

to strengthen. Other engineers, examined on Monday last, gave it as their opinion that the Martin boilers were dangerous, from their liability to foam, and from the incessant care they required to prevent disaster.

It is noticeable that those most interested in the examination, and specially concerned in the verdict, express unbounded confidence in the boilers and plan of construction, and say, with all their experience, they have found little or no trouble with them. These men who thus testify are naval engineers, and it shows they are willing to abide by their testimony and risk their lives in support of their opinion.

It is not plain in the minds of those not immediately engaged in the examination of the witnesses, what decision will be arrived at by the jury, and at the day we go to press we are unable to procure the verdict, but it would seem from the evidence adduced that the braces gave way in some manner and the roof or shell was torn in consequence. From two indicator-cards found in the engine room, the pressure on the gage was shown to be $34\frac{1}{2}$ pounds; in another portion of the testimony the pressure shown by the gage is stated to be $39\frac{1}{2}$ pounds; but whether this is a misprint or not we cannot say, as we were not present at any of the examinations. The coroner still continues his investigation, and when the verdict is rendered we shall publish it.

THE CLOSE OF THE METROPOLITAN FAIR.

The great Sanitary Fair has closed at last. The huge building in Fourteenth street still stands, but the garlands are gone, the lights are out, the guests have deserted it. There are no fair women passing in and out to enliven it any more, but the memory of their services remains and will never be forgotten. For over three weeks our citizens poured out their money like water for the sake of the sick and wounded soldiers in whose behalf the Sanitary Fairs all over the country have been instituted, and the net proceeds of our Fair, at the present time, reach \$1,100,000, and this without counting the goods which remain on hand to be disposed of by auction. No other sensation has been permitted to interfere with the successful prosecution of this magnificent charity; and it will have an immense effect upon the conduct of our soldiers in the coming momentous campaign. The fields lie green around us and in the sunny corners of the valleys the branches of the trees are bursting into bud and bloom; in connection with this luxuriance and lavish generosity of nature the people will long remember the sympathy and devotion to the interests of the soldiers and the love of country shown by our women, as well, also, the sacrifices they have made to perform their duties to the end. The thoughtful visitor at the Fair who looked on the patient attendants sitting behind their counters and remembered that they were delicate, unused to toil, to the thousand-and-one endless questions, the dust, the noise, the heat, the incessant shuffling of feet, the blare of horns, the rattling of drums, the flapping of flags before their eyes, the overpowering odors—we say those who thought of these things fully appreciated the trial and the heroism which endured it meekly to the end. The triumph is theirs; whatever of glory belongs to the deed, let the crown for it fall upon our women; whatever of grace has been shown in their acts and intentions, let the reward of it be given to the women who have so richly earned it. All that is lovely and of good report, men cheerfully and unanimously accord to the ladies who planned and carried out the great Sanitary Fair.

SPECIAL NOTICE.

JOHN E. HEATH, of Berrian County, Mich., has petitioned for the extension of a patent granted to him July 22, 1850, for an improved machine for raking and binding grain.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, July 11, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the final hearing.

The arsenal at Springfield, Massachusetts, now contains 224,000 muskets.



The Cause of the High Price of Coal.

MESSRS. EDITORS:—The unusually high price of anthracite coal the past winter has been the subject of several articles which, from time to time, have appeared in the SCIENTIFIC AMERICAN and other journals, the general tenor of which has been to attribute the blame to the coal jobbers and miners, who, by combination or otherwise, have raised the price very much above its actual value. This may be true to a certain extent, but is not in my opinion the principal cause for these high prices. A visit made a few years since to the coal regions of Pennsylvania revealed to me certain facts which I think are not generally known, and which may throw some light on this subject. The mining business I found was no monopoly. It was not confined to those who happened to own coal lands, but was open to any one. Neither did it require a very large capital to carry on the business. Mines already opened could be obtained by paying from ten to twelve cents a tun on the amount of coal got out. All that was required were the necessary tools and an engine in some cases to draw out the coal and break it up. So far all is easy and under the control of those who mine the coal. To get the coal to market they must make use of the railroads and canals which run by the mouth of the mines, and over these they have no control. In fact the railroad and canal companies have entire control of the matter, and with them, I believe, mainly rests the responsibility of the high price of coal. The way they control it is by refusing to take it as freight. They will buy all the coal that is mined, paying their price for it, but refuse to carry it for others at any price. The miner therefore is obliged to sell his coal at the price these companies fix or not at all. What this price may be I know not, but at the time of which I speak it could be bought at the mines for seventy-five cents a tun for nut and one dollar for larger sizes. As late as last September but twenty-five cents a tun had been added to these prices; of course, then, these companies did not pay any more than that, and probably less. They take the coal at their prices, carry it to some seaport and sell it. Whatever price they get over and above the cost at the mines is so much freight. By this course not only the miners but dealers and consumers are completely at the mercy of these companies. The buying and selling prices are fixed by them, and those who mine as well as those who buy the coal are obliged to come to their terms. That this course is still pursued I have proof from a gentleman who visited the coal regions this last winter to buy coal. He found the proprietors of the mines anxious to sell at low rates, but they told him it was impossible to get the coal away except by private conveyance, and he was obliged to leave without purchasing.

Such are the facts, gentlemen, and so long as they exist we must expect to pay for our coal some four or five times as much as it is selling for at the mines. As a remedy for the evil I can suggest but two plans, viz:—1st, rival communications with the mines, and controlled by those who have as much regard for public as for private interests; or, 2d, what is better perhaps, let the Legislatures of the States interested oblige these corporations, by laws, to take coal freights the same as other merchandise is carried. When something of this kind is done we may expect to buy coal within three or four dollars a tun for what it is selling for at the mines, and not till then.

W. S. J.

Providence, R. I., April 21, 1864.

Steam on Canals.

MESSRS. EDITORS.—On page 166, current volume of your journal, I notice a communication under the heading, "Steam on the Tow-path." There is certainly much room for improvement in canal navigation, and I have longed to hear of some movement being made to this end. Hoping that the time for this improvement is near, I would offer my idea, which is neither to favor steam on the tow-path nor propellers, but instead, what I would denominate "pursuers." To understand this, I must explain.

Let a hawser or cable be suspended over the middle of a canal for any distance, one or ten miles, properly secured at regular intervals. A boat with an engine of sufficient power is to be placed directly under the cable, and connected to it by machinery. By the operation of this machinery on the cable, the boat is to be moved forward, just as one would move a skiff by pulling along a rope stretched across a stream. A speed of at least 75 miles an hour could be obtained without difficulty, whilst the dangers of railroad travel would be overcome. One boat could be connected to another forming trains as on railroads. On the same plan rivers and coasts could be navigated. Though there are difficulties to this plan, yet greater have been overcome, and the day may not be far distant when traveling by water will leave railroad-ing behind.

W. F. MAPPIN.

Mayslick, Ky., April 13, 1864.

[Seventy-five miles an hour ought to satisfy most persons. Correspondents mistake in making too high estimates, as it gives to many a good idea the appearance of a chimera, and deters sober-minded men from undertaking it.—Eds.]

Sizes for Key-seats.

MESSRS. EDITORS.—We noticed, more that a year ago, that you requested some one to send you a list of sizes for key-seats for shafts, but we have waited in vain to hear an answer to your request from some one of more experience than we have. About two years ago we adopted the appended table as our standard sizes for key-seats. We have found it of great convenience to ourselves and certainly to our customers:

Diameter of Shaft.	Key Seat.	Diameter of Shaft.	Key Seat.
inches.	inches.	inches.	inches.
1	1-4 by 3-32	3 1-2	3-4 by 1-4
1 1-4	5-16 by 3-32	4	7-8 by 1-4
1 1-2	3-8 by 1-8	4 1-2	1 by 5-16
1 3-4	7-16 by 5-32	5	1 1-16 by 3-8
2	1-2 by 5-32	5 1-2	1 1-8 by 3-8
2 1-2	9-16 by 3-16	6	1 1-4 by 7-16
3	5-8 by 3-16		

We also adopted Nasmyth's standard sizes for shafting and also his taps and dies for screws. We consider the general use of a standard size for screws and also for the outside diameter of nuts to be of great importance. If the Government was to compel all their work to be done to standard sizes, we think its adoption by private manufacturers would soon be general.

SNYDER BROTHERS.

Williamsport, Pa., April 14, 1864.

[It seems to us these sizes are shallow for some metals, such as cast iron for instance; some of the large sizes decidedly so.—Eds.]

Terrible Boiler Explosion in Philadelphia.

Another terrible disaster has occurred from the explosion of a steam boiler, in a Philadelphia factory. The *Evening Telegraph* of that city, dated April 25, says:—

"This morning our city was visited by another terrible boiler explosion, as sickening and horrible in its details as the one that recently occurred at the foundry of Messrs. Merrick & Sons, in Washington street. Both of these explosions, like many others of a similar fatal character, occurring on a morning after the boilers had lain idle over Sunday, afford a point which might be investigated in endeavoring to discover the cause of the affair. The yard in the center of the buildings was occupied by the boiler-house, which stood against the north wall, and was a substantial brick building, with an iron roof. There were in the building two tubular boilers, built by Morgan, Orr & Co., of this city, which had been in use about three years. The engineer who had charge of these boilers has been in the employ of Messrs. Cornelius & Baker also about three years, and every confidence was placed in his competency. At twenty-five minutes of eight o'clock, while all the employees of the establishment—about six hundred in number, men and boys—were engaged in various parts of the building, from the fifth story to the basement, the explosion occurred. Two distinct reports were heard, although it is known that only one boiler exploded. The engineer escaped on account of being absent from the boiler-room at the time, and was, it is said, in the office. In order to guard against accident, the firm had taken the precaution to have a steam-gage placed in their private office for their own personal inspection and safety.

"The force of the explosion was most terrific—far more so than the explosion at Messrs. Merrick & Sons foundry. A five-story brick chimney, several feet square, standing against the north building and alongside the boiler-house, was completely razed to the ground, not one brick being left standing upon the other. Two "dipping" shops and the boiler-house were also laid in ruins, and all the windows in the establishment, several hundred in number, were more or less damaged. Some idea of the force of the explosion can be imagined when it is stated that a portion of the exploded boiler, about 750 pounds in weight, was carried to Twelfth and Cherry streets, and there striking a man on the head, killed him instantly. The deceased was employed in loading his wagon at the time of the accident.

"The boiler which did not explode was carried from its place up into the air, and was landed over a distance of a square from the factory. It passed through the top of the William Penn stables, running from Market to Filbert streets, and between Eighth and Ninth, instantly killing one horse and so badly injuring two others that they are not expected to live. The boiler did considerable damage to the stable. It passed through the roof and second floor, and forced one side of the stable out so far as to place it in an unsafe condition. Large pieces of the boiler and other flying debris were also hurled with force to a great distance, and windows for several squares off broken, although no one except the cartman mentioned above, was injured in this way. The yard—a hollow square formed by the buildings, was filled in some places half-way to the second story with piles of ruins. The five-story stack chimney, the boiler-house and the two dipping sheds were all a mass of ruins together."

[The cause of this disaster as of ninety-nine out of every hundred is carelessness of some kind. Attempts made to throw a veil of mystery over these disasters ought to be discontinued, it is simply begging the whole question and discreditable to the age we live in and the state of the mechanical arts.—Eds.]

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Applying Steam Power to Car Brakes.—This invention consists in the employment or use of a steam chest provided with a valve, a steam cylinder provided with a piston, and a spring and a valve regulator, all arranged in connection with a brake-actuating mechanism, in such a manner that the brakes may be subjected to any degree of pressure which may be necessary, and the communication between the boiler of the locomotive automatically opened and closed so as to render the desired pressure constant, whether the same be greater or less. The invention also consists in the employment or use of an escape valve applied to the steam cylinder and arranged in such a manner as to obviate any sudden increase of tension or pull on the brake chain, a contingency which frequently occurs when the train "stretches," and also to exhaust steam from the cylinder when the brakes are to be relieved. The invention further consists in a novel means for connecting the piston-rod with the brake chain whereby a short movement of the former is made to give the necessary length of pull to the latter, and admitting of a short cylinder being used, which is very desirable on account of space being limited where it is most desirable to place the cylinder. William Loughridge, of Nevertown, Md., is the inventor of this improvement.

Bilge Block.—This invention consists in the addition to a bilge block of a piece so arranged on the top thereof and transversely thereto that it may adapt itself readily to the longitudinal curvature of the bilge of the vessel, and of such length that it may support two or more of the ribs of an iron vessel and thereby be prevented from indenting the outer skin thereof. It also consists in combining the hinged or adjustable upper portion of a bilge block with the base or body of the block by means of a screw by which it may be adjusted with greater facility than by the wedges commonly employed. Phineas Burgess, of Brooklyn, N. Y., is the inventor of this improvement.

Pulp Ink.—The object of this invention is to obtain an ink suitable for use on or in canceling stamps and for other purposes, the coloring matter of which will not separate itself from the menstruum and which will always be in condition for use, and which may be applied to a stamp or other device for producing an impression with the use of a pad; and to this end it consists in the admixture with coloring matter and a menstruum to form an ink, of the fiber or dust of leather by which the ink is brought to the condition of a permanent pulp throughout which the coloring matter is uniformly distributed. It also consists in the addition to such ink of paper sawdust, or finely reduced paper and cork dust or finely reduced cork either separately or together, when desired to give the ink greater solidity and to prevent the leather fiber from adhering to the face of the stamp or printing device. Richard H. Rogers, of New York City, is the inventor of this improvement.

Slide and Guide for Molding Flasks.—The two parts of a flask now used in molding or forming molds for casting are provided with two slides attached permanently to two opposite sides of one part of the flask, while the guides between which the slides work are attached to the corresponding sides of the other part of the flask. These slides and guides being permanent attachments, are very liable to become disarranged in withdrawing the casting, and the molder is required to resort to a carpenter to readjust them, and two slides and four guides are required for each flask. This invention consists in having the guides connected with plates, attached to one part of the flask and having the slides made separately and attached to the plates secured to the other part of the flask; all being so arranged that the slides may be readily connected to one part of the flask and the guides of one plate made adjustable, so that the slides and guides may always be kept adjusted in proper position and detached from the flask during the withdrawal of the casting, and two slides and four guides rendered sufficient for an indefinite number of flasks. S. A. Traugh, of Cincinnati, Ohio, is the inventor of this improvement.

Steel Shirt Collar.—This invention consists in the manufacture of a steel collar of a single strip of tempered steel plate painted and varnished, and so indented all round near its edges in imitation of stitching, that it may be worn either as a "turn-down" or "stand-up" collar. It also consists in the employment as a fastening for a steel collar of a metal stud soldered or otherwise fastened to its interior near one end to operate in combination with a hole near the other end, in such manner that no portion of the fastening is visible on the outside of the collar, whereby when worn as a "turn-down," it presents the same appearance as a linen collar made with an inside band and having its fastening in such band. It further consists in providing a steel collar on the inner side with metallic eyes or loops for the attachment of india-rubber or other flexible rings or loops by which to attach it to the buttons of the band of the shirt, such metallic eyes or loops also serving to keep the cravat or neck-tie in place when the collar is worn as a "turn-down. Louis Billon, of Brooklyn, N. Y., is the inventor of this improvement. Further information may be obtained of Messrs. Billon & Foggan, 76 Nassau street, New York City.

Apparatus for removing Starch Deposits.—This invention consists in the employment in a starch cistern of agitators secured to vertical shafts descending into said cistern at points outside its center and operated by means of a sun-and-planet gear, in such a manner that the effect of the agitators is equally powerful in the center of the cistern and at or near its skirts or circumference, and the accumulation of a deposit in the center of the cistern is obliterated; the invention consists further in the application of a scraper extending clear across the center of the cistern and suspended from rods to which a rising and falling motion can be imparted by toothed racks and pinions or other equivalent means, in combination with a revolving ring or annular turn-table, in such a manner that said scraper can be adjusted up and down to any desired height from the bottom of the cistern, and by its action, combined with that of the sun-and-planet agitators, the accumulation of a deposit on any part of the cistern is effectually prevented; the invention consists finally in the arrangement of a platform supported by and moving on rails

over a series of cisterns, in combination with agitators and scrapers (either alone or both combined), which are vertically adjustable by screw rods, toothed racks, and pinions, or other equivalent devices, in such a manner that the agitating mechanism can be raised above the top edge of the cistern and removed by means of the rails supporting the platform, from one cistern to the other, and by these means one and the same agitating mechanism will serve for a series of cisterns. Wright Duryea, of Glen Cove, N. Y., is the inventor of this improvement.

Apparatus for cooling and disinfecting the Air in Vessels, &c.—This invention consists in combining with a refrigerating chamber and room, vessel or other closed space, the air of which is to be cooled or disinfecting, an air conduit provided with or without a fan blower and arranged in relation to the ice or freezing mixture contained in said refrigerating chamber, in such a manner that the air while passing through said conduit will become cooled and flow into the room, vessel, or other closed space, without coming in contact with the ice or freezing mixture, and that the air contained in said room, vessel, or other closed space can be passed once or several times through said conduit either by the natural draught caused by the changes in its temperature or by an artificial draught, until its temperature is brought down to the desired degree; the invention consists further in the peculiar arrangement of a series of revolving drums on a hollow shaft, the interior of which is divided into several channels, in combination with the refrigerating chamber and with or without the fan-blower, in such a manner that the current of air created by the changes of its temperature or by the fan-blower, as the case may be, is compelled to make a long circuit in the interior of the refrigerating chamber and that its temperature is reduced considerably before it is allowed to leave said chamber. Alois Peteler, of New Brighton, N. Y., is the inventor of this improvement.

Machine for grinding Oil Patms.—This invention consists in the employment of one or more mullers, adjustable on arms extending in a horizontal direction from a vertical shaft, in combination with slip-weights and with a stationary bed or platform, in such a manner that by means of the slip weights the muller or mullers can be depressed upon the bed with more or less force as occasion may require, and by imparting to said shaft a rotary motion the muller or mullers are carried over the bed, and the operation of grinding paints can be effected by steam or any other suitable power in contradistinction to the ordinary method of effecting this operation entirely by hand labor. H. W. Gear, of 653 Broadway, New York, is the inventor of this improvement.

Ruffling Machine.—This invention consists in the combination with a fluting machine of a folding guide, so applied as to fold and double a strip of muslin, silk, or other fabric, and deliver it in its folded state between the rollers that the doubling and fluting may be performed by a continuous process. It also consists in the combination with fluting machine and folding guide of a flattening guide interposed between the said folding guide and the fluting rollers. It further consists in a folding guide of novel construction for doubling a strip of muslin, silk, or other fabric, by turning in both edges toward each other on the same side of the strip. Thomas Robjohn, of Mott Haven, N. Y., is the inventor of this improvement.

THE bill to introduce the French metrical system into Great Britain has passed into a second reading in the House of Commons. The debate was not characterized by much profundity of thought or extent of information. We learn that Prof. Airey prefers of all others a binary division. From the beginning until now, it has been customary to divide by four rather than five. Four quarters are a natural division of anything.

ACCORDING to Kirchoff, the great spectrum analyzer, the evidence of the existence of potassium in the solar atmosphere has broken down under closer examination, but additional evidence has been obtained of the existence therein of iron, nickel, barium, copper, zinc, strontium, cadmium, &c., and that no additional elements have been found in the sun.