AUGUST 1st, 1866.

THE LAWS

IN RELATION TO

Steam Boilers

PASSED BY THE

STATES OF NEW YORK AND NEW JERSEY

FOR THE

Protection of Life and Property

AGAINST

STEAM BOILER EXPLOSIONS.

PUBLISHED BY John [illegible] 29 & 31 Nassau St.

NEW YORK.

The Laws

IN RELATION TO THE INSPECTION OF

STEAM BOILERS,

PASSED BY THE

STATES OF NEW YORK AND NEW JERSEY,

FOR THE

Better Protection of Life and Property

AGAINST ACCIDENTS BY

STEAM BOILER EXPLOSIONS.

New York:
PRESENTED BY JOHN ASHCROFT,
NOS. 50 AND 52 JOHN STREET.

JULY, 1868.

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INTRODUCTION

TO THE SUBJECT OF

STEAM BOILER EXPLOSIONS.

The recent enactment of several State Laws, relative to the inspection of Steam Boilers for the better protection of life and property, has induced the writer to place before the public this pamphlet, containing the Laws of the States of New York and New Jersey, together with illustrations and extracts representing and describing some of the most terrible accidents resulting from explosions. Trusting that a perusal of the appended reports may induce owners to look to the better protection of life and property from such calamities,

I remain,

Respectfully,

John Ashcroft.

50 JOHN STREET, N. Y.,

July, 1868.

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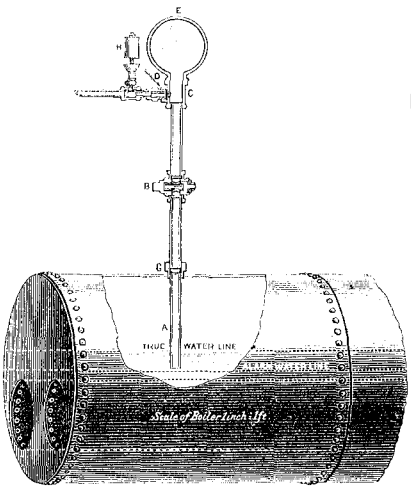
ASHCROFT'S

Patent Low Water Detector.

FOR PREVENTING THE EXPLOSION OF STEAM BOILERS.



MORE THAN EIGHT THOUSAND OF THESE INSTRUMENTS NOW IN USE.

They are endorsed by the highest engineering talent in the country, and by some of the most responsible and best established houses.

ITS CONSTRUCTION IS AS FOLLOWS:

This instrument is made of a piece of one-inch gas pipe A, an air chamber E, a disc of fusible metal D, fusible in boiling water, which is secured to its seat by a union having a whistle on its stem (as represented in the cut.) The union G connects the Detector to the boiler. Its operation is solely upon the natural laws of gravitation and heat, which is as follows:

After the boiler has been filled to the water line and put in operation, the pressure of the steam forces the water into the pipe and air chamber E. As there can be no circulation of water in the pipe as long as the lower end of it is under the water line, the *disc* D will continue solid; but when the water in the boiler evaporates below the end of the pipe to the "ALARM WATER LINE," the water in it falls of its own weight into the boiler, and steam at once takes its place, melts the plug, and notice of LOW WATER is given by the sounding of the whistle.

(*See page* 8.)

State of New Jersey.

AN ACT

In relation to the Inspection of Steam Boilers, and for the better Protection of Life and Property against Accidents by Steam Boiler Explosions.

I. *Be it enacted by the Senate and General Assembly of the State of New Jersey*, That the Governor of the State of New Jersey shall, within thirty days after the passage of this Act, and hereafter as necessity may require to fill vacancies, appoint an inspector-in-chief, and one suitable person in each Congressional district as deputy inspector, said deputy shall be a practical engineer, and whose duty it shall be to inspect steam boilers in such Congressional district, as hereinafter specified and directed; such inspecter-in-chief and deputy inspectors shall hold their office for two years, unless sooner removed by the Governor for cause.

II. *And be it enacted*, That every owner or owners of any steam boiler in use, situated within this State, shall, on or before the first day of July next, and annually thereafter as the inspector-in-chief may prescribe, report to the deputy inspector of the district in which the same may be, the loca-

(*Continued on page* 9.)

ASHCROFT'S

Low Water Detector

Has been in use for more than TWELVE YEARS, and more than Eight Thousand of them are now in use; in no instance have they failed to give timely warning of low water.

They require no care or attention on the part of the Engineer, or the person in charge of the Boiler.

The object of the Detector is not to relieve the Engineer from care or responsibility, but to act as a vigilant watchman. If the attendant performs his duties faithfully, the Detector remains at rest; but if the water in the boiler is allowed to fall below the Alarm Water Line, (see cut,) every person in your establishment will be notified of the fact.

Instructions for applying the Low Water Detector.

Blow off the steam and reduce the water in the boiler to the centre or below; then fill up with cold water to the ALARM WATER LINE; this will reduce the heat of the boiler at once, so as to allow the workmen without delay to drill and tap the boiler for the union G. Be particular and cut the inside pipe so that the lower end will just touch the line above mentioned when the union to which the pipe is attached is firmly screwed in.

This instrument can be safely tested at any time by allowing the water to fall by evaporation to the ALARM WATER LINE. After the alarm is given the water may be pumped into the boiler to its proper height with perfect safety. The ALARM WATER LINE should be at least *one inch* above the highest fire surface.

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tion of such steam boiler; and thereupon, and within sixty days at farthest, the said deputy inspector shall proceed to inspect such steam boiler in such manner as shall be designated by the rules and regulations of the inspector-in-chief, and all apparatus and appliances connected therewith; and that such boiler shall have attached a lock-up safety valve; such valve to be taken wholly from the control of the person or persons engaged in using or working the boiler, and to be set by the inspector to blow off steam at a point of safety to be determined by him; the said lock-up safety valve shall fulfill all the conditions now adopted by the board of supervising inspectors of the United States in reference to said safety valves.

III. *And be it enacted*, That said deputy inspector shall limit the pressure of steam upon every such boiler, and shall certify such inspection and such limit of pressure to the owner, or one of the owners of such boiler, and also to the engineer in charge of the same; in limiting the amount of pressure whenever the boiler under test will with safety bear the same, the limit desired by the owner of the boiler shall be the one certified.

IV. *And be it enacted*, That it shall be the duty of the said deputy inspector, on receiving such report as aforesaid from the owner or owners of any steam boiler, to notify such owner or owners of the time when he will inspect the same, and it shall be the duty of such owner or owners to have such boiler ready for inspection at the time specified in such notice; in case the owner or owners of any such boiler shall fail to report the location of the same as aforesaid, he shall be liable to a penalty of twenty-five dollars; and in case the owner or owners of any such boiler shall fail to have the same ready for inspection as aforesaid, he or they shall be liable to pay the fees and expenses of the said inspection incurred in the inspection of any such boiler, and five dollars in addition

(*Continued on page* 11.)

To Recharge the Detector.

1st. After the disc has melted, shut the cock and pump the water to the line above the end of the pipe.

2d. Remove the union, put in the disc, and screw the union firmly against it. Observe that it does not leak.

☞ *No packing of any kind must be used about the disc; if it is properly refixed it will not drip.*

3d. Open the cock, at first cautiously, to give the water time to cool before it reaches the disc; otherwise it might melt. In fifteen minutes open the cock full.

The prime Cause of Steam Boiler Explosions arises from a deficiency of Water in the Boiler while in action.

Explosions from Deficiency of Water.

Low water in steam boilers is no unusual occurrence. Imminent danger frequently arises from this cause, and it cannot be too forcibly impressed upon the minds of engineers, that there is no part of the apparatus constituting the mountings of a boiler, which requires greater attention than that which supplies it with water. In a properly constructed boiler, every part of the metal exposed to the action of the fire should be in immediate contact with the water; and when proper provision is made to maintain the water at a sufficient height above the parts so exposed, accidents can never occur from this cause. Should the water, however, become low from defects in the pump, and the surface above the fire overheated, then, even at the ordinary working pressure, there is great danger of an explosion.

(*Continued on page* 12.)

thereto; such fees, expenses and penalty in such case may be sued for and recovered by and in the name of the said inspector-in-chief, for the benefit of the county in which such boiler may be situated, and in case said deputy inspector shall fail to make the inspection at the time specified, he shall pay to the owner of such boiler all damages sustained by such failure.

V. *And be it enacted*, That each deputy inspector shall make in proper form a statement of every inspection of steam boilers made by him, and by any board of examiners as hereinafter provided, and the amount of steam or pressure allowed in each case, and report the same within thirty days after any such inspection to the inspector-in-chief; in cases where any steam boiler or the apparatus or appliances connected therewith shall be deemed by such deputy inspector, upon inspection as aforesaid, to be insecure or dangerous, the said deputy inspector shall, as soon as convenient, confer with two practical engineers, one of whom may be chosen by the owner of such boiler, who, with such deputy inspector, shall constitute a board of examiners, whose duty it shall be forthwith to further examine such boiler or boilers, and any two of such board shall prescribe and certify to the owner thereof such changes and alterations as will in their judgment render such boiler, apparatus and appliances secure, and until such changes and alterations are made and such appliances attached, it shall not be lawful for the owner of such boiler to use or permit the same to be used under a penalty of fifty dollars for each day's use, said penalty to be sued for, recovered and applied, in the manner prescribed by the fourth section of this Act. The members of said board of examiners shall each be entitled to receive three dollars for each day or part of a day, during which they are actually engaged in making any examination aforesaid.

VI. *And be it enacted*, That each deputy inspector shall receive for the inspection of a boiler, according to the provisions

(*Continued on page* 13.)

There is no occasion under such circumstances, to search further for the cause of the explosion, from the fact that the material, when overheated to a certain degree, loses about five-sixths of its strength and is therefore unable to resist the internal pressure.

When a boiler becomes short of water, the first thing usually done is to put the feed pump in action; this certainly remedies the deficiency, *but increases the danger*, and may lead to the explosion of the boiler.

Ashcroft's Low Water Detector

Is eminently fitted to guard against accidents caused by low water. It needs not the care or attention of the engineer or fireman to keep it in order. Operating by the force of natural laws, it takes care of itself, and is only called into action by the fall of the water below any fixed level, and then it gives the alarm to all within sound of the whistle of the deficient supply.

It stands as a watchful monitor over the magazine of power on which it is placed, and not only guards it, but notifies the attendant, if he is forgetful or negligent of his duty.

JOHN ASHCROFT,

50 and 52 JOHN STREET.

(*See page* 14.)

of this Act, the sum of three dollars, and such sum, and the compensation of said board of examiners convened as hereinbefore provided, shall be a charge upon the county in which the boiler inspected or examined shall be situated, and shall be audited and paid by the county in the same manner that other county salaries and expenses are paid.

VII. *And be it enacted*, That any owner or part owner of any boiler who shall consider himself aggrieved by the decision of said inspector, or board of examiners under the provisions of this Act, may, within thirty days after the result of such inspection or examination has been certified to him as aforesaid, appeal from said decision to the inspector-in-chief, who may in his discretion order a further examination and inspection, the expenses thereof to be borne by the owner or owners of such boiler, and the decision of said inspector-in-chief, or of said board, upon a re-examination shall be final.

VIII. *And be it enacted*, That it shall be the duty of the inspector-in-chief to prescribe rules and regulations to govern said deputy inspectors in the performance of their duties, to furnish each deputy inspector with the forms or blank certificates of inspection together with the necessary apparatus and appliances for testing and examining steam boilers, to keep a correct record of all inspections of steam boilers, and of the amount of steam or pressure allowed in each case reported to him by any deputy inspector, which record shall be the property of the State, and shall annually be filed in the office of the Secretary of the State; the said inspector-in-chief shall receive annually from the State a salary of five hundred dollars, which shall be paid by the treasurer of the State in the same manner as other salaries are paid; the expense of furnishing apparatus and appliances for the purpose of inspecting steam boilers as hereinbefore prescribed, shall be borne by the State, and paid in the same manner that other State charges and expenses are paid; no bill for any expense or

(*Continued on page* 15.)

☞ **Please read the following Letters, all of recent date, from well known and responsible parties, who have had the Ashcroft Detector in use from One to Twelve Years.**

New York, Feb. 3d, 1868.

John Ashcroft, Esq.—DEAR SIR: In reply to your favor of 31st ult., we would state, that we have had Ashcroft's Low-water Detector attached to our boilers since 1862. They have often given us notice of danger, *owing to pumps being out of order*, or *carelessness of fireman*. The Plugs do not fail to fuse. The Detector is simple in construction. We should not consider our *boilers entirely safe or complete* without them. We remain

Yours truly, HAVEMEYERS & ELDER,
Sugar Refiners.

New York, Jan. 22d, 1868.

John Ashcroft—DEAR SIR: We have had one of your Low-water Detectors attached to our boiler for over two years, and during that period have tested it several times, and have found it to perform its office admirably.

We believe it to be the only safe and reliable Low-water Detector made. Yours truly,
CARHART & NEEDHAM.

Office South Brooklyn Steam Engine and Boiler Works,
Brooklyn, January 23, 1868.

John Ashcroft, Esq., No. 50 John Street, New York—DEAR SIR: Your note of 22d is at hand, and in reply would say that we have had two of your Low-water Detectors attached to our boilers for the past two years, and I take great pleasure in saying that we have frequently tried and have always found them unerring. I would not allow a boiler under my charge to be without one.

Yours respectfully, JAMES ESLER,
Supt. of Machinery Department.

(*Continued on page 16.*)

charges shall be paid, however, unless the same be certified by the inspector-in-chief to be correct.

IX. *And be it enacted*, That the owner or owners of every such steam boiler shall, under a penalty of two hundred dollars, to be sued for, recovered and applied in the manner prescribed in the fourth section of this Act, cause to be attached thereto a high and low water indicator, with an alarm whistle so constructed and forming part of said indicator that the whistle will give an alarm at low water and at high pressure of steam.

X. *And be it enacted*, That it shall be the duty of said deputy inspectors, on the inspection of any boiler, to deliver to the owner or one of the owners thereof, a certificate, a duplicate of which shall be retained on file of inspection, stating the condition of said boiler, and if he shall deliver or cause to be delivered to the owner or owners of any boiler so inspected, a certificate of inspection, without having first subjected the same to all the mechanical tests hereinbefore provided, he shall be liable to a penalty of $500 for each such act, or if, after such inspection, he shall render a false report, either to the owner or the inspector-in-chief, he shall be liable to a penalty of five hundred dollars for each offence, to be sued for, recovered and applied in the manner prescribed in the fourth section of this Act, provided, that the said certificate of inspection shall be placed and kept in some conspicuous place on the premises, where the boiler therein referred to is used.

XI. *And be it enacted*, That this Act shall not apply to boilers upon railroad locomotives, nor to boilers used for heating private dwellings.

XII. *And be it enacted*, That this Act shall take effect immediately.

Approved April 16th, 1868.

(*Continued on page* 17)

☞ **Please read the following Letters, all of recent date, from well known and responsible parties, who have had the Ashcroft Detector in use from One to Twelve Years.**

Metropolitan Hotel, New York, Feb. 17, 1868.

John Ashcroft, Esq., 50 *John Street, New York*—MY DEAR SIR: We have in use on our boilers, Metropolitan Hotel, three of your Low-water Detectors, and they have given us entire satisfaction. We cheerfully recommend them to all parties who may be using steam boilers, as being a great safeguard against accidents.

Yours truly, S. LELAND & CO.

New York Power Loom Carpet Mills, Foot of West 43d St.,
New York, January 28th, 1868.

John Ashcroft, Esq., New York—DEAR SIR: We have had attached to our boilers, six of your Low-water Detectors, for the past two years. And I take great pleasure in saying that they have given *entire satisfaction;* and have found them unerring, and would not *allow a boiler under my charge to be without one.*

Yours respectfully, GEO. H. HIGGINS, *Engineer.*

New York, March 25, 1868.

John Ashcroft, Esq.—DEAR SIR: I have had one of Ashcroft's Low-water Detectors attached to my boiler for the last five years, and during that time it has given *entire satisfaction.* In fact I would not do without it on *any account.* With it an explosion is rendered almost impossible, as it gives sure and timely warning of any danger. It should be attached to every boiler, not only on account of the safety it insures, but the expense it saves, in preventing the boiler from being *burned,* thereby causing it to leak, through the carelessness of the engineer.

Yours, &c., JOHN W. AMERMAN.

(*Continued on page* 18.)

STATE OF NEW JERSEY.

I, HORACE N. CONGAR, Secretary of State of the State of New Jersey, do hereby certify, that the foregoing is a true copy of an Act passed by the Legislature of this State, and approved by the Governor the Sixteenth day of April, A. D. 1868, as taken from and compared with the original now on file in my office.

In Testimony Whereof, I have hereunto set my hand, and affixed my official seal, this Thirteenth day of May,
[L. S.] Eighteen Hundred and Sixty-eight.

H. N. CONGAR.

(*See page* 19.)

☞ **Please read the following Letters, all of recent date, from well known and responsible parties, who have had the Ashcroft Detector in use from One to Twelve Years.**

503 West 24th Street,
New York, February 12, 1868.

Mr. John Ashcroft: We have had one of your Low-water Detectors attached to a forty-horse power steam boiler, at our manufactory, for seven years past, and have tested its efficiency as a low-water alarm on several occasions, varying in time from six to eighteen months; in every trial the alarm was promptly given, and our confidence in the apparatus correspondingly increased. We regard it as a very valuable invention, and have no hesitation in recommending it to all using steam boilers, as a safe and reliable instrument. Respectfully yours, &c.,

MITCHELL, VANCE & CO.

Housatonic, Mass., January 22, 1868.

Mr. John Ashcroft, New York—DEAR SIR: Your favor of 21st inst., is received, and in reply I would say, we have had Ashcroft's Low-water Detector in use on our boilers about seven years, and know of no instance in which it has failed to indicate the absence of water, by melting of the fusible plug, and blowing the whistle, whenever the water has fallen below the end of the pipe, with steam up. It is the most reliable Low-water Detector that we have ever used. Very truly yours,

OWEN PAPER CO.,
HY. D. CONE, *Treas.*

Tapley's Morrocco Factory,
Lynn, Mass., September 17, 1867.

We have used Ashcroft's Low-water Detector for the last 10 years, and have found it to be perfectly reliable. We have melted out the disc, after it had remained in place, and in full operation, for *two years*, and the disc melted as readily as if just placed in position. NATHAN SMITH, 2d, *Engineer.*

(*Continued on page* 20.)

State of New York.

[Every law, unless a different time shall be prescribed therein, shall commence and take effect throughout the State on and not before the twentieth day after the day of its final passage, as certified by the Secretary of State. Sec. 12, title 4, chapter 7, part 1, Revised Statutes.]

[Every law so published in the State Paper may be read in evidence from the paper in which it shall be contained, in all the courts of justice in this State, and all the proceedings before any officer, body or board in which it shall be thought necessary to refer thereto, until three months after the close of the session in which it became a law. Sec. 8, title 7, chap. 8, part 1, Revised Statutes, and Laws of 1845, chap. 280.

CHAPTER 969.

An Act in relation to the inspection of Steam Boilers in the State of New York, except in the Metropolitan Police District.

PASSED JUNE 22, 1867; THREE-FIFTHS BEING PRESENT.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

I. The Governor of the State of New York shall, within sixty days from the date of the passage of this act, and hereafter as necessity may require, appoint a suitable person who shall be inspector in-chief, and one suitable person, who shall be a practicable engineer, in each congressional district as deputy inspector for such district, whose duty it shall be to

(Continued on page 21.)

☞ **Please read the following Letters, all of recent date, from well known and responsible parties, who have had the Ashcroft Detector in use from one to Twelve Years.**

Ironton, O., January 28, 1868.

Mr. John Ashcroft, New York—DEAR SIR: Yours of the 21st inst. came to hand a few days since, requesting us to report the result of the use and benefit of your Low-water Detectors. We have been using your Detectors on *eleven boilers* connected with our mill and machinery, and have frequently tested them, and upon every occasion they have given sufficient notice by an alarm from the whistle, before the water was low enough to endanger them in the least. We consider the detectors above referred to, *invaluable*, and would not do without them at any reasonable cost.

Very respectfully yours,
THE IRONTON ROLLING MILL CO.

Gorham Manf'g Company,
Providence, January 25th, 1868.

Mr. John Ashcroft—DEAR SIR: It gives us pleasure to testify that we have had two of Ashcroft's Low-water Detectors in use for five or more years, and have ever found them correct and reliable. No expense has attended their use, and little or no care has been required to keep them in working order. We can confidently recommend them for public use.

Yours respectfully, GORHAM MANF'G CO.,
JOHN GORHAM, *Pres't.*

Boston, January 9, 1868.

This may certify that we have had Ashcroft's Low-water Detector in use for the last *thirteen years*, and have found it to give the alarm when exposed to low water. We regard it one of the valuable checks which should be attached to every steam boiler in use. A. WENTWORTH & CO.

(*Continued on page* 22.)

inspect steam boilers in such congressional district, as hereinafter specified and directed. Such inspector-in-chief and deputy inspector shall hold office for two years from the date of appointment, unless sooner removed.

II. Every owner of a steam boiler or boilers in use in any of the said congressional districts of the State, shall annually, and at such convenient times and in such manner and form as may by rules and regulations to be made therefor by the inspector-in-chief, report to the deputy inspector for any congressional district in which such boiler or boilers are situated, the location of such steam boiler or boilers, and thereupon, and as soon thereafter as may be practicable, the said deputy inspector shall proceed to inspect such steam boiler or boilers and all apparatus and appliances connected therewith, and the strength and security of each boiler shall be tested by hydrostatic pressure; and every boiler or boilers so tested *shall have, under the control of the inspector-in-chief such attachments, apparatus and appliances as may be necessary for the limitation of pressure, locked and secured in like manner as now in practical use by the United States inspectors of steam boilers according to act of Congress, July twenty-fifth, eighteen hundred and sixty-six;* the said deputy inspector shall limit the pressure of steam to be applied to or upon such boiler, and such deputy inspector shall certify each inspection and such limit of pressure to the owner of the boiler inspected, and also to the engineer in charge of the same, and no greater amount of steam pressure than that certified in the case of any boiler shall be applied thereto. In limiting the amount of pressure wherever the boiler under test will with safety bear the same, the limit desired by the owner of the boiler shall be the one certified.

III. It shall be the duty of the said deputy inspectors, or a ny of them, on receiving any such report as aforesaid fr om

(*Continued on page* 23.)

☞ **Please read the following Letters, all of recent date, from well known and responsible parties, who have had the Ashcroft Detector in use from One to Twelve Years.**

Butler Hospital, January 23d, 1868.

John Ashcroft—DEAR SIR: Yours of 21st inst. is received. There have been in use at this institution, three of Ashcroft's Low-water Detectors, for a period of about ten years; during this time the whistle has given the alarm of *accidental low water four times*; the water has also been repeatedly allowed to get low on purpose to try the apparatus, and it never failed to sound the alarm.

We nominally change the plugs yearly, but one which had been in use *three years*, melted when the water left it, the same as the new ones did. We think the Detector reliable.

I am, very truly yours,
JOHN W. SAWYER.

Office of the Cambria Iron Company,
No. 400 Chestnut St., Philadelphia.

You ask our opinion of the thirty-five "Low Water Detectors" furnished us by you. The best opinion we can give you is this: Please send us fifteen more to Johnstown, and send your bill to this office, and oblige, Yours, respectfully,
EDWARD Y. TOWNSEND,
Vice-Pres't Cambria Iron Co.

Office of Dutchess Print Works,
Wappingers Falls, January 22d, 1868.

John Ashcroft, Esq.—DEAR SIR: We have had a number of your Low-water Detectors on our boilers for the *last six years*, and are satisfied of their being a safeguard against explosion from low water. They never fail of giving warning when anything has gone wrong to cause low water, and do, with pleasure, recommend them. Yours respectfully, J. FAULKNER, *Supt.*

(Continued on page 24.)

the owner of any boiler or boilers, to notify such owner of the time when he will inspect such boiler or boilers, as hereinbefore specified, and it shall be the duty of any such owner to have such boiler or boilers ready for inspection on the day and at the time specified in such notice. In case the owner of any such boiler or boilers shall fail to report the location of such steam boiler or boilers to the deputy inspector as aforesaid, he shall be liable to pay fifty dollars, and in case the owner of any such boiler or boilers shall fail to have the same ready for inspection as aforesaid, he shall be liable to pay the fees and expenses of the said inspector incurred in the inspection of any such boiler, and five dollars in addition thereto. Such fees, expenses and penalty in such case may be sued for and recovered by and in the name of the said inspector-in-chief for the benefit of the county in which such boiler or boilers may be situated.

IV. Each deputy inspector shall make, in proper form, a correct statement of all inspections of steam boilers made by him and any board of examiners as hereinafter provided, and the amount of steam or pressure allowed in each case, and report the same within thirty days after any such inspection or examination to the said inspector-in-chief. In cases where any steam boiler, or the apparatus or appliances connected therewith, shall be deemed by such deputy inspector, upon such inspection as aforesaid to be *insecure or dangerous*, the said deputy inspector shall, as soon as convenient, confer with two practical engineers, who, with such deputy inspector, shall constitute a board of examiners, whose duty it shall be forthwith to further examine such boiler or boilers, and any two of such board shall prescribe such changes and alterations as may render such *boilers, apparatus and appliances secure and devoid of danger*, and in the meantime, and until such changes and alterations are made and *such appliances attached*, the owner of such boiler or boilers, on notice to that

(*Continued on page 25*)

☞ **Please read the following Letters, all of recent date, from well known and responsible parties, who have had the Ashcroft Detector in use from One to Twelve Years.**

Factory office of the Glen Cove Starch Company,
Glen Cove, N. Y., Feb. 8th, 1868.

John Ashcroft, Esq.—DEAR SIR: Yours of a recent date requesting our opinion of Ashcroft's Low-water Detector, is to hand. In answer, would briefly say: We have tried and abandoned many so-called Low-water Detectors, because of their unreliability, at all times, and under all circumstances, *could not trust them.* Ashcroft's Low-water Detector came to our notice about two years since, and as a test was placed upon our boilers, resulting in its being *attached to all the boilers in our establishment.* We feel it to be our duty to say both to you and the public, that we have found your Detector at *all times*, and *under all circumstances, fully reliable*, which we cannot say of any other with which we have had any experience.

Yours respectfully,

GLEN COVE STARCH CO.,

WRIGHT DURYEA, *Supt.*

Office of Leonard Atwood,
Norwich, Conn., February 14th, 1868.

John Ashcroft, Esq., 50 *and* 52 *John St.:* Having applied six of your Patent Low-water Detectors to different boilers, with very flattering results, I do not hesitate to pronounce them the best and only reliable Detector in use. I would recommend them in all cases where safety is required. *They have prevented one of the boilers on which they were placed from exploding, in consequence of low water.* No boiler should be without them.

Yours very truly, LEONARD ATWOOD.

(*Continued on page* 26.)

effect, which shall be given at once by such deputy inspector, *shall be prohibited and prevented from using the said boiler or boilers, under a penalty of fifty dollars for each day's use of such boiler or boilers*, which penalty shall be sued for and recovered in the same manner as the penalty imposed by the third section of this act. The said board of examiners shall each be entitled to receive three dollars for each day or part of a day that they are engaged in making any examination of a boiler as aforesaid, and their actual expenses while so engaged.

V. Each deputy inspector shall receive for every inspection of a boiler according to the provisions of this act, the sum of four dollars, and his actual expenses attending such inspection, and such sums, and the compensation and expenses of any board of examiners convened by a deputy inspector as hereinbefore provided, shall be a charge upon the county in which the boiler inspected or examined shall be situated, and shall be audited and paid by the county in the same manner that other county salaries and expenses are paid.

VI. Any owner of a boiler or boilers who shall consider himself aggrieved by the action of any inspector or any board of examiners, under the provisions of this act may, within thirty days after any such inspection or examination as aforesaid, appeal from the decision of such examiners to the said inspector-in-chief, who, in his discretion, after an examination of the appeal and the report of the deputy inspector in any such case, may order a further inspection and examination, the expense thereof to be borne by the owner of any such boiler or boilers.

VII. It shall be the duty of the inspector-in-chief to make and prescribe rules and regulations which shall govern deputy inspectors in the inspection and examination of steam boilers.

(*Continued on page 27.*)

☞ **Please read the following Letters, all of recent date, from well known and responsible parties, who have had the Ashcroft Detector in use from one to Twelve Years.**

The Bethlehem Iron Co.,
Bethlehem, Pa., May 19, 1867.

Mr. John Ashcroft, No. 50 *John Street*—DEAR SIR: Yours of 10th inst. is at hand, requesting our opinion of your Low-water Detectors. In reply would state that we have ***24*** *of these Detectors* at present in use, and are *putting them on all boilers* we put up. This, I think, is sufficient evidence of our appreciation.

Very truly, JOHN FRITZ, *Supt.*

Office of Russell and Erwin Manufacturing Co.,
New Britain, Ct., January 22*d*, 1868.

Mr. John Ashcroft—DEAR SIR: We have had Ashcroft's Low-water Detector in use on our boilers during the past *eight years*, and have never known them fail to give the alarm when the water was low. We now have four of them in use, and *should not run a boiler without this protection.* Yours respectfully,

RUSSELL AND ERWIN MANF'G CO.,
J. M. WOODRUFF.

Scranton, March 8, 1866.

In reply to your inquiries as to the practical operations of Ashcroft's Patent Low-water Detector we use at our works, it affords me pleasure to say that of the thirty in use, not one has failed to report itself when the occasion required it, and we are entirely stisfied of their value.

Yours, respectfully, JOS. H. SCRANTON, Pres.

Lackawanna Coal and Iron Company.

Sir: I have attached quite a number of the Low-water Detectors myself, and seen a great many more in use. I have also known them in a number of instances to save boilers, and in no instance have I known them to fail in case of low water.

G. B. KING,
Inspector of Steam Boilers, Lowell, Mass.
And twenty years Master Mech. Boston and Lowell R. R.

(*Continued on page* 28.)

To furnish each deputy inspector with the forms or blank certificates of inspection, together with the necessary apparatus and appliances for testing and examining steam boilers at the expense of the State. To keep a correct record of all inspections of steam boilers and of the amount of steam or pressure allowed in each case reported to him by any deputy inspector, which record shall be the property of the State, and shall annually be filed in the office of the Secretary of State. The said inspector-in-chief shall receive annually, from the State, a salary of two thousand dollars, which shall be paid by the Comptroller of the State in the same manner that other State salaries are paid. The expenses of furnishing apparatus and appliances for the purpose of inspecting steam boilers as hereinbefore prescribed shall be borne by the State and paid in the same manner that other State charges and expenses are paid. No bill for any such expenses or charges shall be paid, however, unless the same be certified by the inspector-in-chief to be correct.

VIII. All fines, expenses and penalties incurred and recovered under this act, which are recoverable by or in the name of the said inspector-in-chief, under this act, shall be paid into the treasury of the county, in which the same may have been incurred.

IX. This Act shall not apply to the Metropolitan police district.

X. It shall be the duty of said deputy inspector, on the inspection of any boiler or boilers, to deliver to the owner or owners of the same a certificate of inspection, stating the condition of said boiler or boilers, as in the second section herein provided; and if any of said deputy inspectors shall deliver or cause to be delivered to the owner or owners of any boiler or boilers so to be inspected a certificate of inspection, without

(*Continued on page 29.*)

☞ **Please read the following Letters, all of recent date, from well known and responsible parties, who have had the Ashcroft Detector in use from One to Twelve Years.**

Office of Machine Shop, National Armory,
Springfield, Mass., Feb. 20, 1868.

John Ashcroft—SIR: Yours of January 20th is received, and in reply would say, that six of the Ashcroft Patent Low-water Detectors have been in use since last August, and have always found them to operate when necessity required.

Very respectfully, SAM'L W. PORTER,
Approved—J. G. BENTON, *Brevet Col. Com'g.* *Master Machinist.*

Cornwall Anthracite Company.

I am in receipt of yours, asking my opinion of Ashcroft's Low-water Detector. There are two sets of boilers at this place, and two at Donaghmore to which the Detectors are attached, and two sets of boilers here to which I intend to have them applied as soon as opportunity offers. I am so well satisfied with them that I consider them not only a necessary, but an absolutely indispensable appendage to every steam boiler or set of boilers.

Yours truly, A. WILHELM, *Manager.*

Sir: We have had in use for several years, at our works, nine of your Low-water Detectors. They have, in many instances, notified us of low water, and on one occasion unquestionably saved us from a serious accident. We value them highly, and would not be without them. CHAS. M. BURNEY, *Boston Belting Co.*

Bridgeton, N. J., October 4, 1865.

Sir: For the last year we have had Ashcroft's Low-water Detector on each of the boilers in use at these works, and it affords me pleasure to bear testimony to their perfect reliability to perform all you promised for them, as has been shown on two occasions within a few months. It is a most valuable invention, and we shall in future apply them to all of our boilers. We have already fourteen of them in use. Yours, &c.,

B. C. NICHOLS, *President and Manager.*

(*Continued on page* 30.)

having first subjected the said boiler or boilers to the mechanical tests as hereinbefore provided, *he shall be liable to a penalty of five hundred dollars for every such act*, to be sued for and recovered in the same manner as the penalty imposed by the third section of this act. And it is further provided that if any owner or owners of any boiler or boilers so inspected shall thereafter use or allow to be used therein an amount of steam greater than is specified in said certificate of inspection, he or they shall be liable to a penalty of one thousand dollars, to be sued for and recovered in the same manner as the penalty imposed by the third section of this act. And it is further provided that the said certificate of inspection shall be kept in some conspicuous place on the premises where the boiler referred to by said certificate is used. And it is further provided that every owner or owners of steam boiler or boilers *shall cause to be attached thereto a low-water indicator, to connect with a steam whistle*, said low-water indicator to be of such construction as to be approved by the inspector-in-chief. In case the owner or owners of any such boiler or boilers shall fail to attach, or cause to be attached, *said low-water indicator*, he or they shall be liable to a *penalty of five hundred dollars*, to be sued for and recovered in the same manner as the penalty imposed by the third section of this act.

XI. This Act shall take effect immediately.

STATE OF NEW YORK,
OFFICE OF THE SECRETARY OF STATE, } *ss.*

I have compared the preceding with the original law on file in this office, and do hereby certify that the same is a correct transcript therefrom and of the whole of said original law.

FRANCIS C. BARLOW,
Secretary of State.

☞ **Please read the following Letters, all of recent date, from well known and responsible parties, who have had the Ashcroft Detector in use from One to Twelve Years.**

Boston, January 8, 1868.

Ashcroft's Low-water Detector.—After an experience of nine years I can say that it is *infallible*. Attached to our 16 boilers *nine years since*, and *in daily use during that period*, I can give the verdict in favor of it, which is, that it is *infallible*. Operated by the law of gravitation, it is faithful to that law. It can not help it.

JAMES LEE, JR.

Monongahela Paper Mills, April 14th, 1866.

Mr. John Ashcroft, New York—DEAR SIR: Your Low-water Detector, recently purchased from you, operated yesterday afternoon, under circumstances that prevented a terrible explosion of the boiler of this establishment. I regard the Detector as invaluable, and would not, on any account, be without it.

Yours truly, A. CULBERTSON.

Office of Downer Kerosene Oil Co.
No. 108 *Water St., Boston, June* 10, 1867.

Mr. Ashcroft—MY DEAR SIR: I take pleasure in giving you my unqualified approval of your most beautiful and promptly efficient apparatus for detecting a low stage of water in steam boilers, called your Low-water Detector. I have had them in constant use on our boilers for the last ten years, and during the entire period they have always proved efficient and trustworthy. I set the Detector some six inches above the flues, in order to ensure perfect safety, and from this cause the plugs have melted out, I think at least seventy times, giving the alarm promptly, and noisily enough to ensure the attention not only of the engineer but of all persons in the vicinity. I consider no steam boiler perfect without one of your Detectors, and with it no boiler can be damaged from low water.

You are at liberty to use this slight testimonial as may best serve your interests. Respectfully yours,

JOSHUA MERRILL, *Supt. D. K. O. Co.*

☞ **The United States Government have had the Ashcroft Detector in use for some years. Read the following.**

Eng. and Mech. Dept., Navy Yard,
Washington, June 29, 1862.

Capt. John A. Dahlgren, Comd't.—SIR: In obedience to your order of May 30, 1862, after one month's trial of Ashcroft's Low-water Detector, attached to the boiler in the anchor shop, I would respectfully state, that the Detector is simple, sure and efficient. I consider it a perfect security against damage from low water in the boiler. I would recommend it to remain on the boiler, and that twenty-five of the same be furnished.

Very respectfully, your obed't serv't,
G. R. WILSON.

Respectfully referred. J. A. DAHLGREN, *Comd't.*

Portsmouth Navy Yard,
August 11, 1862.

Admiral Smith: I herewith forward the report of the officers directed by me, in accordance with your orders, to report upon Ashcroft's Low-water Detector. From a personal inspection, as well as from this report, I am confident that it is a most useful invention for every steam boiler, and the more so as this faithful monitor never assumes its power until a warning is necessary.

I most cheerfully recommend its adoption throughout the Naval service. G. F. PEARSON, *Comd't, Portsmouth.*

Bureau of Yards and Docks,
October 1, 1862.

Sir: You will adopt and apply Ashcroft's Low-water Detector on such boilers in the yard under your command as you shall deem most advantageous to the public interest.

Yours respectfully,
(Signed,) JOS. SMITH, *Admiral U. S. N.*

Com'r J. B. Montgomery, Navy Yard, Boston.

☞ The United States Government have had the Ashcroft Detector in use for some years. Read the following.

Navy Yard, Portsmouth, N. H.,
August 11, 1862.

Sir: We have witnessed, with much interest, the working of Ashcroft's Low-water Detector, as tested on the steam boiler in Ord. Department of this yard, and respectfully report, as the result of our observations, a coincidence of opinion as to its simplicity and its promise of future usefulness.

It notifies everybody in the neighborhood that water is low in the boilers. We recommend it.

Very respectfully your obedient servants,

(Signed,) A. MURRAY, *Com'dr.*
JOS. M. BRADFORD, *Lt.-Com'dr.*
G. J. PRESCOTT, *M. Machinist.*

Captain Geo. F. Pearson, Comd't, Navy Yard, Portsmouth.

Approved. (Signed,) G. F. PEARSON, *Comd't.*

Navy Yard, Boston,
Machinist's Dept., Aug. 25, 1862.

Sir: Agreeably to your order, we have tested Ashcroft's Low-water Detector, and have the honor to report that the instrument is simple in construction, and is, in our opinion, reliable in its operation. It worked successfully in our presence. We deem it a desirable appendage to steam boilers as a safeguard and an alarm to persons exposed to danger.

We recommend its use, on the condition that the alarm should be considered *prima facie* evidence of neglect on the part of persons in charge of boilers to which it is attached.

Very respectfully, your obed't servant,

M. H. MERRIAM, *Supt.*

Commodore J. B. Montgomery, Com'dg Naval Station, Boston.

SAVE YOUR BOILERS FROM EXPLOSION.

PITTSBURGH, PENNSYLVANIA, 1867.

As explosions in most instances are caused by allowing the water to get too low in the boilers, we, the undersigned, desire to urge upon manufacturers, and all using steam, (not only for their own sakes, but for the sake of the community at large,) the necessity of having an independent attachment to their boilers which will never fail to give immediate notice when the water is getting too low for safety. Our experience for several years has proved the reliability of ASHCROFT'S LOW-WATER DETECTOR for that purpose, under a variety of circumstances, and we are warranted in saying that wherever that instrument is applied, the water cannot get to a dangerous point without our being notified of the fact.

Eagle Iron Works, James Wood & Co.
Lewis, Bailey, Dalzell & Co.
Schoenberger & Co., per J. Harris, Engineer.
Spang, Chalfant & Co., per Lewis King, Engineer.
Union Iron Mills, Andrew Kloman, Superintendent.
Brown & Co., per R. Means, Engineer.
Park Brothers & Co.
Barr & Myers, Pittsburgh Post.
Henry McCoy.
John Grayburn, Chronicle.

50 and 52 JOHN STREET, N. Y.

EXTRACT FROM THE REPORT OF CAPT. W. M. MEW

TO THE

SECRETARY OF THE TREASURY,

ON

LIFE SAVING INVENTIONS,

Made February 20th, 1868.

ASHCROFT'S LOW-WATER DETECTOR

Consists of a pipe passing through the top of a boiler, the lower end reaching to the low-water mark, the upper portion extending above, and outside the boiler, to which are attached an air-chamber and whistle. The communication between the pipe and the whistle is cut off by a disc of alloy, which fuses at a temperature of 212°, or at the boiling point of water.

The operation is as follows: After the boiler is filled with water the steam forces it up the pipe into the chamber, and there being no circulation, it remains comparatively cool; but when the water falls below the end of the pipe the steam immediately replaces it melts the disc, reaches the whistle, and gives the alarm.

It is believed that this device is both safe and reliable, and its use is recommended.

Very respectfully your obedient servant,

W. M. MEW.

HON. H. McCULLOCH,
SECRETARY OF THE TREASURY.

A PARTIAL LIST

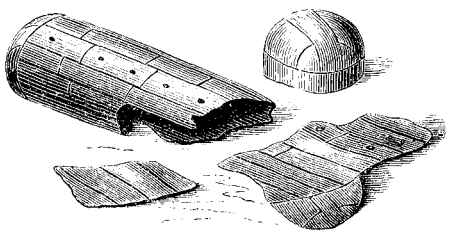
OF THE

Steam Boiler Explosions in 1867.

We select the following, from the report of Mr. E. B. Marten, Engineer of the Midland Boiler Association. They are a few of the many terrible accidents that could have been prevented by the application of the

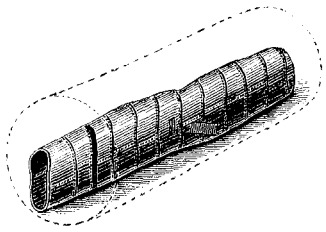
Ashcroft Low-Water Detector, and Double Seated Lock Safety-Valve.

No. 1. *January 2d.* 3 *killed,* 3 *injured.*



Plain cylinder, 33 ft. long, 6 ft. diameter, 33 lb. pressure. Only set two days, but was old and deteriorated, and had worked before at another place. It had been turned ¼ round, and old fitting-holes stopped. First rent was supposed to be in a seam at front end, over the fire. Main portion of shell was driven back, and front end forward, and torn in its flight. The cause of explosion was, that the seam in front was over-heated and injured, and also incautious working without a steam-gauge and Low-water Detector.

No 2. *January 2d.* 1 *killed*, 4 *injured.*

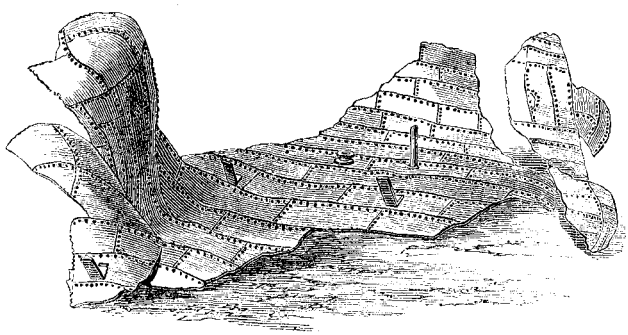


One tube externally fired, 30 ft. long, 6 ft. 6 in. diameter, with dished ends. Tube 2 ft. 9 in. diameter, slightly oval. Pressure 60 lb. Tube collapsed sideways from end to end, because it was not strengthened by hoops or other means, which were the more needed because it was slightly oval and the longitudinal seams were nearly in one line.

No. 3. *January* 3*d.* 1 *killed.*

Boiler for heating apparatus. Fire was lighted without noticing that as there was no safety-valve all escape of steam was prevented by the connecting-pipes being frozen. *Our Double Seated Lock Safety-valve would have prevented it.*

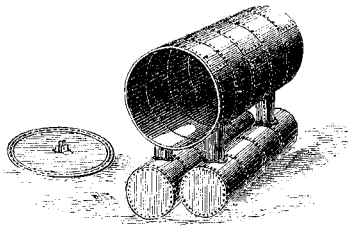
No. 4. *January* 26*th.* 3 *injured.*



Plain cylinder, 30 ft. long, 6 ft. 2 in. diameter. Pressure, 30 lb. to 35 lb. Rent into four pieces, which were flattened out and scattered on to other boilers, but are arranged in sketch so as to

show their original position in the boiler. It had worked a very long time, and was overheated and injured along the fractured line. *Should have had a Detector and Safety-valve.*

No. 5. *January* 30*th.* 2 *killed*, 2 *injured.*



Elephant boiler, 16 ft. long, 5 ft. diameter; tubes, 1 ft. 10 in. diameter; 45 lb. pressure. Flat end blew out, throwing boiler upwards by reaction, but shell and tubes were not injured. The flat end was not sufficiently stayed, having only one stay-rod to the centre, the bolt of which was broken. Cause, low-water. A Detector would have saved it.

No. 6. *January* 23*d.* 1 *killed.*

Boiler. Fire had been out some days, and the boiler burst soon after rekindling it, and did much damage, because the supply-pipes were stopped by frost, and there was no safety-valve for escape of steam. *Our Safety-valve would have saved it.*

No. 7. *January* 9*th.* 1 *killed*, 3 *injured.*

Boiler, which burst because the supply-pipes were stopped by frost, and there was no safety-valve.

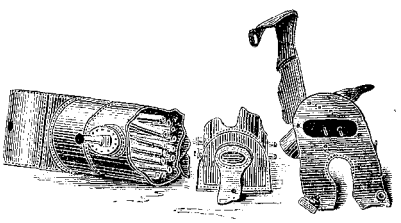
No. 8. *February* 8*th.* 1 *killed*, 4 *injured.*

Small boiler to 6 horse power engine. Gave way at centre of furnace, and water forced out at both ends. The water was low. *Ashcroft's Low-water Detector would have saved it.*

No. 9. *February 11th.* 4 *injured.*

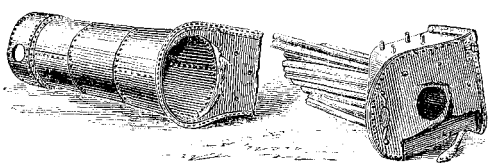
Cornish, about 30 ft. long. Tube, 3 ft., unstayed. Tube collapsed sideways, and was rent from grate-bars to end, without injuring front plates or shell. It was short of water. *Ashcroft's Low-water Detector would have saved it.*

No. 10. *March 12th.* 1 *killed*, 3 *injured.*



Agricultural, 45 lb. pressure. Fire-box blew off, and the outer shell separated from it. The cause of explosion was over-pressure from the safety-valve being screwed down. *Our Lock Safety-valve would have prevented this terrible accident.*

No. 11. *March 19th.* 8 *killed*, 4 *injured.*



Agricultural, 45 lb. pressure. Fire-box and tubes blew out. The cause of explosion was over-pressure, as the safety-valve was tied down with string. *Our Lock Safety-valve would have saved the lives and loss.*

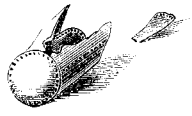
No. 12. *March 23d.* 3 *killed*, 1 *injured.*

Colliery boiler, 30 lb. pressure. Rent in two while the engine was standing, but no details obtained.

No. 13. *March 29th.* 2 *killed*, 2 *injured.*

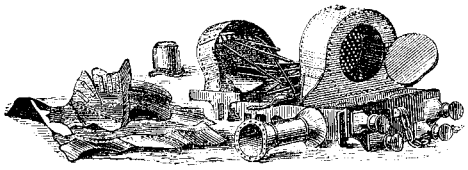
Small plain cylinder with nearly flat ends, 4 ft. 7 in. long, 2 ft. 4 in. diameter; plates $\frac{5}{16}$th inch No emptying-plug or feed-pipe, and only a very small hand-hole. Front end attached by slight angle-iron, which gave way, leaving the shell unmoved. The cause of explosion was the internal corrosion of front end, owing to very bad water being used. The plates were reduced to a knife edge in line of fracture.

No. 14. *May 9th.* 2 *injured.*



Plain cylinder, 3 ft. 2 in. long, 1 ft. 8 in. diameter; plates, $\frac{5}{16}$th inch; pressure, 30 lb. Workmanship and material very inferior. Piece of top ripped out from manhole, and allowed man-lid to blow out through manhole. The cause of the explosion was the large manhole and over-pressure. The safety-valve was too small, and very roughly made. *Our Lock Safety-valve would have saved it.*

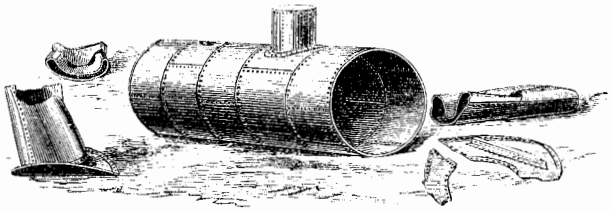
No. 15. *May 10th.* 1 *killed*, 1 *injured.*



Locomotive, 130 lb. pressure. Barrel blown away and broken

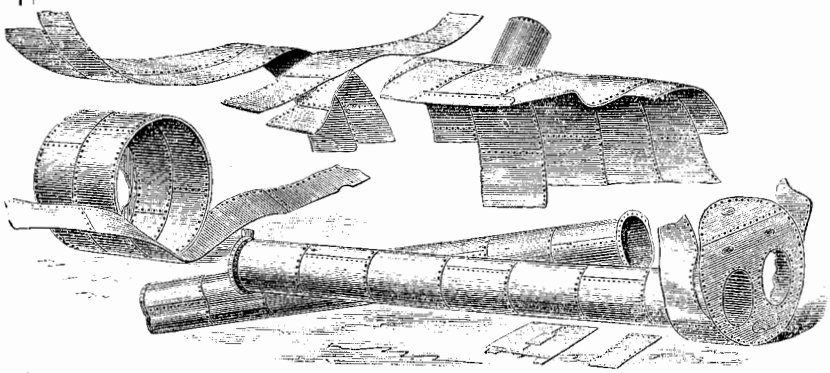
to pieces, leaving fire and smoke boxes. The cause of explosion was supposed to be the strain on the boiler caused by its being made a stay to the frame without allowance for expansion, and thereby weakening a horizontal seam.

No. 16. *May 18th.* 4 *injured.*



Cornish, one tube 20 ft. 6 in. long, 5 ft. 4½ in. diameter; tube, 3 t. diameter; plates, ⅜ in.; pressure, 64 lb. The ends came out and tube collapsed for its full length, every joint being broken. The cause of explosion was bad construction and workmanship, and tube too weak for pressure. Should have had a Lock Valve and Detector.

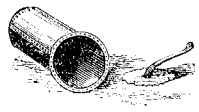
No. 17. *June 4th.* 2 *killed.*



Two tube, externally fired, 30 ft. long, 7 ft. diameter; tubes, 2 ft. 4 in. diameter; pressure, 50 lb. Two plates lately put in bottom gave way, and shell rent along bottom and opened out, dividing into several pieces, which were scattered to great distances,

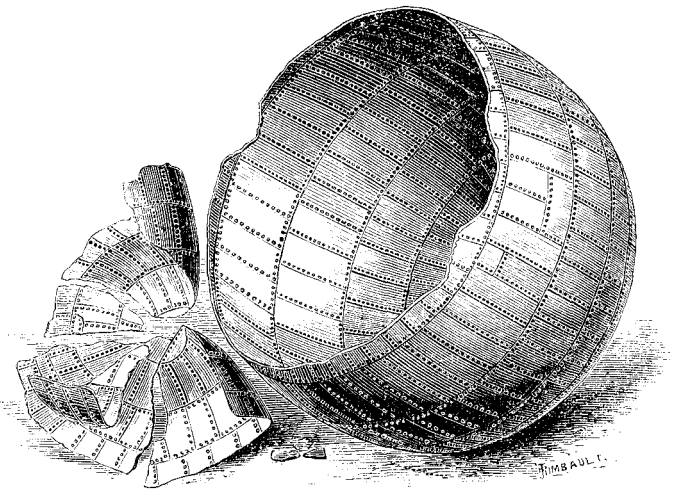
but are arranged in sketch so as to show their original position. The cause of explosion was too frequent repair over the fire-place, and external firing.

No. 18. *April 20th.* 1 *killed*, 2 *injured.*



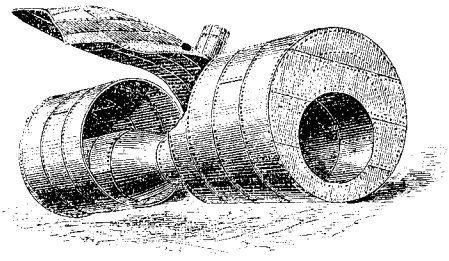
Plain cylinder, 6 ft. long, 2 ft. 5 in. diameter; plates, ¼ in.; pressure, 90 lb. The end blew out from excessive pressure, as the escape from the safety-valve was prevented by a plug. *Should have had a Lock Safety-valve*

No. 19. *July 10th.* 1 *killed*, 2 *injured.*



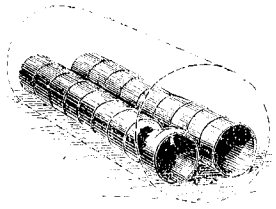
Balloon, 22 ft. diameter; pressure, 5 lb. Bottom blew out, and was torn in pieces. Main portion of shell fell over on to another boiler. The cause of explosion was deep corrosion along the bottom where it rested on the brickwork.

No. 20. *July* 11*th.* 3 *killed,* 3 *injured.*



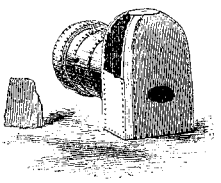
One-tube Cornish, 26 ft. long, 8 ft. 10½ in. diameter; tube, 5 ft. diameter for 8 ft. 6 in. of front end, tapering to 4 ft. diameter at back; pressure, 30 lb. Rent along bottom, allowing central ring of plates to open out. The whole boiler was thrown some distance by the re-action of issuing contents. The cause of explosion was corrosion at midfeather wall, the plates being little thicker than paper.

No. 21. *July* 13*th.* *None injured.*



Two-tube Cornish, 31 ft. long, 7 ft. diameter; tube, 2 ft. 7 in., tapering to 2 ft.; pressure, 55 lb. Left-hand tube collapsed, and about the centre of collapse plate was torn in two pieces from seam to seam. The cause of explosion was over-heating, because the water was being let low before all the fire was out. *Our Low-water Detector would have saved it.*

No. 22. *July 24th.* 1 *injured.*



Locomotive. Side-plate in the upper part of high top fire-box blew away. The cause of explosion was most likely the boiler being made the frame of the engine without allowance for expansion.

No. 23. *January 11th.* 1 *killed.*

Cornish, 12 ft. long, 4 ft. 6 in. diameter; tube, 2 ft. 4 in. diameter; pressure, 40 lb. Small piece of plate was blown out near the bottom, and the boiler was displaced by the re-action of issuing contents. The cause of explosion was extensive external corrosion on the lower part.

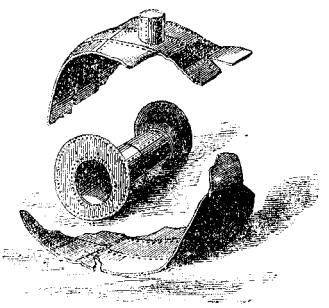
No. 24. *February 15th. None injured.*

Two-flued, 28 ft. long, 6 ft. 9 in. diameter, slightly oval; plates, $\frac{3}{8}$ in.; tube, 2 ft. 8 in. diameter; pressure, 45 lb. Shell had once been externally fired. Rent along the seams, which were in one line, and a large piece of the plate blew away, leaving tubes uninjured. The cause of explosion was defective form and worn-out state of shell.

No. 25. *October 4th.* 4 *injured.*

Water heater made of large bottle-shaped pipes placed in the flue. The force of explosion caused the neighboring boilers to be unseated. No details have been obtained as to the cause of the explosion.

No. 26. *October 7th.* 1 *killed.*

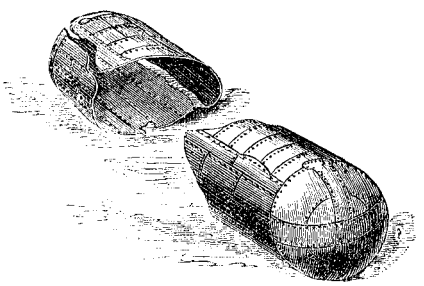


One-tube Cornish, 11 ft. long, 4 ft. diameter; plates, $\frac{3}{8}$ in.; tube, 2 ft. $1\frac{1}{2}$ in. diameter; pressure, 50 lb. Gave way underneath. Top thrown upwards. Front part and tube thrown to the front. The cause of the explosion was extensive corrosion at the bottom where it touched the walls.

No. 27. *September 2d.* 2 *injured.*

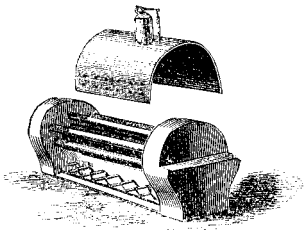
Locomotive, but no details obtained.

No. 28. *November 3d.* 1 *killed*, 1 *injured.*



Plain cylinder, 19 ft. long, 6 ft. diameter; pressure, 40 lb. It was thirty-six years old, and iron deteriorated and also much patched. The cause of explosion was over-pressure for so old a boiler. *Should have had a Lock Safety-valve.*

No. 29. *November 6th.* 2 *killed*, 3 *injured.*

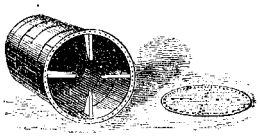


Agricultural, wagon-shaped, 6 ft. 5 in. long, 3 ft. high, 2 ft. 4 in. wide; plates, $\frac{3}{8}$ in.; pressure, 50 lb. Upper portion of barrel blew off. The cause of the explosion was over-pressure.

No. 30. *August 5th.* 1 *killed*, 2 *injured*

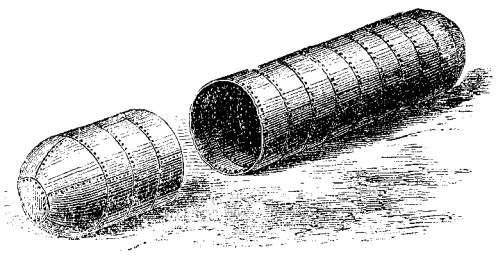
Full particulars are not obtained, but the steam and hot water were allowed to come in from a neighboring boiler through the blow-off pipe while the men were cleaning.

No. 31. *November 7th.* 1 *injured.*



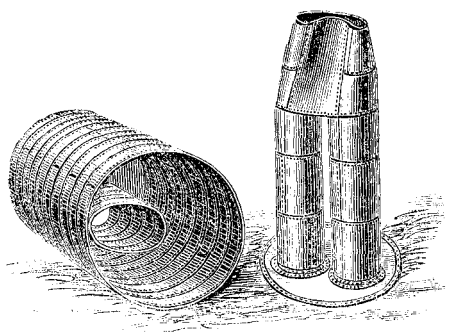
Plain cylinder, 12 ft. 3 in. long, 3 ft. 11 in. diameter; pressure, 20 lb.; flat front, and round back end. Main portion thrown back, and front forward. Front torn all round the root of angle-iron, and stay-rivets drawn through flat end. The cause of explosion was weakness of construction of flat end, and bad safety-valve, which could have been loaded to 60 lb. *Should have had a Lock Safety-valve.*

No. 32. *November* 11*th.* 3 *killed*, 10 *injured.*



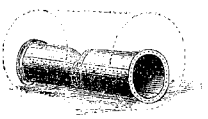
Plain cylinder, 40 ft. long, 5 ft. diameter; plates, $\frac{5}{16}$th in.; pressure, 45 lb. to 50 lb. Parted at third seam, and front thrown forward, and main portion backwards. The cause of explosion was a seam-rip of old standing near patch at place of first rupture.

No. 33. *November* 14*th.* 4 *killed*, 3 *injured.*



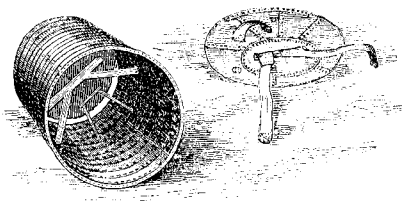
Breeches tube, 25 ft. 6 in. long, 7 ft. 6 in. diameter; plates, $\frac{5}{16}$th in.; pressure, 30 lb. Front end and fire-grate tubes and taper junction were thrown to the front in one piece. Main shell not injured. Back part of tube remained in boiler. Bottom part of taper junction, where flattened to receive the two fire-tubes, collapsed upwards. The cause of explosion was the want of proper stays or strengthening tubes, and consequent weakness. There was only one safety-valve of small size. *Should have had our Lock Safety-valve.*

No. 34. *November 21st.* 3 *killed,* 2 *injured.*



One-tube Cornish, 11 ft. long, 5 ft. diameter; pressure 44 lb. Tube gave way at an old crack at back of strap-plate and partially collapsed.

No. 35. *November 27th.* 1 *killed.*

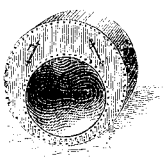


Plain cylinder, 25 ft. long, 6 ft. diameter; plates $\frac{1}{16}$th in.; pressure 50 lb. Had been a one-tube Cornish, but tube had been taken out, leaving flat ends. Back end was blown out. Main shell thrown forwards. The cause of explosion was weakness of construction in not sufficiently strengthening the flat end to compensate for loss of tube.

No. 36. *October 31st. None injured.*

Cornish, 26 ft. long, 5 ft. 6 in. diameter; tube, 2 ft. 11 in. diameter; plates, $\frac{3}{8}$ in.; pressure, 30 lb. Tube collapsed for want of proper strengthening hoops, blowing out back end and blowing boiler forward.

No. 37. *December 7th. None injured.*

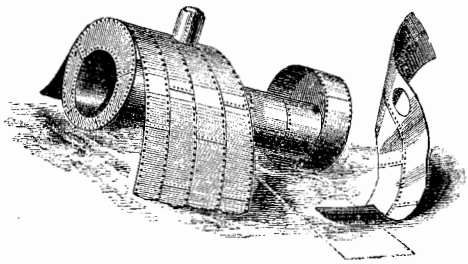


One-tube Cornish, 28 ft. long, 6 ft. diameter; tube, 4 ft diameter; plates, $\frac{3}{8}$ in.; pressure 28 lb. Tube collapsed for the whole length, but no particulars of the cause obtained.

No. 38. *December* 14*th.* 2 *killed.*

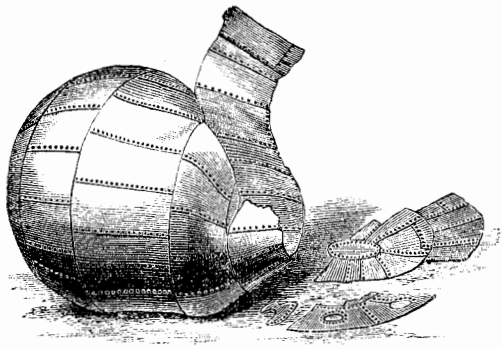
Some repair had been done to a boiler, and a blank flange used to stop off the steam, was being removed without shutting the stop-valves to the other boilers, and the joint blew out when the bolts were loosened.

No. 39. *December* 23*d.* 6 *killed,* 4 *injured.*



One-tube Cornish, 18 ft. long, 6 ft. diameter; tube, 3 ft. 2 in. diameter; plates, $\frac{3}{8}$ in.; pressure 25 lb. Rent along bottom, and two rings of plates blown away, but tubes and ends not much injured. The cause of explosion was extensive corrosion on the part resting on the midfeather wall.

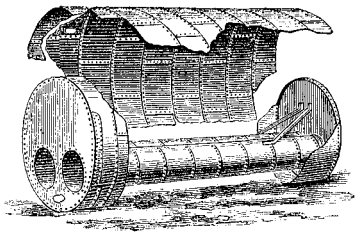
No. 40. *December* 28*th.* 1 *killed.*



Balloon, 11 ft. 6 in. diameter, and 11 ft. 6 in. high; plates, $\frac{3}{8}$ in. Bottom domed up 3 ft. 6 in. over fire; ordinary pressure, 8 lb.

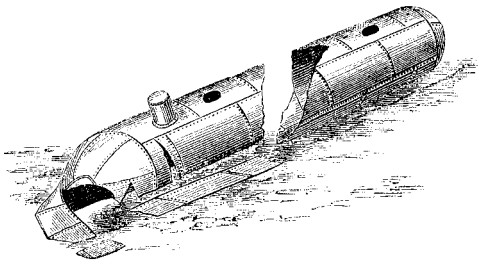
Boiler had worked two days at 25 lb. pressure, but safety-valve loaded to 16 lb. The cause of explosion was undue pressure for an old boiler of such weak shape. *Should have had our Lock Safety-valve.*

No. 41. *December 30th.* 2 *injured.*



Two-tube Cornish, 22 ft. long, 7 ft. 2 in. diameter; tubes 2 ft. 7 in. diameter; pressure 15 lb. Rent along bottom, and shell blown away, leaving tubes and ends nearly uninjured. The cause of explosion was that the bottom was corroded to a knife edge all along the midfeather wall.

No. 42. *December 31st.* 2 *killed,* 1 *injured.*



Plain cylinder, 30 ft. long, 4 ft. 6 in. diameter; plates $\frac{3}{8}$ in.; pressure 29 lb. Rent over fire near where a new plate had lately been put in. Front part of shell opened out and rent, and back end blew away in one piece. The cause of explosion was deterioration from 20 years' wear and bad management. *Should have had a Low-water Detector and Lock Safety-valve.*

STEAM BOILER EXPLOSIONS.

The following is a partial list of some of the *fearful accidents caused by steam boiler explosions*, which discloses the *astounding fact* that within the short period of *two years*, more than *one thousand lives* have been *sacrificed*, and *property* to the extent of *many millions of dollars destroyed*. In the majority of cases, *explosions* have resulted from an *insufficient supply of water in the boiler*. Therefore, greater security to life and property in the use of steam has become *a paramount necessity*, and the subject *demands* the earnest attention of all persons using steam boilers.

With these facts so clearly demonstrated by the appended report, it is of the utmost importance that every precaution be used, and every energy exerted in guarding against and reducing to the fullest extent, the many *calamities* of this nature, so frequently occuring, and which can to a great extent be accomplished by the use of *Ashcroft's Low-water Detector*, whose office is to save *life and property*. There is at the present time, in full and approved operation, more than eight thousand of these instruments, of which number, *not one* has been known to fail in giving timely warning of the approach of *danger*.

Another effective and invaluable agent for the prevention of steam boiler explosions, from excessive pressure, is the *Metropolitan Double Seat Lock Safety-Valve*, being simple in construction, and having many advantages unpossessed by any other. It has nearly double the area of the ordinary valve, consequently allowing a much greater escape of steam, thereby relieving the boiler of all undue pressure, and obviating many of those *terrible accidents* such as have occurred from the use of inferior and worthless safety-valves. With these *reliable instruments* attached to a boiler under the charge of a faithful and practical engineer, explosions from low water and high pressure may be entirely avoided.

1865.

Oct. 12.—The steamer "Yo Semite" exploded her boilers near Sacramento, killing 64 persons and injuring 32 others.

Oct. 12.—A locomotive boiler exploded on the South Carolina R. R., killing 3 men.

Oct. 17.—The boiler of a phosphate of lime manufactory in Blazing Star, N. J., exploded, killing 3 men. The boiler was thrown 185 feet. Accident attributed to an insufficiency of water in the boiler.

Oct. 19.—Steamer Fannie Cadwallader. 1 killed.

Oct. 22.—Locomotive on B. & O. R. R. 1 killed.

Oct 23.—A boiler exploded in a carpenter's shop in New York city. 1 man severely injured.

Oct. 27.—A locomotive boiler exploded on the Raleigh and Gaston R. R., Virginia, 2 men killed.

Oct. 27.—A locomotive boiler exploded at Portsmouth, N. H. Fireman killed.

Oct. 27.—The steam-tug "Coinjock," at Norfolk, exploded her boilers, blowing the boat to atoms, and instantly killing 5 persons, all on board.

Oct. 28.—Locomotive on Easton R. R. 2 killed.

Oct. 29.—The steamer "St. John" exploded her boilers at New York. 15 persons killed and a large number severely scalded.

Nov. 7.—The boiler of a steam dredge exploded at Portland. Several persons injured.

Nov. 9.—A boiler used for generating steam in the "Convent of the Sacred Heart," on the Bloomingdale Road, N. Y., exploded, killing the engineer and badly damaging the building.

Nov. 30.—A boiler exploded in the "Penn Treaty Iron Works," at Philadelphia. 1 man killed and several injured.

Dec. 12.—The steamer "De Soto," plying between New Orleans and Pascagoula, exploded her boilers, killing 4 persons and scalding several others.

Dec. 13.—A locomotive boiler exploded on the Illinois Central R. R. The engineer was instantly killed, and parts of the boiler were thrown a distance of 500 feet.

Dec. 15.—A boiler exploded in a brush factory at Lansingburg, N. Y. The engineer was killed and the building and stock damaged to the extent of $20,000.

Dec. 16.—A boiler exploded in a printing office at Buffalo, N. Y. The engineer was badly but not fatally injured.

Dec. 22.—A locomotive boiler exploded in the depot at Terre Haute, Indiana. 2 persons were killed, the roof of the depot blown off, and the building otherwise injured.

Dec. 27.—At Dubuque, Iowa, the boiler of a distillery exploded, killing the fireman and utterly demolishing the building.

1866.

Jan. 2.—At South Coventry, Conn., the boiler of a woolen mill exploded, killing one man and destroying the building. Damage $6,000.

Jan. 4.—The steam tug "Neptune" exploded her boiler in New York harbor. Two men were killed and six badly scalded.

Jan. 9.—A locomotive boiler exploded on the New Jersey Central R. R. The engineer was killed and the engine was blown literally to atoms.

Jan. 24.—The boiler of a mill in Ravenna, Ohio, exploded, killing several persons.

Jan. 30.—The steamer "Miami" exploded her boilers six miles below the mouth of the Arkansas river. The boat took fire from the explosion and burned up. Between 150 and 200 lives were lost. On the same day the steamer "Missouri," near the mouth of Green River, exploded her boilers, and out of 100 passengers only 20 escaped with their lives, many of these being horribly scalded.

Jan. 31.—A locomotive boiler exploded on the Jackson R. R., near Amity City, La. Three persons were killed.

Feb. 2.—The steamer "W. R. Carter" exploded her boilers near Vicksburg. This was a most heart-rending disaster. About 250 persons were killed and nearly as many more were shockingly mutilated and scalded.

Feb. 2.—A stationary boiler in Petersburg, Va., exploded, killing 4 persons and injuring 12 others.

Feb. 3.—The tow boat "Baltic," at New Orleans, exploded her boilers, killing 5 persons and injuring several others.

Feb. 7.—A locomotive boiler exploded on the Flemington R. R., N. J., killing the engineer and badly scalding the fireman.

Feb. 23.—At Jersey City, N. J., a locomotive boiler exploded, badly injuring the fireman. On the same day a boiler exploded in a steam saw mill near New Buffalo, Mich., killing two persons. And still another occurred on the same day, in a foundry at Oshkosh, Wis., killing 4 persons.

Feb. 26.—A very destructive explosion took place at an iron furnace in Middletown, N. Y. One of the boilers connected with this establishment was thrown 500 yards. Others were displaced and the building was destroyed. 5 persons were killed and 6 wounded. Loss estimated to exceed $50,000.

Mar. 3.—The steamer "Lockwood" exploded her boilers near Memphis. The boat was entirely destroyed 20 persons were killed and 25 wounded.

Mar. 9.—A locomotive boiler exploded on the New York and New Haven R. R., at Harlem Bridge. 1 killed and 1 badly wounded.

March 16.—A boiler exploded at Erie, Pa. Building demolished, 1 person killed and 3 severely injured.

March 21.—A boiler exploded at Elkhorn Mills, six miles from Titusville, Pa. 2 persons killed and several injured.

March 28.—The boiler of a steam flouring mill near Mitchell, Ind., exploded, killing 2 persons and wounding 2 others.

April 5.—A boiler explosion occurred at Cincinnati: 2 persons were killed; loss $15,000.

April 23.—The steamer "John Raymond" exploded her boilers near Island No. 40, on the Mississippi River. The engineer was killed and 7 other persons were wounded. Loss $2,000.

May 3.—A tow-boat exploded her boilers near Memphis, killing 9 persons.

May 17.—The steamer "Lion," on the St. Lawrence, exploded her boilers, killing and wounding a number of persons.

May 31.—The steamer "City of Memphis" exploded her boilers on the Mississippi River. 8 killed and many injured. Heavy loss of property.

July 21.—The canal steamer "Henry D. Graw" exploded her boiler, killing 1 person and wounding 2 others.

July 21.—The boiler in a sugar refinery in New York city exploded, killing 1 person and scalding many others.

July 23.—A locomotive boiler exploded at Pittsburgh, Pa.

July 26.—The boiler of a yarn manufactory in Philadelphia, Pa., exploded, killing a number of persons.

Aug. 6.—The steamer "General Lytle" exploded her boilers at Bethlehem, Ind., killing about 20 persons.

Aug. 11.—A locomotive boiler on the Delaware, Lackawanna and Western R. R., at Water Gap Station, exploded, killing 2 persons.

Aug. 20.—A locomotive boiler exploded at Catskill, N.Y., wounding 2 persons.

Aug. 21.—The steam-tug "Tempest" exploded her boiler at Philadelphia, severely injuring the engineer.

Sep. 12.—A boiler exploded in a planing mill at Albany, killing 12 persons, injuring many others, and completely destroying the building. Loss over $20,000.

Sep. 17.—A boiler used for driving a threshing machine exploded at New Milford, Conn., killing 4 persons.

Oct. 15.—A very destructive steam-boiler explosion occurred at St. Louis. One of the city papers says, "The force of the explosion was only equalled by the nitro-glycerine explosion at San Francisco. Three large buildings were reduced to a shapeless mass of bricks and broken timbers, and the iron of the boiler and machinery was twisted in every conceivable shape." Several other buildings were more or less shattered. 14 persons were killed and many others badly injured.

Nov. 12.—A steam tug on North River exploded her boiler, severely injuring 2 men. The boat was blown to pieces and sunk.

Nov 22.—A locomotive boiler exploded on the Georgia R. R., killing the engineer and wounding the fireman.

Nov. 28.—The steam tug "C. S. Hart" exploded her boiler at West Troy, killing 2 persons. The boat was blown to pieces.

Dec. 9.—The boiler of the steamer Thomas Kelso, at Norfolk, exploded, killing 6 persons and wounding many others.

Dec. 10.—A stationary boiler at East Boston, exploded, killing 2 persons and wounding 3 others.

Dec. 18.—A stationary boiler at Philadelphia, exploded, doing great damage.

Dec. 23.—The boiler of a foundry, at Logansport, Ind., exploded, killing 5 persons and badly wounding 2 others.

Dec. 31.—The steamer "Eclipse," plying between Savannah and Augusta, exploded her boilers, totally destroying the vessel. Nearly all on board were lost.

1867.

Jan. 4.—In Lexington, Mass., the boiler of a tannery exploded. Loss about $3,000.

Jan. 14.—A boiler of a mill at Philadelphia, exploded, wounding several.

Jan. 17.—A boiler exploded in the Washington Iron Works, at Newburg, killing 1 person and wounding 4 others. On the same day, the boiler attached to the Planters' Cotton Press, in Galveston, Texas, exploded, destroying the building and wounding 5 persons.

Jan. 21.—A boiler exploded at Ballard's Mill, Chickasaw Co., Miss., killing 4 persons.

Feb. 14.—The steamer "David White" exploded her boilers on the Mississippi, killing 65 passengers. The forward part of the boat was literally torn to atoms.

Feb. 20.—A boiler in a paper mill at Milwaukie, Wis., exploded, killing 3 persons and wounding 3 others. Damage to the mill $20,000.

Feb. 25.—A locomotive boiler, on the New York Central R. R., exploded at Albany. A city paper says: "The force of this explosion was so great that all the surrounding buildings were more or less injured; fragments of the locomotive went through buildings three blocks distant." Damage to the locomotive $10,000.

Feb. 27.—A boiler exploded at Jonesboro, Ill., killing 1 person and injuring several others.

April 9.—The boiler of a portable saw mill at Evansville, Ind., exploded, killing 3 persons and wounding 5 others.

April 17.—The boiler of a cotton mill at Hebronville, near Providence, R. I., exploded with terrific force. The boiler-house, which was of brick and substantially built, was completely destroyed. Heavy loss.

April 23.—A boiler exploded in the City Flouring Mills at Dubuque, Iowa, killing 3 persons and severely wounding several others. The force of the explosion is said to have been terrible beyond description. The brick engine-house and packing-room were torn to atoms, and the stone mill itself was so racked as to be unsafe for future use. Loss estimated at $15,000.

May 13.—The steamer "Lansing" exploded her boilers eight miles from Chicago, killing 6 persons and severely scalding several others. The boat took fire from the explosion and burned up.

May 15.—A boiler exploded in a saw mill at the village of Pleasant, Lucas Co., Iowa. Fireman killed.

May 25.—A locomotive boiler exploded on the Chicago, Burlington & Quincy R. R., near Wyanett, Ill. "The engine was completely wrecked. The boiler was torn into fragments; and the dome, weighing three hundred pounds, was thrown a distance of half a mile, and found imbedded in the earth."

May 28.—A locomotive boiler exploded on the Orange and Alexandria R. R., near Fairfax, "demolishing the after part of the locomotive and killing the engineer and fireman."

May 31.—The steamer "St. Mary" exploded her boilers at New Orleans, badly scalding two persons.

June 4.—A locomotive boiler exploded on the Detroit Branch of the Michigan Southern R. R., killing the engineer and badly scalding the fireman.

June 6.—The boiler of a sash and blind manufactory, in Philadelphia, exploded, demolishing the whole building, which was five stories high and over one hundred and fifty feet deep. "The shock of the explosion shook the buildings for squares around, causing great alarm." At the time of sending this account 13 bodies had been dug out of the ruins, and it was supposed many more had perished.

June 10.—A boiler attached to a portable engine on the Newburgh Branch of the Erie R. R., exploded, severely injuring 10 persons, many of them fatally.

June 12.—A boiler exploded at the Turpentine Works in South Brooklyn, from which a fire ensued, destroying this building and the one adjacent. Loss about $35,000

July 3.—A boiler at the Gas Works, Boston, Mass., exploded, wounding 2 persons.

July 4.—At Penn Haven, Pa., the boiler of a locomotive exploded, killing 2 persons.

July 12.—The boiler of a sugar refinery exploded at Williamsburgh. Loss $4,000.

July 13.—A boiler in the "Fulton Coffee Mills" at Lancaster, Pa., exploded, killing the engineer and wounding several persons. "The engine house was a perfect wreck. One boiler was driven through a brick partition, and several buildings in the vicinity were damaged by the flying masses of brick and iron. The exploded boiler, weighing three tons, was carried more than a square by the force of the explosion."

July 13.—A boiler in a tannery at Cuttingville, Vt., exploded, tearing the roof off of the building.

July 17.—The steam-tug "Johnson" exploded her boilers in Saginaw River, Mich., killing 4 persons. The boat, which was new, was totally destroyed.

July 19.—A boiler exploded in Beatty's mill, Little Falls, N. J. One man injured.

July 20.—The boiler of a steam fire engine exploded in New York city, scalding several persons.

July 21.—A locomotive boiler on the Illinois Central R. R. exploded, killing the engineer and fireman.

July 26.—The boiler of a rolling mill at Norwich, Conn., exploded, seriously damaging the building.

Aug. 6.—The steamer "Gem" exploded her boilers on the Illinois River, near Naples, killing 2 persons and severely injuring 2 others.

Aug. 7.—A steam boiler exploded at Waynesburg, Penn., blowing out both ends of the boiler and damaging the building seriously.

Aug. 9.—A boiler of an iron foundry exploded in Philadelphia, killing 1 man and wounding several others.

Aug. 12.—A boiler exploded at City West, Ind., killing the foreman and wounding 3 others.

Aug. 12.—A boiler attached to a threshing machine exploded near Danville, Ind., killing 3 men. The boiler was torn to shreds, and the pieces rolled and twisted in every shape.

Aug. 16.—The steamer "Palisade" exploded her boilers at New York, slightly damaging the vessel.

Sep. 6.—A boiler exploded in the "Print Works" at Lodi, N. J., utterly demolishing the large brick building in which it was placed, the building being 50 feet by 60 in area, and three stories high. Loss $20,000.

Sep. 9.—A boiler exploded in a wood working manufactory in 28th street, New York. The boiler was carried to a height of 400 feet. In its descent it crashed through a dwelling house in 18th street, killing 3 persons. The fireman was also killed and several others were badly scalded.

Sep. 15.—The boiler of a brewery, at Newark, N. J., exploded, by which 2 persons were killed and 3 others wounded.

Sep. 19.—The steam tug "W. K. Muir" exploded her boiler at Detroit, totally destroying the boat, killing 6 men and severely injuring 5 others.

Sep. 20.—The boiler of a steamboat, at Columbus, Ga., exploded, killing 6 persons.

Sep. 20.—The boiler of a blast furnace at Newburgh, near Cleveland, Ohio, exploded, "causing destruction to everything in that vicinity." Parts of the boiler were blown nearly one thousand feet.

Sep. 30.—The boiler of a brewery in Newark, N. J., exploded, totally demolishing the west wing of the main building. One of the walls, in falling, crushed in a three-story brick dwelling-house adjoining. Several persons were buried in the ruins. The loss of property was estimated at $40,000.

Oct. 6.—The boiler of a portable engine in N. Y. city, exploded. 5 persons wounded.

Oct. 7.—The boiler of a locomotive on the Boston & Maine R. R., exploded, killing 5 persons.

Oct. 18.—A boiler exploded at the head of the dock, Pier 44, North River, New York city. Two men were killed and several severely wounded. "The building, some 75 feet in width and 50 feet deep, was completely destroyed.

The boiler was torn to atoms, and nothing remained on the dock, after the explosion, but a portion of the engine and a few timbers and boards, the ground being covered with the *debris*."

Oct. 19.—A boiler exploded at the Erie Basin, Brooklyn, killing one man. Cause, low water

Oct. 19.—The steam launch "Albemarle" exploded her boilers in the Severn River, opposite the Naval Academy. Two engineers, the coxswain, and fireman were killed. Several others were injured, one fatally.

Nov. 5.—The boiler of a cotton mill at Conshohocken, Penn., exploded, destroying the boiler-house and damaging the main building and machinery to the amount of $20,000. One man was killed.

Nov. 8.—A very destructive explosion occurred in the Forge Department of the Fort Pitt Iron Works, at Pittsburg, Penn. The building was blown to atoms, and the fact that a large number of hands were known to be at work in the building created the most intense excitement. To add to the more horrible nature of the catastrophe, the ruins of the building had taken fire and were in flames. Immediate efforts were made to check the flames and rescue from the debris such of the injured as could not extricate themselves, and take out the bodies of killed. But, notwithstanding the exertions of the firemen, nearly all of the frame work of the building was destroyed before the flames could be subdued.

Sixty men were employed in the forge department, but it is believed that all were accounted for. Thirteen persons were killed by the explosion, and a large number severely injured.

Nov. 10.—The boiler of a flouring mill in Chicago exploded with great violence, killing a large number of persons, and destroying about $75,000 worth of property. A Chicago paper speaks of the occurrence as follows: "The boiler was literally blown into fragments, and the entire building was utterly demolished. By the grand and terrific upheaval, the whole structure seemed lifted bodily into the air, falling back an unrecognizable and chaotic mass. The air, to the height of hundreds of feet, was filled with a shower of brick, lumber, and other material, which, falling, strewed the streets for blocks around with the *debris*."

THE CAUSE OF THE EXPLOSION.

In regard to the cause of the explosion, reports are very conflicting. The facts will probably all be brought out at the inquest, and it may be premature to give an opinion in regard to the matter, but the instance has probably never been known, in the whole history of boiler explosions, that one has occurred of any extraordinary violence from actual pressure of steam with a reasonable supply of water. When a boiler bursts from actual pressure of steam, the weakest part gives way sufficiently to relieve the pressure, but invariably without any great exhibition of violence.

Such an explosion as this, could only occur from the ignition and explosion of a large quantity of highly inflammable gases, which only can collect when the water is nearly exhausted, or at a very low stage.

Nov. 13.—The boiler of a corn and rice mill exploded at New Orleans with terrific force, demolishing the building. Loss of life and property not stated.

Nov. 15.—The steamer "Matanzas" exploded her boilers at Pier 14, East River, New York, killing one man. The engineer had left the steamer an hour previously, and did not return until some time after the explosion had taken place.

Nov. 16.—The freight engine, "Ticonderoga," of the Binghampton and New York Railroad, exploded its boiler, killing the engineer and fireman. The engine was entirely destroyed.

Nov. 20.—The boiler of a portable saw mill exploded at Weston, Wis., killing 2 persons, and seriously injuring several others.

Nov. 25.—The boiler of a locomotive at the Nashville and Decatur Railroad Depot, at Nashville, exploded, killing the fireman and wounding 2 others. The boiler was thrown two hundred and forty feet.

Nov. 25.—The boiler at Lanman's Cotton Press, in Savannah, Ga., exploded, killing 2 men, and seriously injuring the engineer. The building is a complete wreck. The damages are estimated at $8,000.

Nov. 29.—A boiler of a steamship at Liverpool, exploded, killing 33 persons and wounding several others.

Dec. 5.—The steamer "Marshall" exploded her boilers near Rondout on the Hudson River, scalding 2 men, 1 of them fatally.

Dec. 19.—The steamer "Unit" exploded her boiler, and sunk near Jersey City. The fireman was thrown 75 feet and killed.

Dec. 19.—A locomotive boiler exploded in the Union Depot at Chicago, shortly after the train arrived. All the passengers had left the depot and only 4 persons were injured.

1868.

Date.	Location.	Killed.	Wounded.	Description.
January	1..Philadelphia, Pa.	2		Stationary Boiler
"	8..York, Pa.	1	1	Distillery.
"	8..Phillipsburgh, N. J	4		Locomotive.
"	11..Easton, Penn	1	1	"
"	13..Godwinsville		7	"
"	14..Quincy, Ill	1		Flour Mills.
"	14..Muskegan	1	1	Shingle Mills.
"	31..Warsaw, Mich.	4	4	Saw Mill.
"	31..Detroit	2	2	"
Feb'y	5..Pittsburgh, Pa	1	1	Tin Works.
"	17..New York	3	2	Steam Tug.
"	18..Lowell, Mass	3	1	Locomotive.
March	12..*Richmond, Va*	1	4	*Steamboat.*

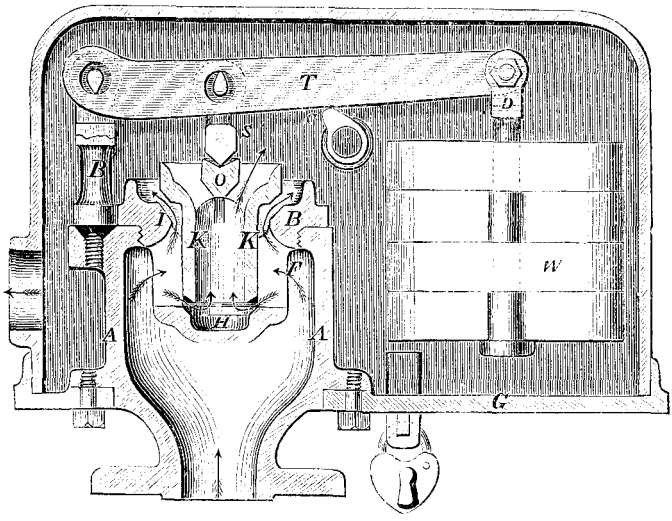
SECTIONAL VIEW

OF THE

METROPOLITAN

Double-Seat Lock Safety Valve.

PATENTED MARCH 10, 1868.



DESCRIPTION.

This valve is constructed with an upright cylinder, (attached to the boiler in the ordinary way,) within which is placed the double seat valve, consisting of a cylindrical valve and perforated casing, forming an annular steam chamber between the casing and cylindrical valve, into which the steam is admitted, and having also seats and guides for reception of the inner cylinder, which slide within the same, constituting a double seat valve, whereby, as the valve is raised from its seats, additional surface is exposed to the steam, which then has a free and easy exit from the boiler, thereby preventing accidents from explosion by over pressure, as it instantly relieves the boiler of all undue pressure.

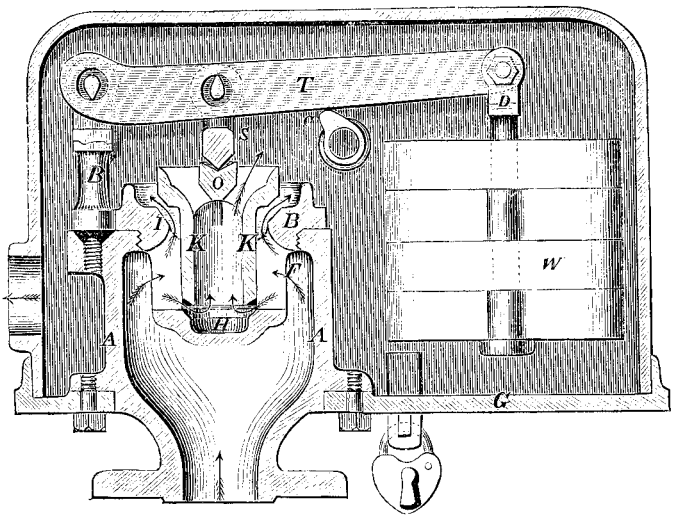
JOHN ASHCROFT,

PROPRIETOR AND MANUFACTURER,

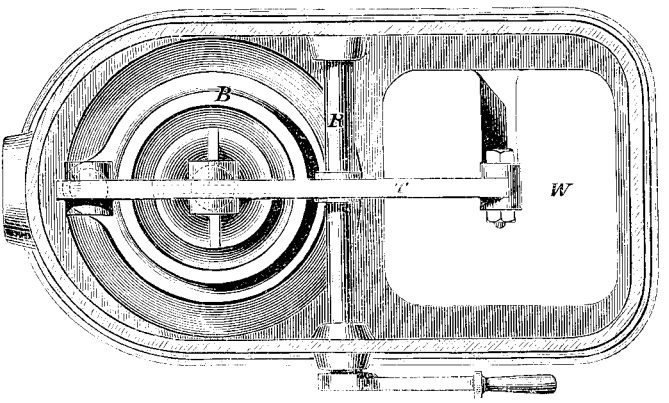
50 and 52 John St., N. Y.

METROPOLITAN

Double-Seat Lock Safety Valve.



SECTIONAL VIEW.



TOP VIEW.

EXPLANATION OF CUTS.

A A represents the valve chamber or casing, extending downward through bottom plate G, for attaching to boiler dome by means of a flange or screw. The outer cover over the entire valve perfectly conceals all the inside arrangement so as to make a perfect non-tampering valve. W are the weights, of 10 and 5 lb. each, so that the valve may be weighted down to any desired pressure designated by the Inspector or any other parties having control of the valve. The cover is fastened under bottom plate G, by means of slotted lugs passing through the plate and receiving a cross-bar or gibb, through the end of which the bolt of lock passes, thus preventing the cross-bar from being withdrawn, and holding the cover and plate G firmly together. C is a cam attached to rod R, passing transversely through the cover, and directly under the lever T, and so arranged for a wrench that the lever may be lifted at pleasure, to allow the valve to raise from its seats. The arrows represent the escape pipe from the valve.

THE METROPOLITAN

DOUBLE-SEAT LOCK SAFETY VALVE

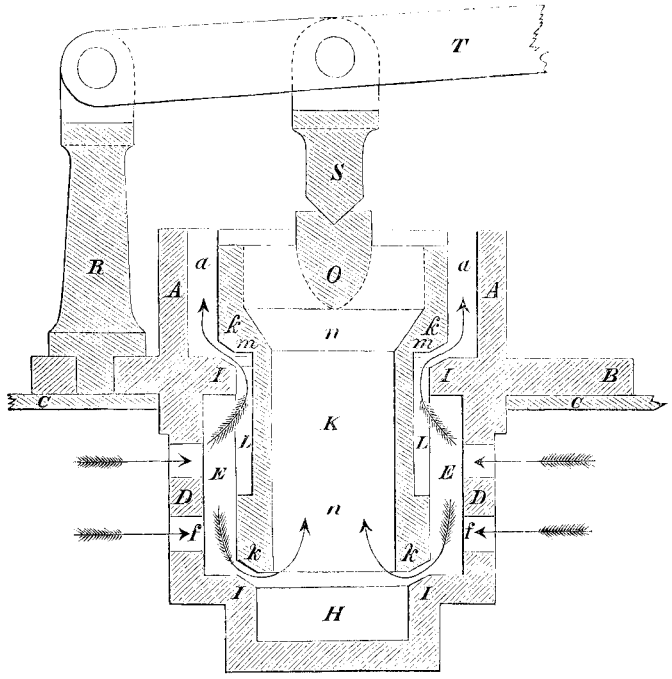
Stands the highest on the list of all Safety or Lock Valves made; is the best and most sensitive; is not cumbersome; requires less weight; relieves the boiler instantly, and complies in every respect with the U. S. Steamboat Law; has been approved by the Inspector-in-Chief of the State, and is recommended by him as well as by the best engineering talent in the country.

PRICE LIST.

1 inch	$45 00
1½ "	50 00
2 "	55 00
3 "	75 00
4 "	105 00
5 "	155 00
6 "	175 00

THE METROPOLITAN
DOUBLE-SEAT SAFETY VALVE.

PATENTED MARCH 10, 1868.



FOR LOCOMOTIVES.

The nature of this valve consists in the combination of two hollow Cylinders, one within the other, and so placed, in relation to the dome or steam-space in a boiler, as to project downward into said space, in direct communication with the steam, the outer Cylinder being attached to the dome or shell of the boiler, and having perforations which admit the steam into an annular chamber between the Cylinders, and having also seats and guides for reception of the inner Cylinder, which slide within the same, constituting a Double Seat Valve, whereby, as the valve is raised from its seats, additional surface is exposed to the steam which then has a free and easy exit from the boiler, thereby preventing accidents from explosion, as it instantly relieves the boiler of all undue pressure.

STATE OF NEW YORK,
Office of Inspector-in-Chief of Steam Boilers,
Poughkeepsie, N. Y., May 26th. 1868.

John Ashcroft, Esq., 50 *and* 52 *John St., N. Y. City*—DEAR SIR: Having fully satisfied myself that the Ashcroft Low-water Detector and Improved Double-Seat Lock Safety Valve are excellent instruments, and reliable for the purposes for which they are intended, and my opinion having been greatly strengthened by the commendations of many competent practical engineers, I do therefore officially approve of their use, and authorize all Deputy Inspectors of the State of New York to endorse and recommend their adoption.

Very respectfully, E. J. WILBUR,

Inspector-in-Chief of Steam Boilers.

John Ashcroft—DEAR SIR: In answer to your inquiry as to the merits of the Patent Metropolitan Double-Seat Safety Valve, I would say that I have used this valve on Locomotive Engine No. 63, coal-burner, on the Camden and Amboy R. R., for the past eight months, and it has exceeded my highest expectations.

Being an old engineer, I have used many varieties of safety-valves, but never one before that has filled its mission so completely. It is admirably adapted for locomotives, and more especially coal-burners, as it obviates a difficulty not always controllable, even with the most constant watchfulness—that of keeping the steam down to the pressure allowed. It requires no attention whatever, for, as the pressure exceeds that at which the valve is set, it is raised from its seats and all the surplus steam allowed to escape at once.

I feel so much its usefulness and reliability, that should the Company refuse to attach one to any engine placed under my care, I would have one put on at my own expense. I can therefore cheerfully recommend it to all locomotive engineers.

I am, yours respectfully,

ABNER HUSTON.

Office of the Bordentown Machine Co.,
Bordentown, N. J., May 20th, 1868.

John Asheroft, Esq., 50 *John St., N. Y.*—DEAR SIR: In answer to your inquiry relative to the merits of the Metropolitan Double Seat Safety-Valve, I have to say that I have examined and tested its merits, and I cheerfully say that it is the most complete, simple and reliable valve that I have ever seen or used, and recommend it as a means of saving boilers from explosion. Herewith please find our order for four (4) more double seat valves.

Yours truly, JAS. MOLYNEUX, *Supt.*

Office of the South Brooklyn Steam Engine Works,
South Brooklyn, N. Y., June 3d, 1868.

John Asheroft, 50 *John St., N. Y.*—DEAR SIR: In reply to your letter of the 28th ult., relative to the merits of the Metropolitan Double Seat Lock Safety-Valve made by you, I take pleasure in saying that it possesses many advantages over all the other safety-valves I have ever seen or used. It is simple and reliable, and I would recommend its adoption to all persons using steam boilers, as a means of preventing explosion from over pressure.

Yours very truly, JAMES ESLER.

Newburgh, N. Y., Jan. 12, 1868.

John Asheroft, Esq.—DEAR SIR: In answer to your inquiries referring to the Double Seat Lock Safety-Valve made by you, I cheerfully say that I have no hesitation in pronouncing your Valve to be the most complete safety-valve that I have ever seen or used. It possesses advantages over all other valves now in use, and I cheerfully recommend its adoption as a means of saving many boilers from explosion.

Yours truly, SAMUEL STANTON,
Supt. Washington Iron Works.

Office of Wm. Wright "Patent Steam Engines,"
55 Liberty St., New York.

John Ashcroft, Esq.—DEAR SIR: Your favor of the 25th inst. is before me, requesting my opinion relative to the merits and advantages of the Double Seat Lock Safety-Valve made by you. In reply, I take great pleasure in saying that I have thoroughly examined it, and must say that it possesses *more real merit* than any other safety-valve that I have ever seen or used. It is simple in construction and has nearly *double the area* for the escape of the surplus steam, than any other valve of corresponding size that I know of. I heartily recommend its adoption as a means of saving boilers from explosion.

Yours respectfully, WM. WRIGHT.

Bordentown, N. J.

John Ashcroft—DEAR SIR: About ten months ago I was placed in charge of Locomotive Freight Engine No. 77, running between West Philadelphia and Jersey City, on the Camden and Amboy R. R. Attached to the boiler of this engine were two ordinary safety-valves, each valve containing eight superficial square inches. I was frequently detained at stations and turnouts, and owing to the rapid increase of steam in the boiler while thus delayed, found the valves insufficient to relieve it of extra pressure without being assisted by hand, to raise. When the engine was thus standing I have often found the pressure to increase from 120 to 170 pounds in an incredible short space of time, and have been alarmed at what might result thereby.

About seven months ago the two old valves were removed, and one of your Double Seat Valves attached in their place, since which time I have had no trouble or difficulty, as the valve instantly relieves the boiler of all undue pressure. I most earnestly recommend it to all R. R. and other engineers, as by far the best and most efficient safety-valve now before the public.

Wishing you every success, I remain, respectfully,

JOHN SWAINE.

Office of U. S. Supervising Inspector—2d District,
23 Pine Street, New York, July 17, 1868.

John Ashcroft, Esq., 50 *and* 52 *John Street, N. Y.*—SIR: Having been called to examine officially a "Locked Safety-Valve," presented for approval or disapproval, as required by the "Act of July 15th, 1866," section 3d of that Act, and rule 46, adopted by the Board of Supervising Inspectors, October 10th, 1866, at their annual meeting, held at Buffalo, N. Y., I have the honor to state that on the 15th instant I made the required examination and a partial test, under steam pressure, of your Double Seated Locked Safety-Valve, the valve having been loaded at three different pressures, viz.: 25, 30, and 40 pounds to the square inch of pressure on the boiler. The operation being *entirely satisfactory, and in every way demonstrating a decided improvement*, inasmuch as it is very evident that a greater volume of steam can be discharged from a boiler, and the pressure more instantaneously reduced by a valve constructed in the manner in which your *Double Seated Safety-Valve is constructed*, than could be accomplished by the common single disc valves in use.

It is made more plain by stating the construction of your Valve, showing its novel arrangement. It being constructed with an upright cylinder, (its attachment to the boilers are in the ordinary way) within which is placed the Double Seat Valve, consisting of a cylinder valve and perforated casing, forming an annular steam chamber between the casing and the cylindrical valve, into which the steam is admitted, and having also seats and guides for the reception of the inner cylinder, which slides within the same, constituting a a double seat valve, whereby, as the valve is raised from its seats, additional surface, is exposed to the steam, which then has a free and easy exit from the boiler, thereby preventing accidents from causes it is intended to guard against in a *larger measure* than is usual to be found in the ordinary valves.

You are hereby notified, that, in my opinion, your Valve comes within the rules required by the United States Inspectors of Steam Vessels, *and is accepted by them throughout the Second District.*

I am, very respectfully, your obedient servant,

WM. BRADFORD.
Supervising Inspector.

State of New York.
Office of Inspector-in-Chief of Steam Boilers.
Poughkeepsie, N. Y., July 15, 1868.

John Ashcroft, Esq., 50 and 52 John Street, New York City.—DEAR SIR: After a thorough and careful examination of the Metropolitan Double Seat Lock Safety-Valve, both by myself and competent practical engineers, I am pleased to say that it possesses all the merits necessary to meet the requirements of the law governing the use of Lock Safety-Valves, and I hereby give this as my official approval of the said Valve, and all Deputy Inspectors will endorse and approve of them when applied.

Very respectfully,

E. J. WILBER,
Inspector-in-Chief of Steam Boilers.

Bordentown, N. J., June 26th, 1868.

John Ashcroft—DEAR SIR: I am employed as engineer on Locomotive No. 19, on the Camden and Amboy Railroad, and have had in use for the past seven months, one of your Double Seat Safety-Valves. Previous to having it attached, I had great difficulty in controlling the pressure of steam, the old valves being insufficient to relieve the boiler while stopping at stations. Steam pressure would increase from 125 to 180 lbs. in such an alarmingly short space of time, that I felt insecure, fearing an explosion, or at least a rupture of the boiler. Since your valve has been attached, I have had no difficulty, as it relieves the boiler of all undue pressure almost instantly. I have felt more security and experienced less trouble with it, than with any valve I have ever had or seen.

Very respectfully,

JAS. W. SANFORD.

EXTRACTS FROM THE REPORT

OF THE

COMMISSIONER OF PATENTS

TO THE

SENATE OF THE UNITED STATES

On the Subject of Steam Boiler Explosions.

The determination of the question of Steam Boiler Explosions involves the consideration of the causes of these fatal occurrences, as well as a remedy for the same.

The fact that the steam engine has come into such general use, and has been placed under the management of men widely differing in their education and judgment, and many of them entirely destitute of scientific knowledge, has given rise to a great variety of suppositions designed to account for the explosion of steam boilers, most of them are mere crude speculations without any foundation in fact or physical analogy.

Such are the pretended explanation, which refer the explosions to the presence of electricity, or the generation of hydrogen gas, and its union in explosive proportions with oxygen, within the boiler.

Of the former supposition it is only necessary to say that electricity, if present at all, would reside on the outside of the boiler, and of the latter, the necessary conditions are not present, which would render it probable. In the ordinary condition of a boiler, no Hydrogen is produced, and if it were, it could not procure a sufficient supply of oxygen, to combine with it in explosive proportions.

A supposition has been advanced by a mechanical Engineer of Baltimore, to this effect; it supposes the water in a steam boiler to be permanently thrown out of level, by an unequal pressure on its surface, resulting from the escape of steam through the throttle valve, and at one end, and the consequent diminution of pressure at that point; this alteration of level, of course, exposes a portion of the boiler to become unduly heated, and when the working of the engine is stopped, the restoration of level by gravity brings the water in contact with the over-heated metal, producing highly elastic steam which may result in explosion.

That undue pressure within a boiler, gradually increased, is one of the most frequent causes of explosions has been proved. This gradually increased pressure may result from accidental failure of the apparatus intended to relieve it, or from this being intentionally prevented from operating by the reckless hands which sometimes have control of it, as in the case of the Steamer Moselle, whose boilers exploded from excessive pressure, resulting by over-loading the safety-valve, so that from the extra weight placed upon it it must have had at least 500 lbs. pressure to the square inch within the boilers.

Humanity calls aloud for some measure to be taken, if possible, to prevent these melancholy explosions, particularly when we think of the number of lives, and the amount of property lost within the last few years, from the mismanagement of that powerful agent, Steam, which is easily controlled in the hands of a competent man.

There are many men who engage in the business of engineering, who are not mechanics, and who learn in a short time how to start and stop an engine, but know nothing of the dangerous properties of steam, being entirely ignorant both of the theory and practice of mechanics; with such engineers it is not strange that Steam Boiler Explosions are so alarmingly frequent.

THE

ASHCROFT PATENT LOW WATER DETECTOR,

AND

METROPOLITAN

Double Seat Lock Safety-Valve

Answer all the requirements of the United States and State Laws in relation to the Inspection of Steam Boilers and the instruments to be applied thereon, and have been adopted and recommended by the U. S. Supervising Inspector and the Inspector-in-Chief of the State of New York. They comply with the State Laws of New Jersey, and will prevent all accidents from over-pressure, collapsing or burning of flues, and from *Low Water*. We have applied over Eight Thousand Detectors, and in every case they have protected the boilers to which they were attached. They are an assurance upon property and the lives of those employed in the vicinity of steam boilers.

List of Explosions which occured on Steamboats,

During a period of Ten Years, from 1838 to 1848.

Number of Boats on which explosions have occurred	233
Number of Passengers, Officers and Crew killed, enumerated in 62 cases	300
Whole number killed (in 164 cases)	1,805
Whole number wounded (in 111 cases)	1,015
Average number of passengers killed in the enumerated cases	23
Average number of Officers killed	2
Average number of Crew killed	4
Average amount of damage done in enumerated cases	$13,302

NATURE OF ACCIDENT.

Bursting Boiler	101
Collapsing Flues	71
Bursting Steam Pipe	9
Bursting Steam Chest	1
Bolts of Boiler forced out	1
Struck by Lightning	1
Blew out Boiler Head	4
Breaking Cylinder Head	1
Breaking Flange of Steam Pipe	2
Bridge Wall Exploded	1
Unknown	3
Not stated	38

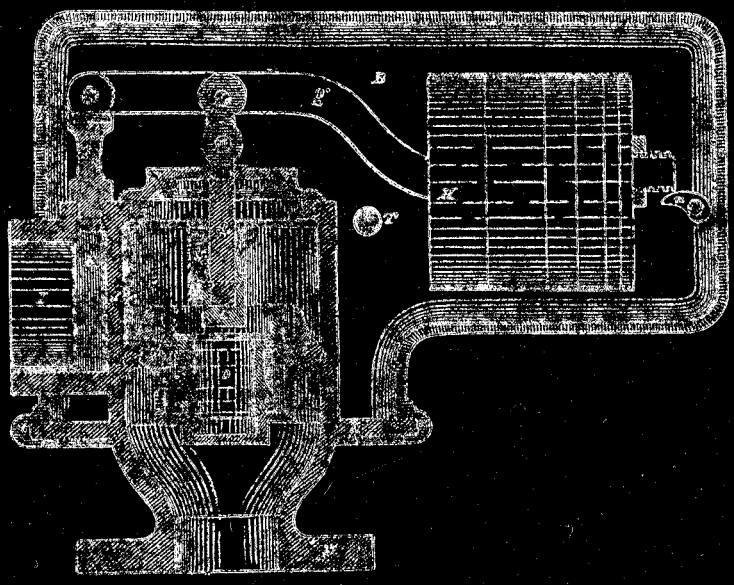
ESTIMATE

Of the total Loss of Life and Property calculated from the averages of the given cases.

Pecuniary Loss, 233 cases, at $13,302	$3,099,365
Loss of Life, 233 cases at 11 each	2,563
Wounded, 233 cases at 9 each	2,097
Total killed and wounded	4,660

METROPOLITAN

DOUBLE-SEAT



(SECTIONAL VIEW.)

LOCK SAFETY VALVE.