

CANADIAN  
ELECTRICAL NEWS

AND  
STEAM ENGINEERING JOURNAL.

Vol. I.

TORONTO AND MONTREAL, CANADA, JUNE, 1891.

No. 6.

S. R. EARLE'S AIR AND STEAM INJECTORS.

THIS device, invented by Mr. S. R. Earle, of Belleville, Ont., is for the better combustion of fuel in furnaces connected with steam boilers, enabling any one to use a cheap grade of fuel such as waste coal, hard and soft coal screenings, tan bark, saw dust, &c. It takes the place of fans for creating a forced draught, using, it is claimed, a much smaller amount of steam, and is very desirable in any place where the draught is poor. It will also be found advantageous where even the best fuel is used, but is especially adapted to burn hard coal screenings, maintaining as strong a blast as desired. The injector is built in the wall of the furnace, the nozzle passing underneath the grate bars. The ash chamber having been made tight, the air and steam is compressed in the ash chamber, the commingled air and steam passing through the ignited fuel, the steam being converted into hydrogen gas. This mingled with the air is the hottest fuel known. The steam is not lost as applied in operating fans, but is turned into fuel after creating the blast.

The air injector (Fig. 1) shows the device as applied to the side wall of a furnace, this circumstance being an exceedingly convenient feature of its application and necessitates no structural change of any furnace to which it may be applied, and it is entirely out of the way. The device consists of a tapering section of an injecting tube having a straight portion or neck at the smaller end, preferably, an outward peripheral flange, to which is connected a flaring, round, oval, or elliptical tubular discharge section, having, preferably, a flange, which is bolted to a flange to allow the straight outlet to be removed and an elbow section having a flaring mouth substituted to adapt the injector to suit marine and locomotive boilers. The larger end of the tapering section of the injecting tube is closed by a cap. A series of perforations are made in the periphery of the tapering section, near the larger end, to admit air into the injector. The injector is preferably of oval or elliptical shape in cross section throughout its length to obtain better distribution of the commingled air and steam, especially in furnaces of large size. A steam pipe enters the tube through the outer or closed end, terminating with a series of branches, each having a small orifice to discharge a small jet of steam into the injector

longitudinally, and the branches extend past the series of perforations and cause an induced current or indraft of air, which becomes incorporated with the steam to assist combustion while passing through the fuel. The noise caused by the discharge of a considerable jet of steam against the air in the injector is greatly moderated by smaller steam jets more or less distributed. A bell shaped hood surrounds the larger end of the tubular section and peripherally incloses the series of air perforations. The open end of this hood projects beyond the larger end of the injector and is provided with doors, closing over the end cap, the hood, when the doors are closed, preventing direct indraft through

the perforations, to economize fuel when the fire is banked or slow combustion desired after the steam valve has been closed. The middle portion of the injector is embedded in the wall of the furnace below the bars. The commingled steam and air discharged from the injector pass up between the furnace bars and through the fuel to promote combustion. The perforated portion of the injector projects from the outer face of the wall of the furnace to allow air to freely enter the perforations, and by embedding the middle portion of the injector in the wall of the furnace the noise of the steam and air passing through the injector is lessened, and an objectionable feature thereby removed. This is one of the simplest as well as the most satisfactory injectors of its class yet designed.

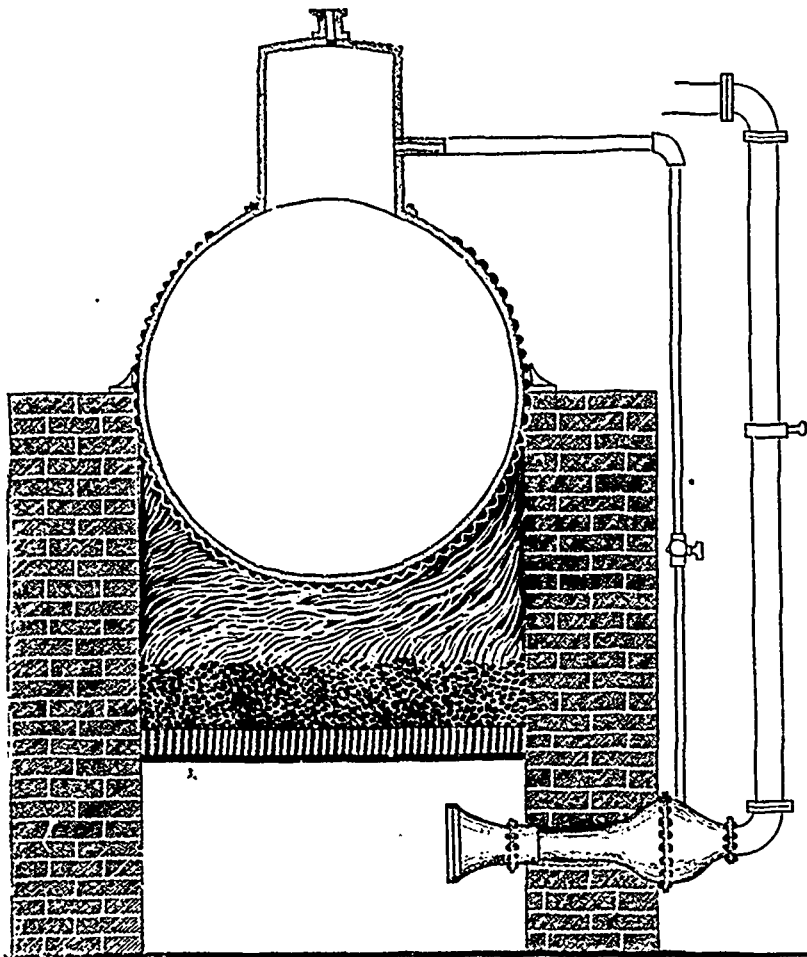


FIG. 1.

Fig. 3 is the combined air injector and exhaustor, and will do all that the air injector will, and in addition will exhaust the gases from mines, ventilate ships, buildings, etc. This machine is practically noiseless when applied as shown in Fig. 1.

These machines have been in successful operation for some months, and are now working boilers, driving electric light plants and other machinery, also operating gas-producer cupolas, one of which may be seen working at the Consumers' Gas Company, Toronto, Ont.

Fig. 4 is the grate bar used in burning hard coal screenings, sawdust, tanbark, or any fine fuel.

The town of Port Arthur invites tenders until the 15th inst. for the purchase of \$75,000 of debentures. The money realized is intended to be expended in building, equipping and operating an electric street railway.