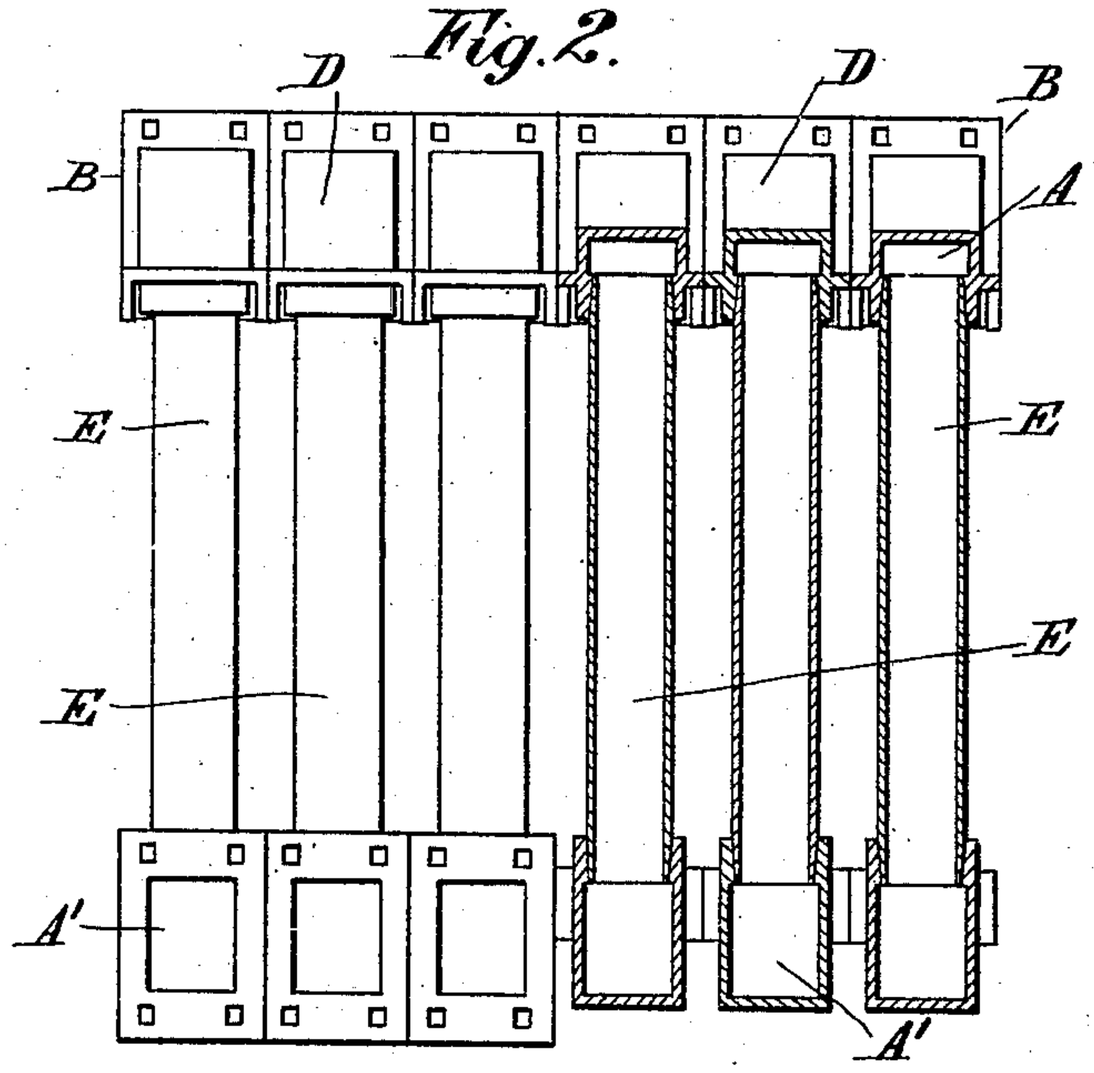


Fig. 2.



Witnesses:
Thos. J. Byrnes.
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F. W. Green,
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by Kerr, Page & Cooper, Attys.

UNITED STATES PATENT OFFICE.

FRANCIS WILLIAM GREEN, OF WAKEFIELD, ENGLAND.

APPARATUS FOR HEATING AIR.

No. 883,951. Specification of Letters Patent. Patented April 7, 1908.

Application filed July 13, 1904. Serial No. 216,330.

To all whom it may concern:

Be it known that I, FRANCIS WILLIAM GREEN, a subject of the King of Great Britain, residing at Economizer Works, Wakefield, Yorkshire, England, have invented certain new and useful Improvements in Apparatus for Heating Air, of which the following is a specification, reference being had to the drawing accompanying and forming part of the same.

My invention relates to apparatus for heating air, more particularly an apparatus of the type in which the air to be heated is divided by means of pipes or conduits, suitably arranged, into a plurality of streams or currents. The apparatus is located in the path of a heating medium, such as the hot products of combustion from a furnace, so that the hot gases composing the same will bathe the various conduits and headers of the apparatus and so impart heat to the air flowing therethrough.

The object of my invention is to provide an apparatus of this kind which shall be simple and inexpensive to manufacture and withal efficient and economical in operation.

To these ends the invention consists of the novel features of construction, arrangements of parts, and combinations of elements hereinafter described and more particularly set forth in the claims.

For a more detailed explanation of my invention reference may now be had to the annexed drawing, in which

Figure 1 is a side elevation of the apparatus, one-half thereof being shown in section, and Fig. 2 is an end view of a half of the apparatus, partly in section, showing a number of sections arranged side by side.

The headers or boxes to which the distributing pipes or conduits are connected are indicated by A, A′. Each box is preferably rectangular in cross section, as opposed to a circular form, and is provided at one end with a flange B by which it may be connected to the supply or discharge pipe, as the case may be. On one side of the box is a plurality of openings, as, for example, four, to receive the distributing pipes which divide the air into a plurality of streams or currents. From the flange B to the position occupied by the first pipe, C, the walls of the box are parallel, as shown clearly in Fig. 1. From the first pipe, C, the opposite wall is given a gradual slope, as shown at D, to the last pipe E, where it is curved, as at F, to meet the other wall. It is desirable that the opening at the flange B and the capacity of the box throughout should be such that the velocity of the air therethrough will be substantially the same as in the pipes E, C, G, H. For this purpose the cross section of the box is made progressively smaller from the first pipe C to the last E by sloping the wall D, as just described, the slope thereof being so proportioned that the increased capacity of the header or box over each succeeding pipe is sufficient to permit the air flowing from or into such pipe to pass without material change in its velocity. This plan effectually obviates conflicting eddy currents which otherwise would seriously interfere with the efficient operation of the apparatus. Even a slight eddying which might occur at the extreme end of the box is obviated or largely reduced by the curving of the same at the point F.

The apparatus is assembled preferably in the manner shown in the drawing. The boxes constituting the bottom header are arranged with the flanges B together, as shown clearly in Fig. 1, and with the pipe openings upward. At the upper ends of the pipes the upper headers are connected, with their flanged ends extending outwardly. A number of such sections are arranged side by side, as shown in Fig. 2, so that a stream of air flowing along a conduit connected at its side with the upper box at one end of the apparatus will enter all the boxes at the same time, and flowing therethrough will pass downward through the pipes E, C, G, H, to the first set of lower boxes. Thence to the second set of lower boxes, up through the second set of pipes to the outlet boxes at the other end of the apparatus, from which the air passes to the conduit which leads to the point of utilization.

As a convenient means for rigidly connecting the upper headers in proper relation to each other, I provide the closed end of each of the same with a laterally projecting bracket F′, the brackets being connected by means of a plate or tie-strap D′, the respective ends of the latter resting on and being secured to said brackets by rivets, or other fastening devices, as indicated at E′.

It will be understood, of course, that the embodiment herein described is merely the preferred form of my invention, which may

be variously embodied without departing from its proper scope.

What I claim is:

In an air-heating apparatus, a pair of inlet and outlet headers arranged in longitudinal alinement, each header consisting of a hollow body rectangular in cross section and having a straight wall formed with flue receiving openings, the wall of each header opposite to said straight wall being inclined from the open end of the header toward its closed end, the reduced ends of said headers being disposed adjacent each other, and each formed with a bracket, a plate secured to said brackets to rigidly connect said headers, a connecting header spaced apart from and parallel to said inlet and outlet headers, consisting of a hollow body having a straight side disposed parallel to the inlet and outlet headers and formed with flue receiving openings alining with those in the other headers, said connecting header being formed with the wall opposite to its straight side, inclined from its central portion toward its opposite ends, and flues secured at their opposite ends in said flue receiving openings.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANCIS WILLIAM GREEN.

Witnesses:
GEORGE FERGUSON,
WILLIAM HARRISON.