

own Governments. If this course has been pursued in any case the success of the spies has not been flattering. In a recent number of the London *Artizan* we notice elaborate copper plate engravings which purport to be plans of the monitor turrets. They are incorrect in so many respects that they cannot be criticized; they bear not the most remote resemblance to the monitor turrets and their fixtures, except that they are round. To crown all, but one gun is shown in the turrets. If no better than this can be done we may as well open the doors at once and give every one free access to our ships-of-war.

SUBMARINE WARFARE.

We have from time to time chronicled the attempts of the Confederates to blow up our vessels-of-war with submarine torpedoes. Some of these efforts have been successful, while others have failed. The *Ironsides* was attacked off Charleston, but suffered little damage; while the *Housatonic*, a wooden ship, or sloop-of-war, was sunk by one of those machines. The close professional observer must have remarked the similarity which exists between the boats or whatever the craft is which conveyed the torpedoes to the vessels attacked. They are all mentioned in the reports as long and low, and almost indistinguishable; the time of attack is generally at night, when darkness is likely to favor the operation. The last assault of this kind was made upon the *Minnesota*; and the results are thus related by a correspondent of the Philadelphia *Inquirer*:—

About 1:50 A. M. a boat was hailed by the sentry on post on the port gangway, but not receiving any answer, he fired several times at her. This did not have the effect of receiving any answer, when the officers of the deck hailed her and she answered *Roanoke*. She was then ordered off, or else she would be fired into. This warning she did not heed, for immediately she ran into our port beam, and at the same instant she exploded a torpedo, giving a great shock to the ship, and doing a great deal of damage. One of the forward guns was immediately trained upon her; but it did not check her speed. Several tug-boats were despatched after her, but they did not succeed in finding her. The damage done to the ship was somewhat serious. The deck and walls of the engineers' steeerage were badly torn up. The paymaster's storeroom was also badly damaged. The shell room appeared as one mass of ruins, owing to the displacement of the shells. The shaft alley of the propeller was crushed in, and prevented the working of the machinery. Several guns were lifted from their positions and thrown against the ports, crushing them completely. The steamer which caused this excitement was of small dimensions, and was a propeller. She did not appear to be a steamer excepting the smoke-stack. The only time that she showed signs of life was when she was retreating, when she commenced to fire up and raise steam. She was capable of containing but a few men.

Another writer says:—

It seems exceedingly strange that the mysterious craft could come down the river past all the picket boats, and not be observed until almost alongside the flag-ship, which lay nearer the mouth of the river than any other vessel of the fleet. Where she came from is not known; but it is surmised that she ran out of the Chuckatuck. She must have been propelled by muffled oars as she neared the flag-ship; but as soon as the torpedo was attached she steamed rapidly away. The report made by the explosion was very heavy. It was heard very distinctly at Fortress Monroe. The torpedo was placed amidship, and was not properly adjusted. Had it been rightly fixed to the vessel, there can be no doubt that it would have been blown to atoms, and the hundreds of unconscious sleeping men hurled into eternity without the least warning.

It was stated at the time of the attack on the *Ironsides*, that the torpedo-boat went to the bottom; but this does not appear to have been any particular loss to the enemy, as the craft which assailed the *Minnesota* is evidently of the same construction. It is very plain that threats do not frighten these adventurers, and if the officer-of-the-deck on the *Minnesota* had fired into the rebel craft without ceremony, instead of parleying, he might have sent her to the bottom.

It will not do to dismiss this attack as a mere matter of chance. They are not chances; they are deliberate and well-organized schemes to blow up our large frigates. Having no ships of their own to lose in this way, the Confederates are perfectly secure in attacking ours; and they have shown that a submarine boat may be constructed which will, to all intents and purposes, destroy the finest vessel that floats. A little more practice will make them perfect, and the next attempt may be more successful. One remedy against disaster from this source appears to lie in providing booms, or out-riggers, armed with cables or chains that cannot be severed by a blow from a cutlass. These, extending at a distance of

twenty feet or more, will prevent the torpedo-boat from approaching too near. Firing at these adventurers with muskets is rather uncertain work, and if no means can be provided to keep them off, the navy will have to record the loss of some of its finest ships, for the rebels have come too near success to be satisfied with anything less. However we may despise rebels as public enemies it is poor policy to underestimate their capacity for mischief. If they do not move armies in heavy battalions against us, they are incessantly at work with bands of marauders. If they have no iron-clads or frigates fit to cope with ours, they have submarine boats which they use with great effect, as the results of their expeditions show. When the enemy plots, we must counterplot; and it would seem not impracticable or a waste of time for naval commanders to exercise more vigilance, and frustrate the attempts of the rebels before serious loss occurs to the navy.

NEW MODE OF SMELTING LEAD ORES.

Prof. A. H. Everett, of this city, has just brought to perfection a very neat improvement in the reduction of lead from galena, by which a considerable saving in expense is effected. One of the common methods of reducing this ore is to mix it with iron in a reverberatory furnace; the sulphur at a high temperature, having a stronger affinity for iron than for lead, leaves the lead and combines with the iron, forming sulphide of iron, while the lead is drawn off as a separate metal.

At the present time, however, the high price of even iron scraps (about \$40 per ton) induced Prof. Everett to look about for some substitute, and it occurred to him to try the waste tin scraps of the tin plate-workers; in these he has the very best of wrought iron, and in a form exposing the largest surface for the action of the sulphur. The tin scraps, being a waste product, can be had at a nominal cost.

After a series of experiments the practical difficulties of the new process were overcome, and now several tons of ore are being smelted by it daily at Prof. Everett's furnace, at the foot of Horatio street in this city.

The operation is extremely simple. Five hundred pounds of the sulphide of lead are mixed with 125 lbs. of tin scraps in a reverberatory furnace, and kept at an intense heat; the charge being stirred every 15 minutes. In from one to two hours the whole mass becomes fluid, and the reduction is complete. It is found best to introduce one half the charge of tin scraps, and allow it to become red hot, when the ore and the remainder of the scraps are added.

Besides the cheaper and more rapid reduction of the ore by this process, the tin of the scraps is mixed with the lead, increasing the yield, and for many purposes improving the quality. Prof. Everett has secured a patent for this valuable invention.

New Uses of Iodine.

From the specification, recently issued, of a patent by Professor Hofmann, of London, we learn that a new coloring matter, which dyes silk and wool of a beautiful violet, blue violet, or red violet tint, has been produced by the application of iodine extracted from sea-weed. It has long been thought that if iodine could be used as a coloring substance it would be one of the most powerful known. The patented process consists of mixing in certain proportion the substance called rosaniline with the iodides of ethyl, methyl, or amyl. This dye may be used in the same manner as the aniline colors, and is already in the hands of practical people in all the manufacturing districts, and bids fair to be the "color" of the season. The use of iodine as a disinfectant has also been noticed by Dr. Richardson, who states that iodine, placed in a small box with a perforated lid, is a good means of destroying organic poison in rooms. During the late epidemic of small-pox in London, he has seen the method used with benefit.

THE "RE DE ITALIA."—The American iron-clad, *Re de Italia*, has arrived safely at Naples. She made an excellent passage; her time was 18 days and 18 hours. Nothing further has been heard from the *Galanuomo*, which went out with the iron-clad to see her safely over. A full description of the *Re de Italia* will be found in back numbers of the current volume.

DEATH OF A DISTINGUISHED INVENTOR.

Mr. Thomas Blanchard died at his residence, No. 109 Tremont street, Boston, on the 16th instant, of apoplexy. He was nearly seventy-five years of age. Mr. Blanchard was one of the most celebrated of American inventors, and his lathes for turning irregular forms such as musket stocks, also the arrangement for turning the octagon at the breach of the barrel are widely known, and have contributed largely toward perfecting the weapon and facilitating its manufacture. Mr. Blanchard was also the inventor and proprietor of a machine for bending timber, one for making envelopes, and another for mortising holes. The number of his mechanical inspirations is very great, and for 50 years he has given them to the world in various forms. We little thought when making some account of his lathe for turning irregular forms on page 264 of the present volume of the *SCIENTIFIC AMERICAN*, that we should so soon be called upon to chronicle his death. Mr. Blanchard was married recently, and we met him and his young bride in Washington. It is singular that two great inventors should have passed away at nearly the same time. Mr. Richard Roberts, an Englishman, the inventor of the iron-planing machine and others, recently died in England, and his loss is accounted a great calamity.

Lord Rosse, the Irish Mechanist.

The Earl of Rosse is the "Tubal Cain" of the Irish peerage—a noble Vulcan, a smith and an astronomer equally at home in the forge or among the stars. Most people have heard of his lordship, or if they have not heard of his lordship, they have heard of his great telescope, fifty-three feet long and six feet in diameter, through which the celebrated nebulae of Sir John Herschel was first seen in its most distant aspect of a myriad of clustering stars; and last summer it was asserted that his lordship had an early private view, through the same monster instrument, of the approach of the hot weather, and was thereby enabled to erect sheds for his cattle. The great telescope stands in the middle of the demesne, and is slung between massive stone walls something like a pier of the suspension bridge, without the arch connecting the side masonry.

The first thing that strikes you, is that it is like a gigantic piece of wooded ordnance, being put together with tremendous staves like a cask. The instrument is pointed at a given angle towards the heavens and down in the bottom of the huge cylinder, or cask, if you choose to call it such, is the speculum or reflector, the largest that has ever been made, and the manufacture of which, under his own superintendence, was the triumph of Lord Rosse's mechanical powers. In this metallic mirror is reflected the heavenly body under observation, and on a stage near the opening at the top stands the observer, examining at leisure planet, fixed star, meteor, or nebulae, just as the case may be. Here pigmy man reviews the heavenly host, but Lord Rosse is no pigmy. If his father had worn a blacksmith's apron instead of ermine or sables, the son would have risen from the cinders of the forge to be a Stephenson or a Herschel.

The Earl's residence, Rosse's Castle, is a most amusing mixture of the forge and the feudal fortress. The greater part of the structure is comparatively new, but portions of the old castle, which in the Jacobin wars stood a brief siege, still remain, and bear upon them the traces of cannon balls. The present nobleman has surrounded the building with a rampart and fosse so that in a sudden emergency it might be turned to strategical account. Fortification is one of the many branches of knowledge to which he has turned his thought; but when you get within the line of defense, what a contrast to baronial or military force the objects that meet your eye afford! The genius of Watt triumphs over the imitations of Vauban.

Where cannon might have bristled a tidy steam engine worked; great lathes turned under the towers that frowned defiance at James's force; in the stable, where racing stud or war steeds might have been sheltered, an ingenious and powerful apparatus for polishing the great speculum was fixed; in the corner of the castle yard was a furnace, and close by stood the moulds in which the monster was cast by his lordship, with face and hands begrimed with sweat and coal dust—an event more important, but not as worthily recorded, as the casting of Schiller's bell. Scraps of iron and smith's coal strewn the ground; and, instead of the

baying of hound, or the horn of hunter, you hear the sustained deep breathing of a pair of forge bellows, above which ring the measured clang of sledge and anvil, for his lordship is never idle. When he was Lord Oxmantown, he represented King's county in Parliament, and, when attending his duties in London, would sometimes escape from a dull debate to the forges of Birmingham or the ship-building walls of Blackwall.

THE BOILER EXPLOSION ON THE "CHENANGO."

On the 15th instant, while the United States gunboat *Chenango* was steaming down the harbor to Fortress Monroe, the larboard boiler exploded with terrible violence. A large number of persons were killed and several scalded, and, up to the present writing 22 have died of their injuries. Our account is taken from the statements of competent observers, but we were not able to obtain a view of the boiler personally.

The boiler was of the kind now in use in the Navy, and is known as Martin's patent. It was nearly square in form, had vertical water tubes, and was in all respects similar to others of its class. In regard to the circumstances attending the explosion but little is known. This is a stereotyped, most melancholy and unsatisfactory conclusion to arrive at, for boiler explosions have become almost infectious, and seem to rage at times like the epidemics which destroy nations. The point of rupture occurred on the top behind the uptake, and was a simple rending of the boiler shell in two parts from end to end, the fissure following the double-riveted seams, rending one row, so we are informed, but leaving the other by the side of it intact. The opening is from 6 to 10 inches in width.

The sheets that gave way were strongly stayed to the crowns of the furnaces in the usual manner by "crow feet" both on the shell and furnace arches. These crow feet were twelve inches apart and protected that area over every square foot of roof, so to speak, of the boiler. After the explosion some of these braces were found broken. The steam and water space of these boilers is contracted, the height from the crown of the furnaces to the shell is but 36 inches, and to the center of the stop valve on the steam pipe the distance is but 4 feet and 6 inches.

As usual in cases of boiler explosion the most conflicting reports are made respecting the cause of the disaster. The most plausible one appears to be that it was caused by a deficiency of water. This loss of water occurred from priming which, as every engineer knows, is a source of danger to say the least. We have seen the water in a boiler with a much greater amount of steam room than this one go from the top to the bottom and back again half a dozen times in as many minutes, the whole structure shaking and vibrating under the action like a man with the palsy, and it was with the greatest difficulty that the vessel was worked into port. It has been remarked to us that the *Chenango's* engine was stopped and then started again, and immediately after the boiler exploded. If it be reasonable to infer from this that the sudden starting of the machinery caused the water to rise as it always does, upon surfaces already over-heated by reason of the boiler's priming, we have one fact which may account for the disaster. Water rising upon intensely heated plates, however, assumes the spheroidal condition and does not instantly give off vapor, and further, if the furnaces were overheated it is more probable that the crowns would have come down, and a collapse have ensued instead of an explosion. These points will be made clearer when the commission of experts which are to examine the case make their report. At the present writing the accounts of different persons agree in some respects.

The braces or the rods, if we may so call them, which go from the shell to the furnace arches were of the best Ulster iron and 1 1/4 inches in diameter. It was stated to us by indisputable authority that these braces were much reduced in diameter, and that the quality of the iron was most excellent. In addition to these braces the shell was protected by heavy angle irons 12 inches apart. The boilers had been subjected to a cold water pressure of 60 pounds to the square inch, and were deemed perfectly safe.

The testimony before the Coroner's jury developed

nothing satisfactory. A third assistant engineer testified that he tried the gage cocks on one of the boilers, he does not say which, whether the sound or exploded one, and was unable to find any water, and also that the steam gage indicated no pressure. His testimony threw no light on the case, and very little upon the circumstances previous to the accident, as he was not in the engine or fire room, and could not know what transpired. The engineer, Mr. Cahill, is spoken of as a very capable man, and his last words were that he had two gages of water at the time of the accident. Against the dead we say nothing, but if boilers foam (and they generally do when new) it is hard to tell whether there are two or ten cocks of water, and there may be solid water in one instant and a boiler full of scething foam in the next.

The committee appointed by Government to investigate the case, says that there was "a defective vein of iron" which caused the explosion.

It is also possible that this boiler exploded from the breaking of the rods attached to the braces, as the great area or shape of the shell, for the boiler was nearly flat on top, caused an enormous strain upon the shell and angle irons which they were unable to bear, and they consequently gave way. All witnesses agree in stating that the noise of the explosion was but slight; "a low rumbling noise," says the assistant engineer, and we may infer that if the explosion had been the result of a mysterious and uncontrollable force, the ship would have been blown to fragments, as buildings and Western steamers are at times. The boiler was tested at 60 pounds on the square inch, and this may have been a positive injury instead of a benefit, since it tended to weaken the structure and render it less capable of withstanding a working pressure of only three-fourths that amount.

The Morgan Iron Works never spare pains to make their work first-class, and their reputation as steam engine-makers stand "A No. 1." This is the first explosion that has ever happened to any new boiler constructed by them. We shall endeavor to give further particulars in a future number.

RECENT AMERICAN PATENT.

Street-sweeping Machine.—This invention consists of a machine which, when drawn through the streets of a city or town, will automatically pound and level the surface of said streets and collect the dirt and dust by an oblique adjustable sweeper and brush and by means of scoops and leave it in heaps on the sides of the streets whence the same can be readily removed by the ordinary dirt carts. This invention will also roughen paving stones when so smooth as to endanger the injury of horses by slipping; it is also useful in winter for abrading ice; while in summer a reservoir is also attached to the machine for the purpose of laying the dust. An engraving and description of this machine will shortly appear in our columns. E. Hambruger, of 169 Broadway (room 6), New York city, is the inventor of this machine.

Fine Clay as a Dressing for Sores.

Dr. Schreber, of Leipzig, recommends the use of clay as the most "energetic, the most innocent, the most simple, and the most economical of palliative applications to surfaces yielding foul and moist discharges." He moreover considers that it has a specific action in accelerating the cure. Clay softened down in water, and freed from all gritty particles, is laid, layer by layer, over the affected part to the thickness of about a line. If it become dry and fall off, fresh layers are applied to the cleansed surface. The irritating secretion is rapidly absorbed by the clay, and the contact of air prevented. The cure thus goes on rapidly. This clay-ointment has a decisive action in cases of fetid perspiration of the feet or arm-pits. A single layer applied in the morning will destroy all odor in the day. It remains a long time supple, and the pieces which fall off in fine powder produce no inconvenience.

THE SANITARY FAIR.—We have made no report of the Sanitary Fair this week, as our first article embodied the principal features of interest to our readers. The exhibitions will close on Saturday and the net receipts will be something over \$1,000,000. At the present writing they reach \$950,000.



ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING APRIL 12, 1864.

Reported Officially for the Scientific American.

Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

42,263.—Manufacture of Shears.—John Abernethy & Wm. H. White, Woodbury, Conn.:

We claim the manner of making shears substantially as herein described, that is to say by first forming a blank by punching, by secondly shaping that blank by swaging and hammering into a form substantially as shown in the drawings, and lastly by uniting two blanks and blades by a steel bow riveted thereto, all substantially as described.

42,264.—Plow.—Samuel Aland, Rome, N. Y.:

I claim the combination of the mortised crop-bar, D, standard, B, brace, C, and lug, G, constructed and arranged to operate as and for the purpose herein set forth.

42,265.—New Manufacture from Hemp, Flax, &c.—Stephen M. Allen, Woburn, Mass.:

I claim, first, As a new article of manufacture, a cloth, felt or yarn, made from long-stapled fiber prepared in the manner herein set forth.

Second, I claim as a new article of manufacture cloth, felt, yarn, &c. made from long-stapled fiber prepared in the manner described and mixed with cotton or wool as set forth.

Third, I claim as a new article of manufacture cloth, felt, and yarn made from long-stapled fiber prepared as described, with or without admixture of cotton or wool, and dyed or printed as herein set forth.

42,266.—Lamp.—James R. Baker, Kendallville, Ind.:

I claim, first, So combining a wick-tube with a lamp-burner, that it may be turned outward by its thumb lever, H, G, for the purpose of trimming the wick, or be removed therefrom for the purpose of supplying a new wick, substantially as set forth.

Second, I claim so applying a wick-tube to a lamp burner, that the flame of the lamp, when the wick-tube is turned outward for the purpose of trimming the wick, will be in a direction opposite to the oil supply openings of the lamp, and with an interposing portion of the lamp-burner between the plane and the oil-supply openings, substantially as described.

Third, I claim the foot-piece, I, in combination with the wick-tube, I, for the purpose set forth.

Fourth, I claim the detail, I, in combination with the wick-tube, I, and foot-piece, I, for the purpose set forth.

Fifth, I claim the tubular portion, M, of the sliding half-tube, N, in combination with the wick-tube, I, substantially as and for the purpose set forth.

Sixth, I claim in combination with the collar, D, having opening, e, therein, I claim the sliding half-tube, N, with opening, e', therein, said parts being arranged and operating substantially in the manner and for the purpose set forth.

42,267.—Self-acting Mule for Spinning.—Harvey S. Bartlett, Smithfield, R. I.:

I claim, first, The mode of operation substantially as described by means of which a disconnection is effected at stated intervals between the cam-bearing shaft, B, in a self-operating mule and the source of motion derived from the pulley, A', when the mechanism to effect the same is combined and arranged in the manner substantially as specified.

Second, The combination of the spring, D, and the clutch, W', with the mechanism by which the position of the lever, E, with its stop, F, is shifted for the purpose of restoring the connection of the cam bearing shaft, B, with the main source of motion, substantially as shown and described.

42,268.—Packing Projectiles for Rifled Ordnance.—Wm. Boekel, Philadelphia, Pa.:

I claim, first, The described employment of a band, A, when embodied with the soft metal packing and drawn upon the body of the projectile, substantially in the manner and for the purpose specified.

I also claim the use of a cup, B, of any form equivalent to the one herein shown, when combined with the soft metal packing in the described manner and bearing upon the back end of the projectile, substantially as and for the purpose set forth.

42,269.—Lamp.—Wm. G. A. Bonwill, Dover, Del.:

I claim, first, The collar, C C', constructed as described with a series of apertures extending completely around it, variable in capacity by the action of the register and adapted to admit a supply of cool air to the interior of the chimney immediately above the cone or deflector, from the medium outside (without first passing into the cup or burner), to prevent the chimney from being cracked or broken by sudden heat.

Second, I claim the specific combination and arrangement of the spring, F, spur wheels, f, shaft, F', and slotted wick-tube, E, when the said spring is firmly secured by its lower part, f', to the floor of the shell, A, is formed with a double coil, f, f', and rises in two standards, f, f', embracing the shaft, F', in close proximity with the respective spur wheels, f, f', as herein described.

42,270.—Coating and protecting the Silvering of Mirrors.—Diodor Briansky, St. Petersburg, Russia. Patented in Belgium, June 27, 1863:

I claim the application in successive layers, to the silvered surfaces of mirrors in manner and for the purpose substantially as herein set forth, of plastic protective compounds combining, like those above enumerated, the essential qualities of elasticity, tenacity, impermeability, insolubility, and adhesiveness.

42,271.—Corn-sheller.—Jacob Brinkerhoff, Auburn, N. Y.:

I claim the cylinder, E, the ties, L and X, the regulators, H, the bed-piece, O, the spiral springs, A, the fans, S, and the platform, P, the whole being constructed, combined and arranged in the manner and for the purpose substantially as herein set forth.

42,272.—Tube Gear of Steam Engines.—Henry T. Carter, Portland, Maine:

I claim the arrangement of the cylinder, the fly-wheel shaft, and the rotary valve in manner so that the valve or its spindle shall be affixed to, and so as to be rotated with and by the said shaft, while each shaft may be in revolution.

42,273.—Coal-sifter.—Otis N. Chase, Boston, Mass.:

I claim, first, The rocking sieve, C, when attached to frame, B, with its sides curved in the line of the motion of the sieve, substantially as described.

Second, I claim the sieve, C, in combination with the inclined planes, f, f, and the slide, D, substantially as described for the purpose set forth.

Third, I claim the handle, E, when attached to the sieve, C, and fitted for the double purpose described, substantially as and for the purpose set forth.

42,274.—Numbering Machine.—John C. Clapp, South Boston, Mass.:

I claim, first, The pawl, J, constructed with the steps, a b c d, in