



Marland's Improvement for Utilising the Heat of Boiler Furnaces. Fig. 3.—A Longitudinal Section, showing the Passages through which the Hot and Cold Air Passes, together with the Bridge Walls and Furnaces.

shows more clearly the relationships of the various parts, especially the passages A and B, in which the gases travel in opposite directions, separated only by thin metal partitions. A₁ and A₂ are bridge walls, F and I the passages through which the air enters, and C the "front connection" by which the air is conducted to the exhaust fan.

We cannot present the whole of Mr. Hoadley's remarks and calculations upon the value of this apparatus. The greater portion of his report is of a character too highly scientific to be specially interesting to our readers. It is enough to say, however, that he considers a setting of the kind capable of producing a very high degree of economy, since it makes it possible to reduce the temperature of the products of combustion to a point far below that necessary to produce a draft by means of a chimney. Of course this is not all gain, because some power is required to move the blowers, but careful investigation shows that this power does not begin to absorb all of the saving which may be effected. It is estimated that the gases when they leave the boiler must be at least 75 degrees hotter than the temperature

due to the pressure of steam. It would give for 80 pounds steam pressure, a temperature of about 400 degrees for the escaping gases. Actual practice shows that the temperatures of these gases vary from 500 degrees up to 1000. Mr. Hoadley is of the opinion that by Marland's plan the temperature of these outgoing gases may be reduced to that of the external air, or say 60° F. It appears, then, that under ordinary circumstances from 16 to 20 per cent. of the total quantity of heat produced by the combustion of anthracite coal, can certainly be saved and returned to the furnace by the Marland apparatus, judiciously arranged and proportioned; that under no circumstances can such saving fall so low as 10 per cent.; and that it will often be 25 per cent., and may, in extreme cases, reach 30 per cent. Finally, Mr. Hoadley thinks that with this apparatus all good boilers using steam at 80 pounds pressure can be made to show a degree of efficiency indicated by the conversion of water at 60 degrees to steam of 324 degrees (80 pounds steam gauge), with a consumption of one pound of coal to ten pounds of water, the coal being supposed to contain five-sixths of its weight in carbon.