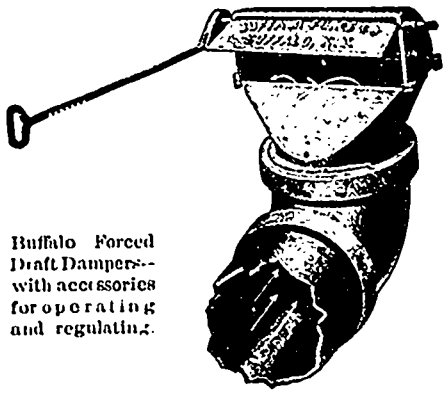
at which the weight of air handled is a maximum. Hence it will be seen that a chimney fixes once for all the maximum power of the boiler plant. If the heating surface is such as to allow the gases to pass away at a greater temperature than at a critical one for the particular chimney, great unnecessary waste is entailed, whereas if the products of combustion are cooled to a lower temperature by the heating surfaces, the



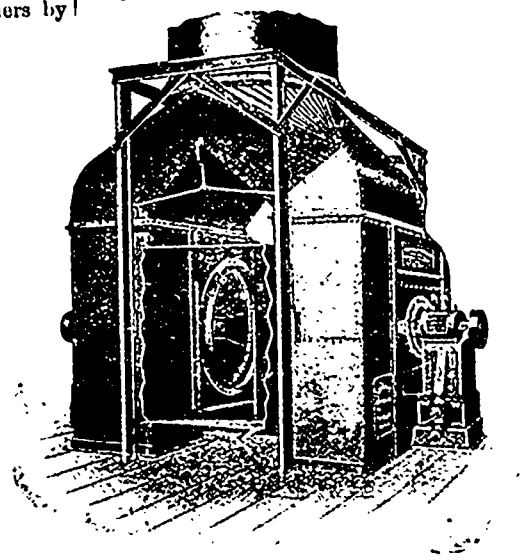
Buffalo Forced Draft Dampers—with accessories for operating and regulating.

intensity of draft, the rapidity of combustion, and hence the furnace efficiency, is correspondingly reduced. If considerations of economy demand an economizer or feed water heater, it is found that to obtain the necessary draft a chimney more than 200 feet high is necessary.

Large chimneys require heavy substantial foundations, often with extensive piling. They occupy a ground space in many cases of great value. They are invariably expensive, and the interest on the fixed capital represented thereby is considerable. Tall chimneys must be protected from lightning, and they sometimes annoy their owners by toppling over when the wind blows more angrily than usual.

A chimney, once built, in addition to limiting the boiler capacity, as we have seen, is subject to atmospheric conditions which cause a fluctuation of its draft. An increasing external temperature not only lowers the draft intensity, but it also increases the volume of air which must be handled in order that a given weight of oxygen may be supplied to the fuel. Varying barometric and hygrometric conditions likewise have their effect. For instance, the effective heat of the furnace is reduced by an amount necessary to vaporize the moisture entering with the air, and hence when the amount of moisture is great it would necessitate an increased rapidity of combustion and consequently a more rapid supply of air in order to secure the proper furnace temperature. For this the chimney is unable to provide.

When we speak of a chimney it almost invariably calls to mind the picture of a stack belching forth dense volumes of smoke. This may be termed as an inherent source of waste of a chimney, and is due to finely divided particles of carbon in the gases becoming chilled below their ignition temperature before coming in contact with oxygen, or in other words, is due to imperfect combustion. This defect of a chimney, together with its inability to efficiently burn low grades of fuel, arise from a defective air supply, that is, it is the same old story of



Buffalo Induced Fans,
with double enclosed engines, connections to stack, supporting frame work fan wheels overhung, water-cooled bearings.