

Steam Fire Engines.

Although hand engines for extinguishing fires are still largely employed in this country, the cities and large towns have very generally adopted the much more effective steamer, with its muscles of iron and steel, which never tire. Our engraving is a very accurate representation of a first class steamer on its way to a fire, and will give a correct idea of these powerful machines to our country and foreign readers, who may never have seen one. But the sheen and glow of the polished steel, iron, and brass, and the volumes of rolling smoke, the rapid rush of the horses, and the coolness and self possession of the men must be left mainly to the imagination. New York—the city proper, without reckoning the suburban cities and villages comprehended in the “Metropolitan Fire Department”—has no less than thirty-four steam fire engines. About one third are from the Amoskeag Manu-

facturing Company, Manchester N. H., the subject of our engraving being one of them. We append a description of “Metropolitan No. 1.”

The boiler of the steamer is 36 inches in diameter and 65 inches in length; it contains 313 copper tubes 24 inches long and one and a quarter inches in diameter. The boiler is of the best boiler plate cased in wood and covered with Russian iron, with brass bands, and with a brass dome and chimney casing.

There are two double-acting pumps lined with brass, four and a quarter inches in diameter, and 12-inch stroke, with rubber valves and brass valve seats.

The steam cylinders are eight inches in diameter and 12-inch stroke, working in the same piston rods with the pumps.

The engine is supplied with two lengths of best rubber suction hose, made upon copper rings four and a half inches in diameter inside. The suction pipe of the pumps is fitted on each side with a brass cup to close the openings if desired, and with a vacuum chamber made of burnished copper.

There are two discharge pipes for the leading hose, with a complete set of “nozzles” for change, from one and a half inches to seven eighths of an inch diameter.

Mr. R. F. Fairlie having been proposed by Mr. Chatwood, and Mr. Holmes and Mr. Pickering representing Mr. Herring's interest. These four gentlemen had chosen M. Paul Douliot, engineer of the firm of Cail & Co., of Paris, as their fifth member, and as their president; and Mr. W. T. Hoyle, secretary of the Whitworth Company, acted as secretary to this jury. The jury met at 11 A. M. to-day, after the preliminary arrangements had been completed, then the sham burglars were introduced, three in number on either side. They were some of the best workmen that could be mustered in England, America, and Germany. Mr. Chatwood had brought one of his foremen and a workman from his shop; the third man, a foreman at Messrs. W. and J. Galloway and Sons, in Manchester, had volunteered his services on the day of the trial. Mr. Herring had sent expressly to America for a celebrated safe-breaker, who was assisted by a man described as particularly



THE METROPOLITAN STEAM FIRE ENGINE, NO. 1., EMPLOYED BY THE NEW YORK FIRE DEPARTMENT.

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TRIAL OF ENGLISH AND AMERICAN BURGLAR-PROOF SAFES IN THE PARIS EXHIBITION--AN EXCITING SCENE.

Correspondence of Engineering.

PARIS, August 13, 1867.

The trial of the burglar-proof safes of Mr. Chatwood, of Bolton, and of Mr. S. F. Herring, of New York, or as our American friends like to call it, “the great contest of American vs. English safes,” has commenced at last in the British testing-house at the International Exhibition. The terms and history of the challenge we have already published, but it may be as well to refer to them in a few words before proceeding to report upon the trial itself. Mr. Herring exhibited a safe upon which he posted a challenge offering to test it against any other safe in the Exhibition. Mr. Chatwood accepted this challenge, and an agreement was drawn up to that effect. Mr. Herring then declared that his safe was not really burglar-proof at all, but simply fireproof; but that there was a burglar-proof box inside the safe, which was the article meant, if not named in the challenge. The appearance of these after declarations created a somewhat unfavorable impression against the American safe-maker, if not against his safe, which occasionally manifested itself during the trial; but the jury certainly tried to do all in their power to maintain the balance as even as circumstances would allow. The jury was chosen by the two competitors; Mr. R. Mallet and

expert at picking locks; and the third also a volunteer, who was the foreman of an Austrian exhibitor of safes, who had a very intimate acquaintance with the construction of Chatwood's safes, having been in the Exhibition ever since its opening, and repeatedly examined Mr. Chatwood's drawings and details of construction, which are exhibited without reserve. These six men, combined in two respective groups, were an interesting match, although the unequal nature of their capabilities somewhat lessened the interest of the trial. Mr. Chatwood had in his favor the calm and business-like method of his foreman, and an extraordinary amount of skill on the part of Messrs. Galloway's man in the use of his hammer, which attracted the just admiration of every one present. On the other hand Mr. Herring's man showed much judgement and experience, assisted, as it was, by the correct knowledge of the Austrian foreman. The personnel having been mustered on both sides, the tools were brought forward. Mr. Chatwood's men had their tools packed in a neat small leather portmanteau. The contents were the well-known serrated wedges used by expert burglars, some levers screwed together in short lengths so as to pack up easily, a small hand hammer and a block-tin hammer which gives no ringing noise in striking. Against this the Americans brought in a sledge hammer, the exact weight of which has not yet been ascertained, but which may have been somewhere about 28 lbs. There were several levers and crowbars 5 or 6 feet long, and a complete drilling-frame large enough to enclose the entire safe, and to insert the ratchet brace for drilling. Last but not least, came some steel wedges of an enormous size. Call these burglars' implements! The jury immediately objected to the employment of this portable blacksmith's shop, and the sensible suggestion was made to allow equal weight, and a maximum size of implements only on each side. This, however, could not be adhered to, since the American tools were not prepared for such a condition, and all parties, anxious to see the trial through, agreed to allow the heavy American tools to be used, with the exception only of some of the very large wedges. The jury allowed the sledge hammer to the Americans, reserving to Mr. Chatwood the right to use a similar one if he thought necessary. This, although it changed the entire nature of the trial, was wise on the part of the jury, since it has been proved by the trial itself, that without sledge-hammers the trials would have lasted much longer than anybody would have cared to witness the operations, except perhaps Mr. Chatwood and Mr. Herring. The operations commenced at 2 45 P. M. There was a clear space all around each safe reserved for the workmen and the two sets were divided by a screen. In front of the latter, Mr. Walker, the well-known watchmaker of Corn-

hill and Regent street placed one of his beautiful chronometers for taking the time occupied by the different operations. A piece of wood sufficiently small to be enclosed in the little box inside Mr. Herring's safe, was put into this latter box, and a piece of similar size was put into Mr. Chatwood's safe; but Mr. Chatwood would not put his block into the small box inside his safe, as he declared that the contest was between the two safes, and not between a series of boxes hidden one within the other. Mr. Chatwood's workmen commenced by applying their small wedges to Mr. Herring's safe, while Mr. Herring's men tried their chance in drilling through the door in front of Chatwood's lock. The wedges did their work expeditiously, although the want of acquaintance with the details of Mr. Herring's construction caused some loss of time, the workmen attempting to drive in wedges at a place where the outer plate of the door overlapped the other part, and could have been removed by a cross-cutting chisel, so as to allow the immediate insertion of the wedge. In spite of this drawback, however, Mr. Herring's safe was completely thrown open in 29 minutes. The audience cheered, and Mr. Herring called out that this was only the fire-proof part of his safe, to which the English workmen replied by knocking out all the drawers and shelves of the safe and throwing them out on the floor. Meanwhile the workmen on the other side had erected their drilling frame, and worked the ratchet-brace, but without success. The drill touching the spiegeleisen which is behind the outer plate of Chatwood's safes, refused to cut, and the work had to be given up as impracticable. They also tried to pick the lock and to apply steel screws and punches to the door, but they made no progress in that direction, and had to give up all idea of forcing the door. As far as the trial had gone on with real burglars' tools, it had lasted till 3 45 P. M. After that the sledge-hammer came into request. Mr. Herring's men commenced the attack upon the dovetailing at the corners of Chatwood's safe by driving in chisels with the sledge. Mr. Chatwood then requested that his men should also be provided with a sledge-hammer for breaking the small box which contained the wood block, and this was at once agreed to by the jury. The hammer was brought in at 4 P. M., and then an amount of battering began at each of the two safes, which will be remembered for some time by every one present. The fragments of chisels and wedges were flying about the room, and the din was so terrific that crowds of spectators collected outside. “This is not burglar's work,” somebody remarked; “the police would soon stop such a proceeding.” But the police in the Exhibition had quite enough to do to keep off the people attracted by the noise, and, as usual, they were courteous enough to hear nothing. The work went on for about half an hour. The English workmen had the disadvantage of working upon a very small surface, as afforded by the door of the small box, enclosed as it was inside a large chest, which prevented a fair blow from being struck in any direction. Here the unusual skill of the striker proved of great value; his blows very rarely missed, although they were sometimes applied in the most trying positions. At Chatwood's safe the manual skill was less; but the men, knowing every joint and every pin, made steady progress, step by step, all parts being perfectly accessible for their operations. The attack was made upon the side of the safe next to the lock of the door; the dovetails were wedged open singly, and each of the connecting studs binding the outer plate to the inner structure was cut through by itself with large chisels. At 4 35 P. M. the outer plate of Chatwood's safe was removed entirely, and the spiegeleisen laid bare. In this form spiegeleisen, as is

well known, has no resisting power, on account of its brittleness, and it therefore took a short time only to knock off this material with the crowbars, so as to arrive at the inner plate of Chatwood's safe. The same operation was repeated on this latter, and at 5.05 P. M. a ridge was opened, through which the ashes and other powdery substances forming the protection against fire, commenced to fall out. It took half an hour more to open up a crevice at the side of the door, through which the paint of the interior could be seen, yet the peculiar construction of the bolts prevented all possibility of widening that breach, and the work had to be re-commenced at the other side. The progress with Mr. Herring's safe was of a different character. The box was fastened inside the safe by an angle-iron girder, which had to be cut through to get access to the front plate of the door. Behind this the box itself consists of a thick front plate, tied to the back plate by a great number of steel bolts, about one inch diameter each, and riveted in with countersunk heads. Behind the front plate there is a construction somewhat resembling the plan of the Chalmers' target, viz., a series of steel plates put on edge, and having their interspaces filled with franklinite iron, which is very nearly the same material as the German spiegel, only made of American ore. The connection between the front and back plate of Herring's box came out to great advantage under these circumstances, since the smallness of the surface exposed to the attack, and the close proximity of the strengthening points, afford no proper working space nor leverage for the tools. This, however, is easy enough with so small a box as that inclosed in Mr. Herring's safe, while it is doubtful whether a larger safe of the same make would allow anything like the proportionate strength of connections. At 5.50 P. M. the workmen on both sides were allowed to rest, and operations were re-commenced at 6.35. At 7.15 the outer plate of Herring's box was thrown off, and wedges were immediately inserted to force open the rest of the door. Daylight was immediately afterwards visible in the small box of Herring's safe and it would have been possible to remove small valuables, such as coins, from this chest through the crevice made. The want of a larger wedge was felt towards the end of this operation, and the suggestion was made to allow Mr. Chatwood's men one wedge similar to those which were used on the other side. This however was not carried out, as Mr. Chatwood's safe had been broken into and the block of wood removed from it at this time, 7.25 P. M., the men having removed the side plate entirely, and cut a hole into the thin sheet-iron plate which forms the inside skin. The hole was just large enough to insert the hand and pull out the small wood block, but there was no access to any one of the drawers in Chatwood's safe, nor would it have been feasible to get at the block if it had been placed in the inside chest without expending a very considerable amount of further time and labor. Mr. Herring's safe being by this time so nearly destroyed that it appeared to be the work of a few minutes only to force the small box open, it was resolved to complete this operation on the following day. The trials were consequently adjourned at 7.40 P. M.

PARIS, August 14.

The jury met at 11 o'clock this morning, and, after deliberation, called upon Mr. Chatwood's men to complete their work, which was done in three minutes. This is only one of a series of tests which these safes are to undergo, and it will be acknowledged by every competent man that it was not of a very scientific character. The *resume* stands simply as follows: The two safes were both "third-class bankers' safes" according to the maker's catalogues. They had each a small separate compartment inside the safe proper. Mr. Chatwood deposited his wooden block in his safe proper, making no use of the inside chest. Mr. Herring deposited his wooden block in the small chest within his safe. Mr. Chatwood's men were skillful, but unacquainted with the exact construction; Mr. Herring's men showed less manual dexterity, but an intimate acquaintance with the construction of Chatwood's safe. The tools of the English workmen were proper burglar's tools, while the tools of the American workmen were boiler-maker's implements of full size, and incomparably heavier than the others, including even the sledge-hammer given to the English workmen at a later hour. Under these conditions Herring's safe was opened in 29 minutes, and the contents of it thrown out to the public. Chatwood's safe proper had a hole made in its side in 4 hours 35 minutes working time. Herring's small box inside the safe was completely broken open within 4 hours 43 minutes working time. Chatwood's small box inside the safe was not opened at all in this trial.

Editorial Summary.

MONT CENIS RAILROAD.—A cable telegram states that the first train passed safely over this Alpine railway on August 28th. Descriptions of the road and notes of progress made in its construction have appeared from time to time in these columns, and in the present issue our foreign correspondent "Slade," restates these facts. The line over the mountains is forty-eight and a half miles in length. The tunnel, if ever finished, will furnish a route between the termini of the roads—St. Michel on the French side and Susa in Italy—six and a half miles shorter.

FOR THE NORTH POLE.—Preparations for the French expedition in search of the north-west passage are progressing on a most formidable scale. M. Lambert, who heads the expedition, proposes to go into the sea of Polymia, as the French call it, from Behring's Straits, and he has studied out a plan by which he pretends to be sure to attain his object. The Emperor has shown his confidence by heading the list of subscriptions with a sum of \$10,000.

THE ANGORA AND CASHMERE GOATS.—We mentioned on page 268, last volume, that Mr. J. S. Diehl had been commissioned by Government to proceed to Europe and Asia, for the purpose of investigating the modes of manufacturing the wool from these goats, and now we have to report his progress. Writing from the Paris Exposition, he believes from all he can learn and see, that the raising of goats and manufacture of their hair and wool may be carried on more successfully in the United States than in Europe. He finds that nearly all the raw material from Asia and Russia is carded, combed, and spun in England, and then sent all over the Continent to be further manufactured. The American specimens of hair were pronounced by judges in Paris, Leeds, Hamburg, and Vienna, fully equal to the best imported. He writes: "I am fully satisfied that we can make the raising of these sheep a success, and their wool more valuable than any hair fleece or fabric now known."

CAOUTCHOUC.—This barbarous appellation is a corruption—it certainly cannot be called an improvement—of the South American Indian name *cahucho*. Although ill-named, the industrial demands for the substance have become so important that experiments have been made in Brazil for cultivating the tree which furnishes the supply, in the same way as the quinquina has been grown in the Himalaya. For preserving the gum in a liquid form, as it comes from the tree, the liquor is filtered, then mixed with about one-eighteenth its weight of strong ammonia. On being poured out and exposed to a temperature of 70 to 100° Fah. the ammonia which preserved it from the action of the oxygen, evaporates, and leaves the gum shaped to correspond with the containing vessel.

\$10,000 REWARD.—An English gentleman, who retains his incognito, but who is guaranteed by the chairman of the London Hospital, promises to bestow two thousand pounds sterling, on any person who before July 1st, 1868, shall have discovered any means by which in all, or nearly all cases, pain can be both permanently and completely annihilated, as it is now extinguished for a short time by anaesthetics. The means must be easy of application, not dangerous, and of moderate cost. In case this discovery is not made by that date, one half the above amount will be awarded for any kindred discoveries of minor importance, but yet of great service in the relief of pain. If the reward is accepted, the process must not be patented but given freely to the medical world at large.

THE EGYPTIAN LOTUS, is a fine aquatic plant sacred to Osiris and Isis, and regarded in Egyptian delineations as signifying the creation of the world. The only place where it is known to grow spontaneously in this country is in a pond in Middlesex county, Conn. The origin of the plant in this spot is not known, but here it flourishes in great perfection. The leaves, slightly resembling those of the pond lily, are nearly round and about two feet in diameter. The flower bud is long and pear shaped, white and slightly resembling the magnolia, when not unfolded.

PACIFIC TELEGRAPH PROJECT.—The Californians are seriously agitating the subject of laying a submarine telegraph from San Francisco to China and Japan, via the Sandwich Islands. Soundings made some years ago, prove the existence of a true telegraphic plateau extending from the California coast to Honolulu, quite as marked as the one between New Foundland and Ireland. The San Francisco *Bulletin* thinks the proposed plan is feasible, and is confident that it will be carried out.

FAST TRAVELING.—It is contemplated, on the completion of a new railroad from London to Liverpool, to run express trains which will surpass anything yet realized in railway traveling in any country. The whole distance between these stations—over two hundred miles—will be run without a single stoppage, and the time occupied will be four and a half hours, the speed being at the extraordinary rate of eighty-one miles an hour.

THE BEGINNING OF THE END.—As noted several weeks since in this journal, the Paris Exposition closes Nov. 1st. The materials of the palace and park, it is announced, will be shortly offered for sale, to be delivered as follows: The aquarium, trees, shrubs, and vegetable soil, on the 1st of November, and the iron work of the building by degrees, as the articles are removed, and at the latest on the 1st of January, 1868. A rumor which prevailed some time ago of the building being sold to Russia was erroneous.

THE TELEGRAPH.—It is officially announced that the Prussian government intends to extend the telegraphic system to every town with a population of one thousand five hundred. The extension will first commence in the province of Saxony.

In noticing the "Victory Kerosene Lamp" last week, we omitted to say that the engraving and description, with the address of the manufacturer, is to be found on page 144, in our paper of Aug. 31, last page of advertisements.

The Mount Cenis Tunnel.

At the beginning of the present year 6,335 meters, a little less than one-fourth of the work, was completed. For the next six months ending June 30th, more work was done than on any half year since the commencement of operations in 1857. The number of meters excavated on the Italian side was 453; on the French side, 321; making the total length of excavations at that date 7,109 meters, or four and two fifths of English miles, leaving three and one-tenth miles yet to be dug. Progress on the French side has been slower

than on the Italian, and in all probability nearly five years more will be required before its half will be finished.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Bessemer steel works at Troy will soon be able to turn out fifty tons of steel per day. Most of the steel is cast in ingots weighing several hundred pounds each. Small castings in sand are full of blow holes, but are claimed to be twice as strong as similar ones made of cast iron. The company are preparing to make steel railroad rails, and in Vermont, works are being erected for manufacturing steel locomotive tires.

The Ohio and Mississippi company are making arrangements for laying a third rail from St. Louis to Odin, making a narrow gage track, so that by the coming fall, cars will be enabled to run through to Cairo and Chicago without change.

It is said that upwards of five thousand different articles in common use are manufactured of the ordinary willow.

An inclined railway is to be built at Bahia, Brazil, for facilitating travel and the transportation of freight from the lower to the upper city. Heretofore both passengers and freight were carried over the steep bluff of one hundred and eighty feet high, dividing the city, on the backs of negroes.

Years since, black walnut furnished the most available fencing stuff in Ohio, and was generally used for that purpose. This year the shipment of black walnut lumber as a valuable wood from Toledo, from the opening of navigation, amounted to one hundred and twenty-five cargoes, aggregating 19,677,300 feet.

A paragraph has been circulating among our exchanges that a rubber belt thirty-six inches wide, one hundred and eighty-two feet long, and weighing 1,007 pounds, was the largest in the world. In another column we refer to a belt to which this distinction really belongs, this one being of three inches greater width, and three feet longer.

The manufacture of artificial fuel from consolidated coal-dust although commercially unsuccessful in this country has met with a very different result abroad. Twenty establishments in France produce yearly 500,000 tons. In Belgium seven manufacturers turn out 400,000 tons, while in other countries the product, though less, is very considerable.

Mining is being prosecuted in New Hampshire with good success. A mine in Lisbon has yielded \$4000 in gold since January, and 417 tons of "dressed copper" have been taken from a mine in the same vicinity.

Learning experience from the lesson of last winter, the Pacific Railroad Company have roofed over ten miles of track in the mountain regions of California, as a protection against a blockade of the road by the heavy snows of these elevated regions.

It is reported that nearly all the rolling mills at Pittsburg will be started in the course of the next two weeks, and that the prospect of business in the fall for the manufacture of iron is good. The workmen who were formerly on strike at Pittsburg having compromised their difficulties, are ready to go to work again.

The next great gold field of the West, is believed to be the neighborhood of the Black Hills of Dakota, now known from actual demonstration to possess the precious metal in great profusion. These hills also it is said, contain silver, copper, and coal. The fine timber growing there, is unsurpassed in the world, and will prove of inestimable value when these regions are settled by a mining population.

The largest steel works in this country are located on the Susquehanna river, near Harrisburg. The steel trade is said to be very dull in England, and even the Bessemer Steel works are reported to be in want of new orders.

To the Rhenish Railway company is due the credit of first introducing a rail nine inches high, with the design of doing away entirely with sleepers, which in Europe forms quite an item in railroad repairs. The nine-inch rail rests upon a bed of plates which are covered with five inches of gravel and on top a two inch layer of earth well stamped down so that the top of the rail projects only an inch above the surface. The two lines of rails are connected every three feet, so that the track resembles a ladder lying on the ground and half buried in it.

The work on the Kansas Pacific railway, west of Fort Hays, has been abandoned, on account of the Indians. The work on the Platte route is still going on rapidly.

It is estimated that in the first five months of 1867, there were imported into this country iron and steel worth \$10,495,110—including 53,462 tons of pig iron, 23,512 of bar, and 62,577 of railroad.

Fourteen cashmere goats have arrived at Mineral Point, Wis., the only ones now in the State. The animals are the property of a company, and have been imported at an expense of \$2,500.

California capitalists are taking much interest in a proposed railroad from Marysville in their State, to Portland, Oregon. A survey of the southern end of the line has been begun. The route is through the Sacramento valley over an unbroken plain. The valley is one of the most fertile regions in the state, the first forty-two miles being a succession of harvest fields. The estimated cost of this end of the line for eighty miles, is only \$12000, per mile. The serious difficulties will be found further north.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

HORSE HAY FORK.—Charles D. Blinn, Port Huron, Mich.—This invention consists in constructing the prongs with a socket for the reception of the removable handle, and in the combination and arrangement of the loop or ring toggle and ropes, with each other and with the prong.

PORTABLE CRANE FOR LOADING WAGONS, ETC.—Amos Leitner, Hopewell, Ohio.—This invention has for its object to furnish a convenient portable machine for loading wagons, etc.

CORN HUSKER.—Daniel Williams, Saginaw City, Mich.—This invention has for its object to furnish a simple, cheap, convenient, and effective machine for use in husking corn.

WASHING MACHINE.—John Worden, Normal, Ill.—This invention has for its object to furnish an improved washing machine, simple in construction, quick and effective in its operation, which will not wear or injure the clothes and which can be manufactured at a comparatively small expense.

SPRING.—Edward C. Lewis, Auburn, N. Y.—This invention has for its object to furnish an improved manner of centering the leaves of springs and keeping the ends of the outer leaves in place upon the inner ones.

FLOATING FLEXIBLE FENCE.—John Pitcher, Mount Vernon, Ind.—This invention has for its object to furnish an improved floating fence, so constructed and arranged that it will adjust itself to the varying depth of the water and which shall be so flexible as to yield and not offer a rigid resistance to the water, while at the same time maintaining the same general position.

COTTON SEED PLANTER.—J. C. Tobias, Helena, Ark.—This invention relates to a new and improved device for planting cotton seed, and it consists of a revolving toothed wheel and a revolving toothed shaft placed within a suitable hopper, and used in connection with an adjustable slide at the bottom of the hopper, the latter being mounted on wheels and connected with a harrow, furrow opener, and a coverer, all arranged in such a manner as to insure the proper planting of the seed and the covering thereof with earth.

HORSE RAKE.—A. W. Coates, Alliance, Ohio.—This invention relates to a new and improved combination and arrangement of parts, whereby a very simple horse rake is obtained, one which will operate perfectly and be capable of being manipulated with the greatest facility.

COMBINED WASHER, WRINGER, AND TABLE.—James Whitney, Bristol, Vt.—This invention has for its object to furnish an improved machine by which clothes may be washed quickly and thoroughly, without wearing or tearing them, by which they may be conveniently wrung out when washed, and which, when not in use for washing purposes, may be used for a work table.