We mean such a mechanism as shall enable the steam commander to set ont on a long voyage deeply laden, with a small diameter of paddle-wheel ; that is, with the paddle boards near to the axis, and to in­crease the (effective) diameter of the paddle, that is, to remove the paddle-boards farther from the axis, as the vessel proceeds on her voyage and is lightened by the consumption of coal. The invention of a durable, eco­nomical, and safe apparatus still remains to be made. In the infancy of steam-navigation, Mr Buchanan of Glasgow published an account and drawing of a reefing paddle ; Messrs Bolton and Watt are also in possession of a very old method of reefing paddles ; the Society of Arts in Scotland offered a prize several years ago for the inven­tion, without obtaining, out of many plans, one to be re­commended for practice ; and, finally, the indefatigable inventor, Mr Hall of Basford, has patented a very elegant mechanism for the same purpose. It still, however, re­mains to introduce and establish a perfect reefing appa­ratus, and the author of such a system will render the common paddle-wheel a perfect propeller.

*The following Table exhibits a comparative view of the Size and Power of six of the largest of the recently constructed Vessels for Transatlantic navigation.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NAME OF VESSELS.** | | | | | |
| British Queen | President | New York. | Great Western. | Liverpool. | Acadia.\* |
|  | Ft. In. | Ft. In. | Ft. In. | Ft In. | Ft In. | Ft. In. |
| Length from Figure Head to Taffrail, | 275 0 | 273 0 | 233 0 | 240 0 | 234 0 | 228 0 |
| Length of Upper Deck, | 245 0 | 243 0 | 0 0 | 0 0 | 212 0 | 206 0 |
| Breadth within the Paddle-Boxes, | 40 0 | 41 0 | 36 6 | 0 0 |  | 34 4 |
| Breadth over all, | 61 0 | 68 0 | 60 0 | 57 0 | 58 4 | 56 0 |
| Depth of Hold, | 27 0 | 30 0 | 22 0 | 20 0 | 23 3 | 22 6 |
| Diameter of Paddle-Wheels | 31 0 | 30 0 | 0 0 | 0 0 | 28 0 | 28 0 |
| Diameter of Engine Cylinder, | 6 51/2 | 7 6 | 0 0 | 0 0 | 6 I | 6 0 |
| Length of Stroke, | 7 0 | 7 6 | 0 0 | 0 0 | 7 0 | 6 10 |
| Power of Engines, . | 500 h p. | 600 h. p. | 0 0 | 460 h. p. | 450 h p. |  |

\* The three other North American Royal mail steam-ships Britannia, Caledonia, and Columbus, are of the same dimensions as the Acadia.

DESCRIPTION OF THE PLATES ON STEAM-ENGINE AND STEAM NAVIGATION.

Plate cccclxviii. Figs. 1 and 2. These figures ex­hibit a front and side elevation of one of the simplest forms of the non-condensing steam-engine. Its prin­cipal parts are the cylinder A, the piston-rod P *p,* and connecting rod *p* K, acting directly upon the crank K X, and fly-wheel W W. Besides these there are only an eccentric and valve-rod *xx x,* and governor *w w.* Two columns and an entablature support one extremity of the crank axle, and give attachment to minor ap­pendages. The other extremity of the axle rests on the wall of the building. To the columns is attached *g g,* a guide for the top of the piston-rod. The feed-pump *fff,* is worked by an eccentric on the crank-shaft.

Figs. 3 and 4. The form of engine here exhibited, is of still greater mathematical simplicity than the last, al­though its mechanical arrangements are probably more intricate. In this engine no member intervenes between the piston-rod and the crank. A cross-head carried by the piston-rod, open in the centre, permits the crank-pin, in its circle of rotation, to oscillate freely on alternate sides of the piston; and being itself powerfully confined to motion in the vertical direction only, by the slides on the columns of the framing, the vertical motion of the piston-rod is precluded from the production of any other dynamical effect than the most direct of all possible con­versions of rectilineal into rotatory motion. The cross­head is marked H H in the figure, the columns being marked *m m.* The other letters refer to the same parts as in the last figure.

Figs. 5 and 6. In these figures the high-pressure en­gine is represented in its most improved form for sta­tionary purposes. It is analogous, in the arrangement of its principal parts, to the usual construction of Bolton and Watt's condensing-engine. A cast-iron base sup­porting six columns and an entablature, forms a framing upon which the parts of the engine are distributed, so as to form what is called a Portable Engine, being entirely independent of the building in which it may happen to be placed. At one extremity of the base is placed the cylinder A A, and at the other the crank­-axle X, and fly-wheel W W. The motion is transferred from the piston P *p,* through the great lever L L L, and connecting rod or crank-rod L K. The feed-pump *f f* is in this instance worked from the point *m* of the paral­lel motion, in the way generally adopted in condensing engines for working the air-pump, whose place in fact it here occupies. The valve is a short D-slide, worked by eccentric gear, *x x x x.* S is the steam-pipe. The educ­tion pipes E are seen descending on both sides of the valve-casing; they unite in a common chamber beneath the cylinder, whence a pipe conveys the educted steam to the chimney, or to serve some other purpose, as the case may be. The governor acts as in the previous case. This drawing is taken from the form of engine manufac­tured by Messrs Caird and Company.

Figs. 7 and 8 is a form of the upright condensing en­gine manufactured by Messrs Carmichael of Dundee, and successfully applied by them to various purposes. It is compact and has been found to work well.

The cylinder A A is placed upon the floor, and on either side of it stands a cast iron column. These co­lumns are hollow and are used as steam-pipes, S S S S, to convey the steam to the jacket of the cylinder, from which it finds its way into the valve-chest D. On the top of the columns is a cross-beam sustaining the crank axle, and the columns support guides m *m m m,* on which, by means of wheels *g g,* and a cross-head *g p g,* the piston-rod P *p* is maintained in its vertical position, so that the connecting rod *p* K is directly attached to the crank-pin K. The air-pump G is worked from the crank­shaft by means of a second crank or bend, and an eccen­tric a: ,r works directly the slide valve; *ff* is the feed­pump for the boiler, worked directly from the air-pump cross-head ; *w w w w* is the governor, with its appenda­ges ; C is the condenser ; N the cold well.

Plate cccclxix. In fig. 1. of this plate we have given a sectional elevation of a land-engine of twenty- five inch cylinder and five feet stroke. In fig. 2. we have given its horizontal section at the level of the base of the cylinder, and in the remaining figures the details of its