Date.	Wind.	Course.	Lat.	Long.	Dist.
Oct. 23,	Variable,	.	.	.	.
Oct. 24,	.	.	.	.	.
Oct. 25,	Variable,	S. 86 W.	51-14	13-47	156
Oct. 26,	Variable,	86	50-53	21-43	300
Oct. 27,	South,	85	50-28	29-12	284
Oct. 28,	S. E.,	78	49-28	36-25	285
Oct. 29,	Calm,	79	48-34	43-58	302
Oct. 30,	S. E.,	75	47-18	51-05	296
Oct. 31,	S. E.,	57	44-27	57-10	306
Nov. 1,	Variable,	68	42-42	63-09	279
Nov. 2,	N. N. E.,	66	40-35	69-23	304
Nov. 3,	N. E.,	88	(Sandy Hook)		211

REMARKS.

Oct. 23 and 24—1-50 P. M., passed the Rock ; 2-35, discharged the pilot off Belle Buoy ; 7-20, off South Stack, strong southerly gale and rain ; 5-26 A. M., passed Tuskar ; 11-50, Bally Cotton, light winds and cloudy ; 12-49, off Roche's Point ; 1-28 P. M., anchored off Queenstown ; 4-25, weighed and proceeded ; 4-50, discharged pilot off Roche's Point ; 10-20, west of Fastnett.

Oct. 25.—Light westerley breeze and heavy northwest sea.

Oct. 26.—Light wind and heavy westerly swell.

Oct. 27.—Moderate breeze and cross sea.

Oct. 28.—Light airs and cloudy.

Oct. 29.—Calm and sultry.

Oct. 30.—Light breeze and dense fog.

Oct. 31.—Light breeze and dense fog.

Nov. 1.—Light breeze and strong northwest breeze and clear.

Nov. 2.—Fresh breeze and cloudy.

Nov. 3.—Strong gale and dark cloudy weather ; 8-30 P. M., slowed engines ; midnight, sounded in eighteen fathoms ; 7-15, received pilot. B.

For the Journal of the Franklin Institute.

On Carlsund's Old Steam Piston. By JOHN W. NYSTROM, C.E.

In a late number of the *Scientific American*, and also in some English journals, I have noticed some incomplete statements of the Swedish piston, a steam piston invented by Capt. Carlsund over twenty years ago. The piston is a detail in the steam engine of considerable importance, and a correct description of the one referred to may be found useful to engineers.

Fig. 1 represents a section of a steam cylinder, with Carlsund's piston ; figs. 2 and 3, portions of the packing rings ; and fig. 4, a section of the periphery part of the piston. The form of the piston is readily understood by the figure ; both the cylinder-heads have a similar concave shape. The higher the steam is used, the more concave should be the piston ; that in fig. 1 is proportioned to about 30 lbs. pressure to

the square inch. This form makes the piston and cylinder-heads sufficiently strong with very thin metal.

The two packing rings surrounding the piston are made of cast iron, each in one piece, jointed as shown in figs. 2 and 3. The diameter of the rings is cast about the same as that of the cylinder; for large cylinders a little larger, and for small ones smaller.

The rings are turned on the four sides, and the joint cut, as shown in fig. 2; the line *a b* should be perfectly parallel with the sides. The joint is then finished as in fig. 3, with the greatest care that the seam *a b* is perfectly tight, and the outside diameter of the ring a little larger than that of the inside of the cylinder, sufficient to allow for turning. A strap is now screwed around the ring, to keep the joint in position; a hole of about one-quarter the thickness of the ring is drilled in the joint, and a pin *c* inserted. The ring is now placed on a centre-plate turned to the correct diameter of the inside of the ring, the strap taken off, the ring turned to the correct diameter of the cylinder, and the sides to the correct size of the grooves in the piston. This work requires a skilful workman; the last touch on the sides of the rings and of the grooves should be made by a new-sharpened good steel, and the greatest care taken that the rings be not too small for the grooves; should there be any play, it will jar when the piston is in motion. The breadth of the rings is made about 0.3 the square root of the diameter of the cylinder in inches, and the thickness about one-third the breadth.

During my time in Motala, Capt. Carlsund used to put canvass in the bottom of the grooves, but with high steam the canvass will burn. In the engines I have built I put vulcanized india rubber in the grooves, as shown by the dotted part, fig. 4, which is found to answer very well; when the india rubber becomes hot, it expands, and presses the ring gently and uniformly to the sides of the cylinder, and makes the piston perfectly tight. Pistons and cylinder-heads of this form will weigh about one-half of the ordinary clumsy and complicated form.

I have made this piston also in blowing machines and in air-pumps for sugar-works, and found it to answer very well.

Capt. Carlsund has made this piston for all kinds of steam engines for the last twenty years, but the English journals seem to think it best adapted only to locomotives and portable engines.

It is now over thirteen years since I first endeavored to introduce Carlsund's steam piston in America, but did not succeed. A steamship builder who ordered machinery to be made at one of the first establishments in Philadelphia, desired Carlsund's piston to be tried, for which I furnished a complete drawing; but the engineer of the establishment condemned it immediately. I was told that my drawing was shown to the workmen in the establishment, who joined in a hearty laugh and ridiculed the piston. The engineer then made a drawing of the ordinary complicated piston. I was not at the time familiar with the American system of introducing new things, neither would I feel disposed to follow such a course; but simply stated that the piston is very good and in operation in Sweden, and attempted to describe the manner in which it is made. I now regret that I did not give it out as the greatest wonder of the age.

Scientific Balloon Ascent.—The Lines in the Spectrum. By JAMES GLAISHER.

From the London Athenæum, No. 1850.

For the purpose of observing the black lines in the sky spectrum at different altitudes, and the sun spectrum if possible, an apparatus was employed consisting of a prism, a fine adjustable slit half an inch in length, placed in the focus of an object-glass, and a telescope directed to the prism, lent for the purpose by the Astronomer Royal, and is the same apparatus as that used by Prof. Smyth on the Peak of Teneriffe. No angular measure was prepared for or contemplated; only eye observations and comparison of differences between the spectrum as seen on the ground and at different heights during the journey. A careful examination of the spectrum between the hours of 3 and 4 P. M., before starting, showed B as the boundary at the red end, and a little beyond G at the violet end when looking at the sky; and when looking at the sun, I could not see quite to H. The lines C, D double, E, b, and F were very plainly shown, with many lines between them. At 4h. 20m., at the height of about half a mile, a cursory examination of the spectrum showed a close correspondence with that on the earth, showing lines B to G, but the extreme lines with, I thought, less distinctness. At 4h. 30m. at the height of about one mile, the spectrum was bright, but less in length, both at the violet and red ends. The line G was quite the limit, and I could not see B, and C was doubtful. At 4h. 35m., at the height of about 2 miles, G was lost entirely, and the violet was dull; I could see F and D, but not beyond. At 4h. 42m., at 3 miles high, I lost violet entirely, and could not see F. At 4h. 46m., between 3 and 4 miles high, the spec-