

draft apparatus substituted for the chimney and placed above the economizer connections. Each of the two fans is driven by a special engine, direct-connected to the fan shaft, and each is capable of producing draft for the entire plant. A short steel plate stack unites the two fan outlets and discharges the gases just above the boiler house roof. All of the room necessary for the chimney is saved, and no valuable space is required for the fans.

COST OF BOILER PLANT WITH CHIMNEY.

12 boilers .....	\$37,000
2 economizers .....	10,500
Boiler and economizer settings and by-passes.....	9,000
Automatic damper regulators and dampers.....	400
Chimney, including foundations .....	10,700
Boiler house .....	11,500

Total..... \$79,100

RELATIVE COSTS.  
CHIMNEY DRAFT.

Cost of chimney .....	\$10,700
Cost of damper regulators and dampers.....	400
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	\$11,100

MECHANICAL DRAFT.

Cost of mechanical draft plant, complete.....	\$ 4,700
Saving by using mechanical draft.....	6,400
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	\$11,100

matic control, will be somewhat less than that with the chimney, while if the economizers remain the same, their capacity relative to the heating surface of the boilers will be greater, so that the ultimate waste by heat in the escaping gases will certainly not be increased.

RELATIVE COSTS.

2,400 NOMINAL H.P. PLANT, WITH CHIMNEY DRAFT.

12 boilers .....	\$37,000
2 economizers .....	10,500
Boiler and economizer settings and by-passes.....	9,000
Automatic damper regulators and dampers.....	400
Chimney, including foundations .....	10,700
Boiler house .....	11,500

\$79 00

2,000 NOMINAL H.P. PLANT, WITH MECHANICAL DRAFT.

10 boilers .....	\$30,833
2 economizers .....	10,500
Boiler and economizer settings and by-passes.....	8,500
Boiler house .....	11,000
Mechanical draft plant complete.....	4,700
Saving by using mechanical draft.....	13,567

\$79,100

The original costs under the two conditions will be about as indicated. A total possible saving of \$13,567 is thus shown, of which \$7,167 is due to the reduction in nominal horse-power made possible by the introduction of mechanical draft.

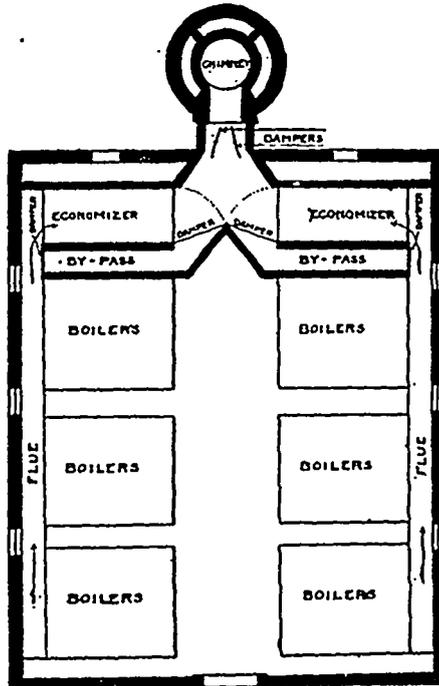


FIG. 5. 2400 H.P., BOILER PLANT EQUIPPED WITH CHIMNEY DRAFT.

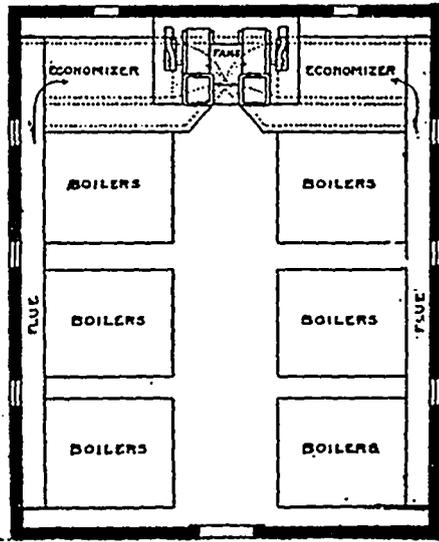


FIG. 6. 2400 H.P., BOILER PLANT EQUIPPED WITH MECHANICAL DRAFT.

The comparatively low rates of combustion which have heretofore obtained are largely due to the inability of the ordinary chimney to overcome the increased resistances incident to the maintenance of a higher rate. Boilers have naturally been proportioned to meet these conditions, but it is manifest that by changes in design or by the introduction of heat-abstractors, they may, under the influence of mechanical draft, be readily operated at considerably above their original ratings, with substantially the same efficiency. As a result it is possible to obtain a given output with a plant of less size and first cost than is possible with a chimney. This is particularly true where the steam consumption is liable to sudden fluctuations for comparatively short periods. The typical boiler plant already presented will serve as an excellent illustration. Suppose it is determined to omit two of the 12 boilers, say one from each pair at the end farthest from the economizers, and to force the remaining boilers up to the original rating, which can be easily done by mechanical means, as a substitute for the chimney. This will decrease the rating to 2,000 h.p. or by 16-2-3 per cent. The volume of air required per pound of coal, with the higher combustion rate, deeper fires and mechanical draft under auto-

A problem that has to be faced sooner or later in most boiler plants is that of increased capacity. This differs from that just presented in that the chimney already exists, and it becomes a question whether the desired result shall be obtained by forcing the existing boilers or by adding to their number. The former method demands an increase in intensity of draft, which with a given chimney, operating well up to its capacity can only be obtained by considerable increase of height at excessive expense, while with either method a larger volume of air is required. As a result, increased output frequently demands not only more boilers, but a new or higher chimney. Here mechanical draft steps in and presents a simple solution of the problem.

(To be continued).

A NEW DRILL.

The accompanying engraving represents an invention, which has recently been patented by the Hon. Henry Aylmer, Richmond, Que., in the principal countries of the world. It is a very simple device, and as shown the stock of the drill has a