

steam to run the machinery regularly. This has proved correct, as upon working the machinery regularly for some hours together, it has been found that additional steam power was required to keep the machinery running regularly, at a uniform speed, so as to produce with regularity and precision the required number of sounds per minute.

I therefore recommended the Department to add a heater, by which the water supplied to the boiler would be warmed by the exhaust steam before entering the boiler. This was accordingly done and the effect was good. The boiler was supplied with hot water instead of cold as originally arranged by the maker, so that no perceptible change in the supply of steam was experienced. Yet it was found that this additional aid given to the boiler was not sufficient to keep up the supply of steam required for working the machinery, so as to give regularly the number of sounds required per minute. My report to the Department on this subject, on the 18th December, 1877, I beg to subjoin. After working the machinery for a short time, I was in favour of having a longer sound, but I found, on consultation with Mr. Crosby who erected the machinery, that three seconds was the longest sound that could be given by this apparatus at one blast. I tried one, two and three seconds between each blast, and found that we could get three, four or five blasts or sounds per minute of two seconds each sound with greater regularity and ease than one of longer duration.

Three blasts or sounds of five seconds in each minute would exhaust the receiver to such an extent, that the required pressure on the air gauge could not be maintained. This apparatus is adapted to sound often and at short intervals, and to have the air pumps to work rapidly and the engine quickly, thus keeping up the required pressure in the air cylinder. If the engine runs slowly and the blast is long the receiver is rapidly exhausted, and the air pumps would be working too slowly to keep up the supply and pressure in the air cylinder.

The full length of the lever of the operating valve, with the ball fully extended only gives three seconds duration for each sound, thus showing that the machine was not intended to give a sound of longer duration than three seconds, the longest sound that can be produced with satisfactory results is one of three seconds duration, three times per minute. If this time is adopted it may be maintained by adding the heater and covering the boiler, as the latter, on the whole, is rather small.

Mr. Crosby, the engineer in charge for the time being, reported that the trumpet could not be kept sounding uniformly without still greater boiler power or supply of steam. The Department therefore directed Mr. Wm. M. Smith, Steamboat Inspector, to proceed to that Station, and examine the machinery and test its power &c. This was attended to by Mr. Smith, who reported fully to the Department on this subject. The Department on receipt of this Report directed that a new boiler be made and placed alongside of the smaller one, and that it should be so arranged that one or both could be used separately or together, as occasion might require. The usual notice was therefore given to mariners of the stoppage of the fog-horn, and a new boiler was tendered for according to the description and specification of Mr. Smith, and the tender of Messrs. McLaughlan being the lowest, it was accepted.

The boiler was completed and forwarded to the Station, and is now in course of erection, under the personal supervision of Mr. Smith. The latter gentleman states that an addition to the present building will be necessary in order to cover the boiler and protect it from the weather; when this addition is completed, due notice will be given of the time the trumpet will be put in operation, and I have no doubt but that the machinery will then be in a condition to work regularly, with an ample supply and head of steam sufficient for all requirements.

The horn itself, which contains a vibrating reed, by which the sound is produced, is a novel arrangement to this branch of the Department. Time alone will show whether its adoption is more economical, and whether it will prove of greater efficiency for the service than those in use on this coast. It occurs to me that it is more liable to get out of repair, and is not so efficient as the ordinary whistle used