THE STIRLING WATER-TUBE BOILER

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FOREWORD

THE selection of steam boilers is a matter which is worthy of the most careful thought and attention. While some purchasers of boilers give this important subject proper consideration, there are many who accept as entirely satisfactory those boilers with which they have had experience, or who buy the cheapest after little or no investigation. Purchasers of the latter class often carefully consider the comparative economy and reliability of engines and auxiliaries, so that in some steam plants we find refinements of economy and convenience in the engines and auxiliaries, while the boilers may be wasteful in operation and deficient in the essentials of simplicity, economy and adaptability to the service for which they are used. While refinements in engine economies add materially to the first cost of the plant, the best boiler may frequently be purchased at a cost comparatively little above that of an inferior one, and will effect a greater saving for a given increase in cost than could possibly be obtained by installing a more efficient engine.

The special requirements of each individual case should be carefully considered before determining the general type of the boiler needed. After the general type has been decided upon, the most important features to be considered are safety, efficiency, durability and accessibility. Of almost equal importance are the experience, skill, financial responsibility and reputation of the manufacturers.

The method of supporting the boiler should provide for the free expansion of the component parts under changes of temperature without introducing unequal strains. The circulation should be such as to keep all parts at practically the same temperature. All parts of the boiler should be so accessible for inspection as to prohibit the possibility of concealed corrosion.

Baffles should be so designed that they cannot be easily damaged or displaced in service or by gas explosions, and should be so accessible that if a defect be discovered it may be readily repaired without removing tubes or any part of the setting.

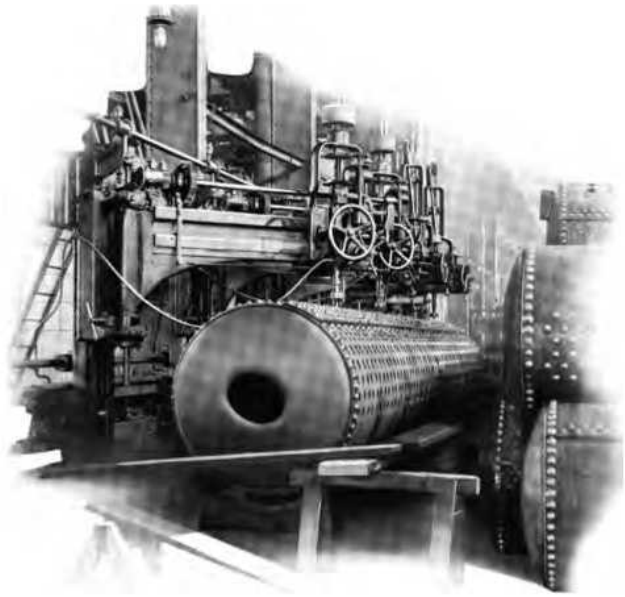
The arrangement of tubes should be such that any tube may be removed and replaced without disturbing any other tube. The spacing should allow the free passage of the gases around each tube so as to avoid the possibility of the gases being throttled or of the spaces becoming clogged by deposits of soot. Sufficient steam and water capacity should be provided to insure dry steam under widely varying load conditions.

Riveted seams should not be placed in the path of the hottest gases. There should be no possibility of steam or air pockets at points exposed to intense heat. Tubes that may become overheated in case of low water should not be used as stays. Staybolts are wholly objectionable. The sole useful purpose which a staybolt serves in a stationary boiler is to make it possible to use a cheap form of construction. Check valves or other delicate mechanical devices should not be used in the interior of a boiler.

BLACKSTONE HOTEL, CHICAGO, ILL., OPERATING 1012 HORSE-POWER OF STIRLING BOILERS

Large flat surfaces, stayed or unstayed, are among the most dangerous and otherwise objectionable features in boiler construction and should not be used in any boiler carrying the high pressures now common in modern steam plants.

Another objection to flat stayed surfaces is that in vertical water-tube boilers the flat surfaces are usually so located as to form a convenient lodging place for flue dust. The flue dust fuses into a hard mass which is difficult to remove,



and which, on account of its non-conductivity, destroys the effectiveness of that portion of the heating surface. Further, such an accumulation increases the chance of corrosion without the possibility of detection. The stays collect scale and mud and increase the difficulty and expense of cleaning.

The life of a good boiler is variable, depending upon the attention it receives, but a modern, properly designed water-tube boiler should be capable of standing the test of a long period of years without material reduction in its margin of safety and economy.