

under the above practical conditions, are very different from what would be given by a more experimental trial of a few hours on shore, with a small quantity of fuel skilfully burned, and all avenues of losses carefully guarded. It must also be considered that these boilers have been in use for some time, and are probably considerably encrusted with scale.

The features of these boilers are, 1st, The heating surface is nearly all vertical surface.

2d, The proportion of calorimeter or draft area to the grate surface is very large at first, and diminishes to nearly one half in the chimney, being at front of tubes, 1·000 to 5·205; at back of tubes, 1·000 to 7·840; in chimney, 1·000 to 10·000.

3d, The proportion of heating to grate surface is very large, being  $33\frac{1}{4}$  to 1.

4th, The hot gases are kept by means of a hanging bridge in contact with the heating surface, until their temperature is properly reduced.

5th, A very great height of chimney, being 75 feet above grates, giving a good draft even with the greatly diminished chimney calorimeters; the rapidity of the combustion is not remarkable as either fast or slow, being at the rate of 13·13 pounds of coal per square foot of grate per hour.

6th, A double tier of furnaces, one furnace in the upper and one in the lower tier, mingle their hot gases at the same bridge. By alternate firing below and above, the temperature of the mingled gases is always kept sufficiently high for combustion, while practically, no inconvenience is found in firing furnaces so arranged.

*Slip of the Paddle Wheel.*—The circumference of the centre of effort of the paddles is 107·3 feet. The mean slip was, therefore,

$$107\cdot3 \times 15\cdot827 \times 60 = 101894\cdot226 \text{ ft.} = \text{sp. of cen. effort of paddles p. h.}$$

$$13\cdot13 \times 6140 = 80618\cdot200 \text{ ft.} = \text{speed of vessel per hour.}$$

---


$$21276\cdot026 \text{ ft.} = \text{slip per hour, or } 20\cdot88 \text{ per cent.}$$


---

For the Journal of the Franklin Institute.

*Propeller Steamers between Boston and Halifax.*

The Boston merchants, after chaining their tri-mount City to the surrounding States as well as the Canadas, by the aid of their seven magnificent railroads, have concluded to extend the sphere of their mercantile enterprise, by launching into a new element, in the establishment of a line of propeller steamers, to ply between Boston and Halifax; and to that end, Messrs. Clark & Jones have contracted for a propeller as the pioneer, of the dimensions herein given.

The trade between Boston and Halifax has heretofore been carried on by a line of sailing vessels, belonging to the same gentlemen, except what may have been done by the English Mail Steamers.

The manifest advantages of propellers over sailing vessels is so plain, from the fact, that the trips of the latter must necessarily be without regularity, while those of the former, under all ordinary circumstances, can be depended on, that the surprise is, that a line of this description has not been put in operation before this. Many passengers from Halifax, as

well as other parts of Nova Scotia, coming to Boston, have heretofore crossed to St. Johns, N. B., and then taken steamers to Boston; a great portion of this travel will undoubtedly come by this new line. A fair proportion of the travel also between the Canadas and Nova Scotia will also, doubtless, prefer the route to Boston by railroad, and thence by this line to Halifax. This accommodation of passenger traffic, and a continually increasing trade with the Provinces, furnish good ground for the belief, that the enterprise will prove successful. One trip a week is anticipated.

The following are the dimensions of the hull, engines, &c.:

#### HULL.

Length on deck,	171 feet.
“ between perpendiculars,	168 “
Breadth of beam,	28 “
Depth of hold,	18 “ 6 inches.
Tonnage,	700 tons.

Three-masted schooner rigged, with foresail and foretopsail. Hollow lines, with an exceeding fine entrance.

Builder—Mr. J. D. Curtis, of Medford, Massachusetts.

#### DIMENSIONS OF ENGINES, &c.

Two cylinders, inverted.	
Diameter of cylinders,	44 inches.
Length of stroke,	33 “
Diameter of air pumps,	
Length of stroke,	18 “
Slide Valves,	
Diameter of shaft in journals,	10 “
Diameter of propeller,	8 feet 4 “

Air pumps worked by beams from cross-head.

S.

#### *Baillie's Volute Springs.\**

The only springs shown in the Great Exhibition, which were lucky enough to gain a prize, were Baillie's volutes; and it is not perhaps too much to add, that their simplicity and excellence fully entitle them to this distinguishing honor. The material of which they are made is flat steel with parallel edges, but tapering in thickness from one end to the other. Such pieces of metal are wound spirally into a cone, so as to sustain pressure and deflexion in the direction of the breadth of the metal. In bringing the invention before the readers of this *Journal*, we have selected as illustrations two examples of the springs as applied to railway purposes.

Fig. 1 is a longitudinal section of a double-spring railway passenger carriage-buffer. The outer cylinder, A, bolted to the front buffer beam, has within it the two volutes, B C, set with their apices towards each other, upon a guide-spindle fastened to the cylinder bottom, this spindle having upon it a bearing disk to receive the pressure from the two springs, when forced towards each other. The short sliding cylinder, D, carrying the buffer disk on its outer end, is fitted to slide within the open end of the spring cylinder, A, and encircles one of the springs, B, a diaphragm being cast across the cylinder, D, to communicate the external pressure to the base of the spring, and to act as a further guide, by passing the

\* From the London Practical Mechanic's Journal, December, 1851.