

either of these valves be in some cases dispensed with?

70. What are marine governors? What is their general construction? How do they act?

71. With a surface condenser and a single-acting air-pump, what is the effect of a leaky foot-valve; and what is the effect of a leaky bucket when there is also a foot-valve?

72. Where is the air-pump pet cock or valve placed? How does it act? What is its object? Does it in every case reduce the effective capacity of the pump? Is it equally applicable to double-acting pumps?

73. At what temperature is the hot well worked? What is the effect of higher temperatures? What is the effect of lower temperatures? What limits the lowness of temperature? Has a very low temperature any disadvantages?

74. Bilge-injection with jet condensers: What are the fittings required? When is it used? What precautions are necessary in using it?

75. When surface condensers are used, what takes the place of the bilge-injection? To what is the connection made? How is its valve formed? Why is this necessary?

76. What are the practical guides to the proper amount of opening of the inlet-valve for the circulating-pump?

77. Feed-pump pet cock or valve: Where is it placed? What is its use? How does it act? Is it always a necessary fitting?

78. What are some of the ways of fastening the ends of surface-condenser tubes? About what size and about what thickness are condenser-tubes? What parts of a surface condenser are made of brass?

79. What is a blow-through valve or cock? To what is it attached? There is sometimes a valve that when opened admits steam from the slide-valve casing to the exhaust port: What is its use? To which cylinder is it fitted?

80. What are snifting-valves? Why are they generally omitted now?

81. What connections are generally fitted to the donkey-pump, and to what services can it be applied?

82. When the engines are stopped in harbour with steam up, what are to be shut and what are to be opened?

83. How is an engine heated up before starting? What precautionary examinations are made before starting?

84. What is an interceptor or catch-water? Where is it fixed, what is its construction, how does it act, and what attention does it require?

85. Describe an air-pump bucket with its valve or valves and its packing. Of what are the valves generally made?

86. Of what materials are air-pump rods made? Why so?

87. What is the racing of the engine? When does it occur? What danger attaches to it? What is done to prevent it?

88. When under way, when the air-pump bucket is at the top of its stroke, at what height is the water in the condenser?

89. What is meant by the "pitch" of a screw propeller? How is it measured?

90. Explain the difference between a "right-hand" and a "left-hand" propeller, and state how each of them revolves.

91. What is the slip of a screw propeller? How is its amount expressed in figures?

92. Which of the valves about engines and boilers have to be worked by hand, which of them work self-actingly, and which are worked by the motion of the engine?

93. Why is soda sometimes put into a boiler, and how is it put in when under way? What is the kind of soda used?

94. Tallow-cups for cylinders were sometimes made with two small cocks, or with only one small cock, or with one large hollow plug-cock, or with one small cock and a valve: which of these are suitable for a high-pressure cylinder, and which for the cylinder of a condensing-engine? Describe how the cup with only one small cock is used. What is now generally used instead of these? How has this change come about?

95. Does a cylinder escape-valve, self-acting, allow all the water to escape; if not, how much is left in the cylinder?

96. What is a "steam lubricator" (sometimes called an "impermeator")? Explain its action. To what part of the engine is it connected? Whether will throwing cold water over it make it work faster or slower? Describe the one used in your last steamer.

97. A common paddle-wheel: Of what is the centre made? Of what are the arms formed? What is the form of the bolts which attach the floats to the arms? How are the arms attached to the centres?

98. Why have some paddle-wheels one or more cast-iron floats in each wheel? With what engines are these most required? At what part of the circumference are they placed?

99. Why are paddle-wheel floats sometimes made of different breadths in the same wheel? With what description of engine is this most needed? Where are the broad floats placed, and where are the narrow floats placed in the circumference of the wheel?

100. What difference is there between a radial paddle-wheel and one with feathering floats? What is the object of feathering floats? Are all the eccentric rods attached in the same way, and are they all of the same form?

101. Whereabout is the centre of the eccentric of a paddle-wheel with feathering floats placed? In that case are the feathering levers on the striking-face or on the back of the float? When the paddle-shaft has an outer bearing, how is the eccentric made?

102. Of what materials are the working-surfaces of a paddle-wheel with feathering floats? How are they lubricated?

103. What is a "disconnecting paddle-engine"? At what place is the disconnecting effected? How is it accomplished? In which of the cranks of a disconnecting engine are the crank-pins fixed?

104. Whether is link-motion valve-gear or the loose eccentric generally used for disconnecting paddle-engines? For what steamers are disconnecting paddle-engines frequently employed?

105. What are expansion joints? Where are they necessary? What attention do they require? Of what should the working-surfaces be made?

106. What omission in the construction of expansion joints may lead to a serious accident when steam is first applied? How is this prevented in the construction of a steam trunnion-pipe for an oscillating-engine?

107. Describe an oil-cup with a siphon worsted. How is the worsted arranged? How is it cleaned? How far down the tube does it extend?