The construction and arrangement of steam jackets so as to prevent or avoid undue strains and tendencies toward leakage, is very important, and it is pretty safe to say that there are few adjuncts of the steam engine requiring so much attention and careful thought both by the builder and the operator, in proportion to the benefits derived, as the steam jacket. It is really a necessary nuisance.

The receivers with heating coils, situated in the track of the steam in transit from cylinder to cylinder should be of liberal dimensions so as to distort the steam distribution as little as practicable; and, in fact, the distribution of the reheating steam throughout the jackets and receiver coils should be brought to and carried at a point which will give the most economical temperature to the working steam at the different points and pressures, keeping the working steam as dry as possible and avoiding so far as practicable the sending of superheated steam to the condenser.

The main pumps constituting the water end of the machine, are made in various ways and to suit the general design, what is known as the straight flow pump to my mind is the latest and best arrangement—the water passing direct to suction chambers, steel valve decks set vertically between suction and pump chambers and discharge chambers, valve cages bolted securely to valve decks. This arrangement is very simple and gets rid of a large amount of friction, but it is a good rule to follow plain forms and arrangements with pump. The normal action of a pump taking and discharging water is an extremely simple one, as natural as an animal breathing, and, indeed, almost the same sort of a performance, so that it is important to have ample water way of easy and natural shapes, obstructing the flow as little as possible, and conforming to the known characteristics of water in motion as far as may be, thus aiding to raise the mechanical efficiency of the pumping engine as a machine doing work, to the highest attainable point.

Examples may be seen in which the mechanical efficiency is as high as 96%, that is the work accounted for and shown as useful amounts to 96% of the total indicated steam power developed.

The pump valves are, of course, highly important details and in general practice have been brought down at the present day, to plain rubber discs, rather hard and of moderate size, supported by brass gratings of circular form, with radial ribs to support the center of the seat. The valve springs are made of the very best spring wire, valve plates for springs have been done away with as they have been the cause of more harm than good. The area of pump valve openings are a subject which has led to many arguments and disputes during the