

STEAM BOILER EXPLOSIONS IN 1875.

(See page 152.)

We publish below the annual record of Mr. Edward B. Marten prepared for the Directors of the Midland Boiler Inspection and Assurance Company, of the boiler explosions which have come under his notice during the year 1875. The similar casualties for the years 1873 and 1874 were as follows:

	Number of Explosions.	Persons Killed.	Persons Injured.
1873	78	57	85
1874	78	77	108

As to the cause which led to the explosions, it will be seen that 13 are ascribed to faults in construction that might have been detected by inspection, 18 to faults that could only have been detected by inspection, 36 were caused by negligence on the part of attendants, and in one case only did the cause of explosion remain undiscovered. These proportions vary considerably from those recorded by Mr. Marten last year and which were as follows:

From faults in construction	24 explosions
From faults only to be detected by inspection	16 "
From faults that could have been prevented by attendants	36 "

It will be noticed that during 1874 no explosion occurred, the cause of which was not apparent.

During 1875, records were obtained of 68 boiler explosions, causing the death of 81 and the injury of 142 persons.

It is not to be presumed that all the explosions in the United Kingdom are here given, as these records are obtained only by private means, and through the courtesy of the owners of the boilers. All names are omitted, as the only object is to place within the reach of those who work boilers, short, simple, and clear descriptions of each case, and as far as possible the lessons to be learnt, as a warning of the evils to be avoided.

Iron works and collieries have as usual contributed the greatest number to the list of explosions, and this is ever likely, as so large a proportion of the steam power of the country is for their use.

More than half the explosions of the year have been from those causes more especially under the control of the attendants.

No. 1. (See Fig. 1.) *January 1st, 1 killed.*—Domestic saddle, welded joints. Used for warming a large building. The frost had stopped up the circulating pipes, and the pressure of steam increased till the boiler could sustain it no longer.

No. 2. *January 2nd, 1 killed.*—Domestic. The fire was lighted when the taps were closed, and the accumulating pressure exploded the boiler.

No. 3. (See Fig. 2.) *January 6th, 7 killed, 10 injured.*—Plain cylinder, 26 ft. long, by 6 ft. 6 in. diameter, $\frac{1}{2}$ in. plates, 25 lb. pressure, longitudinal seams, about 35 years old. Much patched and too weak to bear the usual pressure. The pressure gauge was said to have been incorrect, and the float did not work properly.

No. 4. *January 6th, none injured.*—Two-furnace upright, 21 ft. high, by 7 ft. diameter, $\frac{7}{8}$ in. Tube 3 ft. 6 in. diameter, with cross tubes, 50 lb. pressure. One of the cross tubes had become choked with mud, which prevented the contact of the water with the iron, and caused overheating and rupture.

No. 5. *January 7th, none injured.*—Elbow boiler, 27 ft. long, by 4 ft. diameter, $\frac{3}{4}$ in. plates, tube 2 ft. 4 in. diameter, 70 lb. pressure. The tube became overheated from shortness of water, and collapsed about 3½ in. downwards.

No. 6. *January 9th, none injured.*—Heating apparatus, 4 ft. high, by 2 ft. wide. Burst from over-pressure, frost having caused stoppage in the pipes.

No. 7. (See Fig. 3.) *January 21st, 6 killed, 19 injured.*—Lancashire, one of three, 28 ft. long, by 5 ft. 6 in. diameter. Tubes 2 ft. 6 in. diameter, 64 lb. pressure, 9 years old. The plates had been so reduced by internal corrosion, that they were too thin to stand the accumulating pressure during the dinner hour, when the machinery was standing. The plates were in many places reduced to $\frac{1}{10}$ in. Considerable damage was done to property.

No. 8. (See Fig. 4.) *January 23rd, 1 killed.*—"Breeche tube," 13 ft. long, by 6 ft. diameter, $\frac{1}{8}$ in. plates, 50 lb. pressure. Tube 3 ft. diameter at fire end, 1 ft. 6 in. at stack end. The tube collapsed in second and third rings from fire end, the plates having become overheated from shortness of water.

No. 9. *February, 2 injured.*—Plain cylinder, one of seven, 30 ft. long by 4 ft. 6 in. diameter, $\frac{3}{4}$ in. plates, 37 lb. pressure. The plates on the side gave way where overheated from shortness of water, and the boiler was thrown forward.

No. 10. *February 8th, 1 killed.*—Plain cylinder. No particulars obtained.

No. 11. (See Fig. 5.) *February 10th, 2 killed.*—"Upright," 6 ft. high, and 2 ft. 9 in. diameter, $\frac{3}{4}$ in. plates, 30 lb. pressure. Internal firebox. Had only been working an hour after having been repaired. The spring safety valve had been screwed down so as to prevent the free escape of steam. There was no pressure gauge attached to the boiler or engine. The fracture commenced at the unguarded manhole, and extended from top to bottom of the boiler.

No. 12. *February 26th, 1 injured.*—Locomotive 130 lb. pressure. The bottom part of the firebox gave way, being much reduced by internal corrosion.

No. 13. (See Fig. 6.) *March 1st, 1 killed, 1 injured.*—Cornish, 20 ft. long, by 5 ft. 9 in. diameter, $\frac{3}{4}$ in. plates. Tube, 3 ft. diameter, 45 lb. pressure. The tube being unstrengthened by rings, collapsed nearly from end to end, through injury from shortness of water on some previous occasion. The shell and part of the tube were thrown forward, and the remainder of tube, with one of the ends, was thrown some distance to the rear.

No. 14. *March 15th, 1 killed, 2 injured.*—Marine verticle, 8 ft. high, and 5 ft. diameter, 57 lb. pressure. The cause of explosion was over-pressure, the valve being locked fast by corrosion.

No. 15. (See Fig. 7.) *March 22nd, 2 killed, 6 injured.*—Lancashire, one of sixteen, 30 ft. long, by 7 ft. diameter, $\frac{7}{8}$ in. plates. Tubes, 2 ft. 2 in. diameter, 45 lb. pressure. The shell, being reduced by external corrosion until too weak to bear the ordinary pressure, was rent into many fragments, which were scattered widely.

No. 16. *March 24th, none injured.*—Two-fluid. One flue collapsed from over-heating by shortness of water.

No. 17. (See Fig. 8.) *April 12th, 2 injured.*—Cornish, 2 ft. long, by 5 ft. diameter, 20 lb. pressure. So very much patched and worn as to be unfit to bear any pressure.

No. 18. (See Fig. 9.) *April 15th, 1 killed, 3 injured.*—Lancashire. One of two, 25 ft. 2 in. long, by 7 ft. diameter, $\frac{7}{8}$ in. plates. Tubes, 2 ft. 11 in. diameter, 48 lb. pressure. External corrosion had weakened the plates, so that the boiler could not sustain the usual working pressure, being reduced in some places to $\frac{1}{8}$ in.

No. 19. (See Fig. 10.) *April 28th, 2 killed, 3 injured.*—Plain cylinder, 3 ft. 6 in. long, and 2 ft. 8 in. diameter, 23 lb. pressure, $\frac{3}{4}$ in. plates, ends dished, $\frac{1}{2}$ in. thick. Corrosion had set in along the brickwork seating, and made this part so weak that it could not bear the pressure. The boiler was torn from end to end, and spread out quite flat, doing considerable damage to property.

No. 20. (See Fig. 11.) *May 2nd, none injured.*—Plain cylinder. One of two, 6 ft. 2 in. long by 2 ft. diameter. For temporary use only. The end was so corroded as to be too weak to bear the pressure, which accumulated while the boiler was left.

No. 21. *May 4th, none injured.*—Lancashire, 18 ft. long, by 7 ft. 6 in. diameter, $\frac{7}{8}$ in. plates. Tubes, 2 ft. 2 in. diameter, 35 lb. pressure. Heated by two furnaces. Both tubes collapsed from shortness of water, but dangerous consequences were prevented by the strengthening rings.

No. 22. (See Fig. 12.) *May 13th, 2 injured.*—Plain cylinder, plates arranged lengthways, 22 ft. long, by 5 ft. 6 in. diameter, $\frac{3}{4}$ in. plates, 32 lb. pressure. Gave way from a seam rip at a longitudinal seam on right-hand side.

No. 23. (See Fig. 13.) *May 15th, 2 killed.*—Cornish. One of two, 18 ft. long, by 5 ft. diameter. Tube 3 ft. diameter, $\frac{3}{4}$ in. plates, 60 lb. pressure. The water was allowed to get too low, when the plates became overheated and collapsed.

No. 24. (See Fig. 14.) *May 20th, 2 injured.*—Revolving rag boiler, 25 ft. long, by 6 ft. 6 in. diameter, 43 lb. pressure. For the convenience of frequent opening, the manlid bolts were hinged at one end, and slipped into notches in the lid; therefore, although the lid was made steam tight, it did not maintain its strength, and split, when the reaction of the issuing contents displaced the boiler.

No. 25. (See Fig. 15.) *May 21st, 6 injured.*—Marine, 35 lb. pressure, 14 ft. long, by 7 ft. diameter. Two tubes, 3 ft. 6 in. by 2 ft. 6 in. diameter, and eight tubes, 6 in. diameter, four years old. It was presumed that the safety valve was set fast, causing undue pressure.