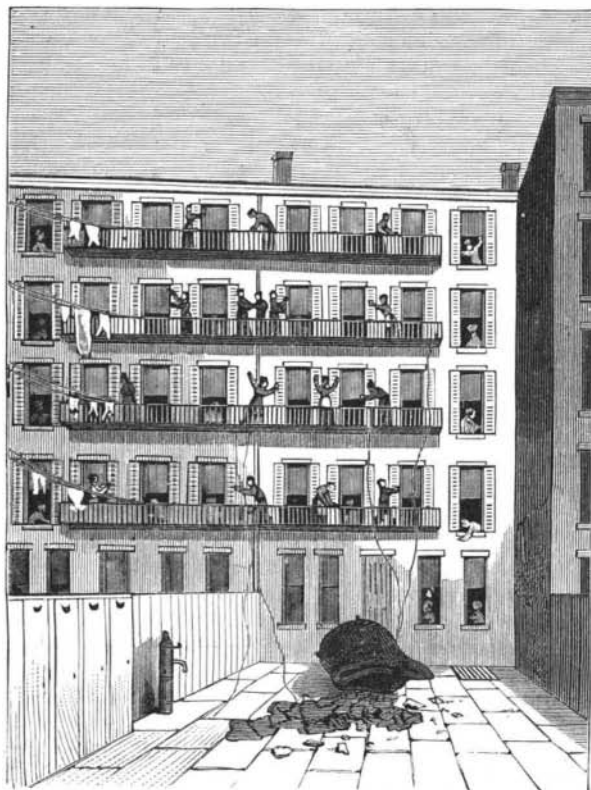


A REMARKABLE BOILER EXPLOSION.

A very remarkable boiler explosion occurred in this city on Saturday, July 16. We illustrate some of the features of the occurrence. The boiler was of the upright tubular type; nine feet high, four feet in diameter, of $\frac{3}{8}$ inch iron, and had 129 tubes. Its total weight was about two tons. It was situated in a



END OF THE FLIGHT.

shed in the rear of No. 6 Gouverneur Slip. The shed was a light structure, sided with corrugated iron. The establishment, which was a wood alcohol refinery, was closed at 3 P.M., and the boiler, it is said, was left with banked fire and gauge showing twenty pounds pressure. The boiler had been inspected December 9, 1886, and then was in good condition, and was allowed



THE EXPLODED BOILER.

to carry 75 pounds of steam. Two hours after the boiler had been left with its fire banked, it exploded.

The iron gave way around the fire box in the legs of the boiler. Under the force of the explosion and of the rush of the steam, it rose like a rocket nearly in a vertical direction, and, about forty feet from the ground, struck the wall of the building. It drove in the wall between two windows, first demolishing the shed in its upward flight. After it struck the building it suddenly changed its direction nearly at right angles, and flew off in the opposite direction. Steam was undoubtedly still escaping and caused its long flight, especially as regards the horizontal component. Rising in its course nearly two hundred feet, it passed over Water and Cherry Streets, and landed in the back

yard of a tenement house, No. 194 Monroe Street. The distance from its starting place to its destination is 460 feet. The flight must have been largely due to the reaction of the escaping steam. When the boiler landed no steam appeared, as all had issued from it before it reached the ground.

The immense flight of the entire boiler is most remarkable, but the small amount of injury it did is not less so. The wonder is not only that it managed to escape so well from the yard containing it originally, but also that it fell with such precision in the other yard. A deviation of fifteen or twenty feet in the length of its course would have brought it on the roof of one or the other of two tenement houses, between which it dropped. The effect of two tons of iron going through a crowded house would have been disastrous. As it is, no one was seriously injured, and even the damage to property is slight.

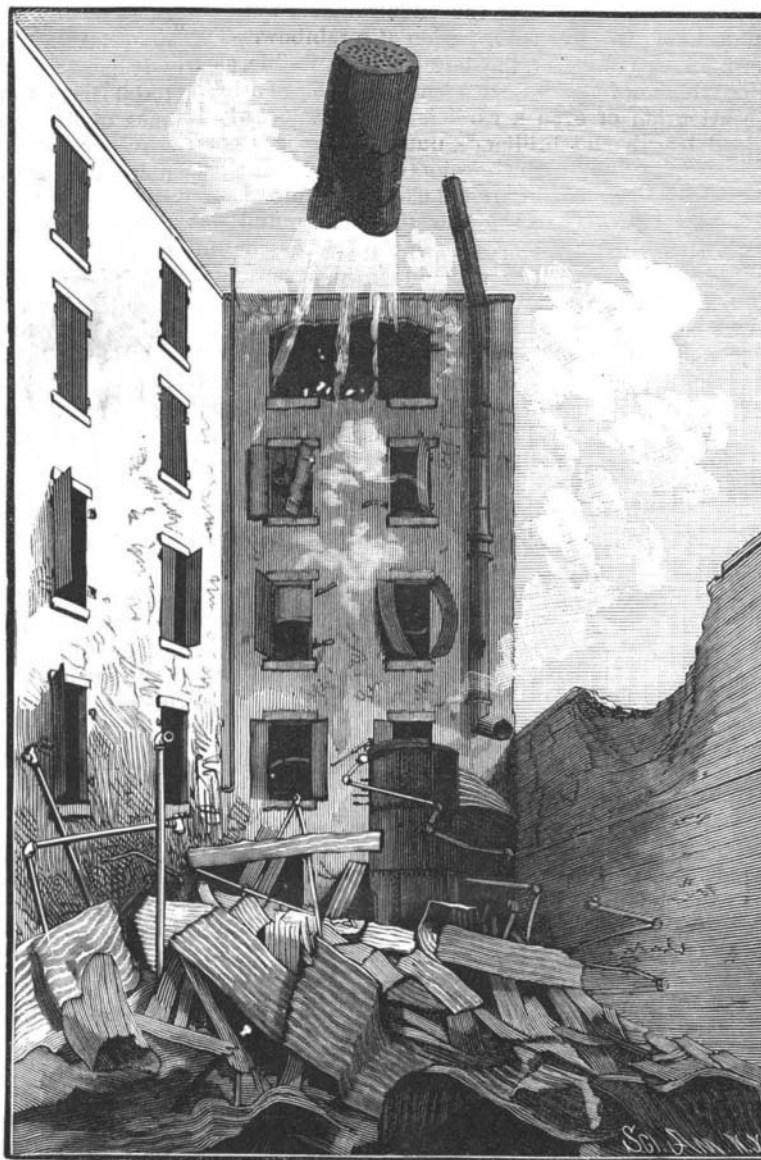
The boiler shows signs of burning around the fire box, where it failed. The lower tube sheet is unburned. The theory of the boiler inspectors is that the door was closed, and the water was low, so that steam generated until the bursting pressure was reached. The door should, of course, have been left open. If the engineer did this, it is probable that some person closed it. It is the first boiler explosion that can be recorded among boilers under city inspection for a very long period of time.

Lightning Rods for Tall Chimneys.

M. Faraday, in the *Architect and Builder* (London), says the conductor should be of half inch copper rod, and should rise above the top of the chimney by a quantity equal to the width of the chimney at the top. The lengths of rod should be well joined metallically to each other, and this is perhaps best done by screwing the ends into a copper socket. The connection at the bottom should be good; if there are any pump pipes at hand going into a well, they would be useful in that respect. As respects electrical conduction, no advantage is gained by expanding the rod horizontally into a strap or tube—surface does nothing; the solid section is the essential element.

There is no occasion of insulation (of the conductor), for this reason. A flash of lightning has an intensity that enables it to break through many hundred yards (perhaps miles) of air, and therefore an insulation of 6 inches or 1 foot in length could have no power in preventing its lead to the brickwork, supposing that the conductor were not able to carry it away. Again, 6 inches or 1 foot is so little that it is equivalent almost to nothing. A very feeble electricity could break through that barrier, and a flash that could not break through 5 or 10 feet could do no harm to the chimney. A very great point is to have no insulated masses of metal. If, therefore, hoops are put round the chimney, each should be connected metallically with the conductor,

otherwise a flash might strike a hoop at a corner on the opposite side to the conductor, and then on the other side, on passing to the conductor, from the nearest part of the hoop, there might be an explosion, and the chimney injured there or even broken through. Again, no rods or ties of metal should be wrought into the chimney parallel to its length, and, therefore, to the conductor, and then to be left unconnected with it. The rod may be close along the brick or stone. It makes no difference. There will be no need of rod on each side of the building, but let the cast iron hoop and the others you speak of be connected with rod, and it will be in those places at least as if there were rods on every side of the chimney. A three-fourth rod is no doubt better than a half inch, and, except for the expense, I like it better. But a half inch has never yet



STARTING POINT AFTER THE EXPLOSION.

failed. A rod at Coutts' brewery has been put up $1\frac{1}{2}$ inches diameter; but they did not mind expense. The Nelson column, in London, has a half inch rod—three-fourths is better. I do not know of any case of harm from hoop iron inclosed in the building, but if not in connection with the conductor, I should not like it; even then it might cause harm if the lightning took the end furthest from the conductor.

An Ocean Race.

The steamship *Arizona*, of the Guion line, and *Servia*, of the Cunard line, which recently left Queens-town about the same time, arrived at New York within an hour of each other. During the entire voyage the two kept constantly in sight of each other. By night

each others lights could always be seen, and at day either the spars or the smoke of one vessel could be seen from the decks of the other steamer. The passengers on the *Servia* were constantly watching the *Arizona*, which they hoped to leave behind, while the people on the rival boat regarded the *Servia* with similar interest. Such close rivalry between ocean greyhounds during a voyage has never occurred before.



FLIGHT OF THE BOILER.