Correspondence

Review of Low Pressure Condensing Engines as applied to Steam Vessels.

MESSRS. EDITORS :—On page 234, current volume of the SCIENTIFIC AMERICAN, I notice an article in reference to the two great iron-clad ships, *Puritan* and *Dictator*, giving a description of their machinery, which is alike in both vessels. They have two cylinders of 100 inch bore and 4 feet stroke of piston. The propellers are 21 feet 6 inches in diameter, with a lead of 32 feet. The writer remarks :—"We do not suppose that twenty miles per hour will be got out of them as stated, but we do think that three-fourths of it is not too much to expect when their models and engines are considered. If the engineers of those vessels gave such information from a practical knowledge of "cause and effect," they certainly have made a great error in their calculations, as the facts and figures will show. The velocity and travel of pistons of low pressure condensing engines have been fully demonstrated in Europe and America, and engines of such proportions never have and cannot make, on an average, over 35 revolutions per minute. Taking this figure as the number of revolutions the engines of the *Puritan* and *Dictator* will make per minute, with 32 feet lead of screw, we have a travel of screw in the fluid nut of 1,120 feet per minute or 67,200 feet per hour : equal to 12 miles, 3,840 feet. Now, deducting from this one-fifth or one-fourth, for the slip of the screw [by far too much.—EDS] (which varies a little, according to the model of the vessel), we have a speed to the vessel of not more than about ten miles per hour. If we compare the practical results of the *Great Eastern* with her double power and two modes of propulsion (side wheels and propeller), we shall see that either one of them would produce about the same speed without the aid of the other. Her propeller is 24 feet in diameter with a lead of 44 feet. Her propeller engines have 4 feet stroke of piston, and at 35 revolutions per minute, she would have a travel of screw of 1,540 feet per minute, or 92,400 feet per hour : equal to 17 miles, 2,660 feet. Deducting the slip, her speed would be about 15 miles per hour, and she would cross the Atlantic from Liverpool to New York, a distance of 3,300 miles, in nine days—a thing she has not yet accomplished, notwithstanding she has the additional aid of paddle-wheels, of 56 feet in diameter, with engines of ample power to drive them ; thus proving that she has never come quite up to 35 revolutions per minute. The rebel steamer *Alabama* has a propeller of 14 feet diameter and 21 feet lead of screw. She has two cylinders of 54 inch bore, and her engines have a stroke of piston of only 17 inches, and probably make 75 revolutions per minute, which would give a travel of screw of 1,575 feet per minute or 94,500 feet per hour : equal to 17 miles 4,740 feet per hour. Deducting the slip (one-fifth) we have 14 miles 1,680 feet, as the actual speed of the vessel per hour. The great number of revolutions have been obtained by shortening the stroke of the piston to 17 inches, and this is the great secret, and only one, for the extra speed she has attained, which has given her such renown as the fastest propeller afloat.

As the stroke of the piston is shortened the number of the revolutions are increased, and as it is lengthened the revolutions become less. The *Alabama*, with a stroke of piston 17 inches and 75 revolutions, makes a travel of piston 189 feet per minute, while a low-pressure condensing paddle-wheel engine, of 80-inch bore and 12 feet stroke of piston, makes only about 18 revolutions per minute ; but the travel of piston is 432 feet per minute. In the one case the piston has to travel 189 feet and be reversed 150 times per minute, and in the other the piston has to travel 432 feet and be reversed only 36 times per minute.

The *Great Eastern's* engine has a 4 feet stroke of piston, and travels 280 feet in making 35 revolutions, and the piston must be reversed 70 times per minute. The *Himalaya* has two cylinders of 84-inch bore and 3½ feet stroke of piston, which would travel 266 feet per minute in making 38 revolutions, and the piston must be reversed 76 times.

It will be seen by the above comparisons that the velocity and travel of piston becomes less as the number of revolutions is increased, from the fact that the shorter the stroke of a low-pressure condensing engine the greater the exhaustion of power, caused by the great number of times the piston is reversed ; because from one-fourth to one-third of the power is employed in the lead of the valve to admit steam into the cylinder before the piston reaches the end of the stroke. This lead forms a steam cushion to stop the momentum of the piston and all the weight attached to it. Without this loss of power such engines would break down in a short time, and do break down when the lead of the valve is lost to any extent. But this is a loss of power, or rather an exhaustion of it, in the right direction ; for the speed of the vessel depends upon the number of revolutions per minute the engine can make, and the shorter the stroke of piston the greater the number of revolutions given to the propeller.

The *Alabama's* engine has the shortest stroke of piston, makes the greatest number of revolutions per minute, and has the greatest speed ; and in no way can the velocity of the low-pressure, complicated condensing engines be increased to give a greater number of revolutions to the propeller, except by gearing, which is sometimes done, or by following the example of the *Alabama* in shortening the stroke.

With all this knowledge before them, some of our marine engineers will give you the dimensions of their engines, the size and lead of the propellers, and tell the public that they can m ke the vessel run eighteen or twenty miles per hour, when in fact the vessel can go only about one half that distance ; because engines like those of the *Puritan* and *Dictator*, although their velocity and travel of piston is a little over one-half greater than that of the *Alabama*, cannot make one-half the number of her revolutions; and as they can give only one turn to the propeller to each revolution of the engine, it is impossible for the vessel to have a speed much greater than we have shown by our calculations. ENGINEER

Washington, D. C., Oct. 31, 1863.

[We give place to our correspondent's criticism of our article on the engines of the *Puritan* and *Dictator*, but do not by any means assent to the ground he takes. He begins by an assumption ; correcting us for stating that fifteen miles per hour is not too much to expect from the ships in question, and shows why they cannot by taking a very low piston speed for the engines as ground work for his argument, and this added to a fabulous amount of slip in the screw very nearly establishes our correspondent's theory. Unfortunately, the slip of a well-constructed screw propeller seldom averages higher than 12 or 13 per centum of its speed, and even this varies considerably with the pitch ; the finer the thread or helix of the propeller is, the less slip or loss of useful effect in propulsion takes place—all other things being equal. As the engines themselves have never had a pound of steam applied to them, we submit that it is premature in our correspondent to calculate from these premises what the speed of the ships will be. The concluding paragraph of our article read thus—"what piston speed will be got out of them remains to be seen." It is a very simple thing to multiply certain figures together when the sums are given, but it is not so easy to set down the piston speed of new and untried engines. We will, however, make a prophecy on our own account, and although we desire to state that we know no more than our correspondent, or even the builders, as to what the speed of piston will be, we will set down 50 revolutions per minute as the maximum, not the medium, which the engines will attain, under favorable circumstances ; which will give a speed, minus one-fourth slip, of nearly 14 miles an hour for the screw. This we do from a knowledge of what such engines ought to achieve. Our correspondent cites the case of English vessels and the piston speeds they attain ; he should know that the average piston speed in this country is much higher than abroad, and while the rebel steamer *Alabama* is quoted as having a probable speed of screw which should drive her through the water at the rate of 14 miles an hour, the cylinders being 54 inches bore and 17 inches stroke of piston, it should be borne in mind that this is not *de facto* proof of such speed being attainable by her. The new gunboats in the navy have a piston stroke of 18 inches only (the first four built we mean) in a cylinder of 30 inches, and they achieve from 80 to 90 revolutions, and on occasions over 100 per minute, with ease, with a screw of the same pitch as the *Alabama* ; not 14 miles an hour, or anything like it

As our correspondent asserts that the piston speed of such engines as the *Dictator's* has been fully demonstrated in this country, perhaps he will be kind enough to tell us where there are any screw engines of that size now running here? An Italian frigate went on an extempore trial trip recently, and in the new and untried condition of the engines, just as they came from the machine-shop almost, 42 revolutions of the screw were obtained with 15 pounds of steam and the throttle but one-eighth open ; these engines are 84 inches in the cylinder by 45 inches stroke, and the slip of the screw was hardly 19 per cent of its speed : not one-fourth even in a new engine.

It is improper to make positive deductions and assertions from possible performances of vessels and engines. There are such things in engineering science as positive and negative slip in screws and paddle-wheels, and a ship may actually run away from her screw—beat her own time in fact ; such feats are rare, and we recall only one instance at the present time—that of the steam sloop-of-war *Niagara*, in 1858. Calculating the actual speed of ships from the travel and slip of the screw, independent of other considerations, is about as proper as it would be to reckon how fast a man could run from the length of his legs. A vessel may churn away at a dock and make 40 revolutions per hour and never advance an inch ; the winds and tides are opposing elements, and exercise an influence which must be taken into account in the problem.—EDS.

Preserving Cider.

MESSRS. EDITORS :—As it is now cider time, I desire to call attention and make inquiry of others, as to the use of the sulphite of lime for preserving cider, or preventing its fermentation. As you have published the recipe, I may state that the directions are: Half an ounce of the sulphite to the gallon of cider. Last year I followed your directions with a barrel of pure juice, which I obtained from a farmer, and the consequence was that I spoiled my cider. There was too much of a good thing, and the cider tasted exactly like that which is left in a tumbler after saleratus has been dissolved in hard cider—a common practice among country people. I have since conversed with at least two other parties who had also used the sulphite, and they both state that one-fourth of an ounce per gallon is plenty. I should be glad to hear from others who have tried it, that we may know how it operated with them. Suppose the cider is already in a tolerably fair state of fermentation when the sulphite is applied, will that make any difference—and if so, what? W. C. D.

Washington, D. C., Nov. 5, 1863.

[It would stop the fermentation.—EDS.

Cellar Floors—Saving Fuel.

MESSRS. EDITORS—Some months ago I requested your advice regarding the dampness of my cellar floor, caused by mixing the cement with coal ashes ; and you recommended me to sprinkle cement, combined with half the quantity of sand, over it when damp. I did so, and the effect was a complete cure for the evil. While writing, I am reminded of another matter, which is worth a notice in your very valuable paper, in these times of high-priced coal. I have tried quite a number of modes to economize the consumption of anthracite, viz : by the air-tight principle of front door, dampers in the pipes, registers in the doors, and putting the doors ajar—all of which plans have their objections ; the latter causing the air in the room to be drawn through the stove and pipes by the vacuum in the chimney, involving great loss of heat, &c. This winter I have adopted a different mode of moderating the fire in my heater in the cellar, which thus far has succeeded well. I have made an opening near the ceiling in the chimney, and carried a 6-inch pipe to the air outside, and I also provided it with a close damper, thereby relieving the vacuum in the chimney without loss of heat in the stove. I find the heating powers to be much increased—caused, I suppose, by the heat of the fire impinging against the side of the sheet-iron work of the stove. At all events, I find a lessened consumption of fuel and a greater amount of heat than before, and the stove requires less attention.

The handle of my damper is plated, and extends to the parlor above, obviating the necessity of going down into the cellar to regulate the fire. Yours, &c.

F. W. ROHRMAN.

Philadelphia, Nov. 18, 1863.

Progress of Astronomy.

[For the Scientific American.]

Few, if any, of the sciences have made greater progress during the nineteenth century than that of Astronomy. At the beginning of the present century, only six planets were known to astronomers, which was but one more than was known in the days of Hipparchus. But what a change has been made in less than sixty-four years! At the present day we can name eighty planets which have been discovered in this brief period, seventy-nine of which were found by means of the telescope, and one—Neptune—by the far-reaching analysis of the mathematician. The telescope has also disclosed to us a new ring and a new satellite to the planet Saturn.

In the department of cometary astronomy an immense number of discoveries have been made. Up to the year 1812 but one comet was known (Halley's) to have been observed at two successive appearances, but before the close of the year 1858, nine had been added to it, whose periods of revolution varied from three and a half to seventy years. In addition to these, astronomers, by their untiring industry and vigilance, detected about twenty, whose periods of revolution were from one hundred to upwards of ten thousand years, and nearly one hundred whose orbits were sensibly parabolic.

Stellar astronomy has not been neglected by astronomers. To Sir William Herschel belongs the credit of first detecting the existence of Binary systems among the fixed stars. Some of the binary stars have made two revolutions around their common center of gravity since their first discovery by Dr. Herschel, and many have completed one and are far advanced on their second revolution. At this time there are upwards of one hundred pairs of stars known which may be properly called binary; and every year and almost every month some astronomer announces the discovery of a new pair. It is now a well-ascertained fact that these binary stars are suns, each revolving around their common center of gravity.

Lastly we come to theoretical astronomy. Within the past ten years a new set of "Tables of the Moon" has been published by Dr. Hansen, from his own theoretical investigations, and which are far superior to any others previously constructed. Leverrier has recently published new tables of the sun, Mercury, and Venus. These tables enable us to calculate with almost perfect accuracy celestial phenomena which occurred twenty centuries ago. Astronomy is wholly indebted to the telescope for the rapid strides which it has made during the last two centuries. The multitudes of comets and planets have all been found by means of the telescope; and had it not been for the accurate observations of the planet Uranus, made with telescopes, which furnished astronomers with data for their theoretical investigations, Neptune would never have been seen by mortal eye.

H. P. TUTTLE.

Newport, R. I.

Blue Color of the Sky.

MESSRS. EDITORS:—On page 262, of the SCIENTIFIC AMERICAN, occurs the lamest conclusion for London science that ever turned up. If you wash a black horse with whitewash, he will be blue; and if you wash another black horse with a thinner coat of whitewash, he will be darker blue. This is the whole story of the cause of the blue sky. The dark region beyond the atmosphere is here the black horse, and the atmosphere is the whitewash. The atmosphere interposes between the eye and space, and causes the latter to appear blue, which is always lighter near the horizon, because a thicker stratum of air interposes horizontally than perpendicularly. The transparency and consequent purity of the atmosphere can always be known by the degree of intensity of blue above. After a thunder shower, the sky is a much deeper blue than it was before it.

Those countries (France is one) which have the bluest sky, have the purest atmosphere; and those with the palest blue (England is one) the contrary. This is the reason why some prefer the moon of Naples to the sun of England. Yours, &c.,

J. MUMA.

Hanover, Pa, Nov. 9, 1863.

Concerning Belts.

MESSRS. EDITORS:—Suppose I have two pulleys of different diameters; say, for instance, one 5 feet, the other 2; the centers of the shafts ten feet apart: what must be the length of belt necessary to put them in running order, and how is the result arrived at?

I have a theory in regard to it, and I would like to know if it is correct; also whether it is new or old. It is this:—I take half the difference of the diameter of the two pulleys, adding to the smaller and subtracting from the greater; thus making them equal. Then take twice the length between the centers of shafts, and add to that half the circumference of each pulley:—thus two pulleys, one 5 feet diameter, the other 2 feet, are equal to 2 pulleys, each 3½ feet diameter $10 \times 2 + 10\ 9956 = 30\ 9956$, which I suppose to be the length of belt.

FRANK E SNOW.

Bridesburg, Pa., Nov. 8, 1863.

[ANSWER.—We have inserted your letter, as there may be others who have fallen into the error you have. Your theory is incorrect, for the reason that you do not consider the slope or inclination a belt has in passing from a pulley of large to one of a small diameter. The matter is much more intricate than one would suppose, but a full explanation can be found on page 38, Vol. I (new series) SCIENTIFIC AMERICAN, and also on page 84, Vol. II. The quickest way to find out the length of a belt is with a tape line strung over both wheels; that saves time and labor.—EDS.

How Fortunes are Made in the Navy.

Several valuable prizes have recently been finally adjudicated, and the money will be ready for distribution in the course of a week or ten days. Among them are the *Memphis*, the *Britannia* and the *Victory*. The former was captured by the United States steamer *Magnolia*, and yielded the snug sum of $510,914 07, after paying the expenses of adjudication. Acting Volunteer Lieut. Wm. Budd, is the happy man who takes as his share $38,318 55, his vessel not being attached to a squadron at the time of the capture, and his share being three twentieths of the half awarded to the captors. All the officers on this vessel belonged to the volunteer service, and their several shares amount to a handsome sum. The sailors, too, come into a small fortune for them; the seamen getting $1,736 86 to each, ordinary seamen, $1,350 88, and the landsmen, $1,157 91. The *Britannia* and *Victory* were captured by Commander R. H. Wyman, of the *Santiago de Cuba*: the former yielding the sum of $169,695 72, and the latter $299,998 45, making $469,694 17—the captures being made within the space of a week. It will be noticed in this case that while the officers get liberal shares, the seamen each receive $897 67: ordinary seamen, $698 12; and landsmen, $598 40. Another steamer was captured about the same time, which has not yet been adjudicated—making altogether a very handsome sum.

The Navy is in immediate want of seamen, and with such chances for fortunes it is amazing that the want exists for a single day. All will agree that "Jack" is reaping a reward for his services.

Reduction of Silver Waste.

The London *Journal of Photography*, states that a method has been discovered for reducing waste silver solutions, which promises to be practically valuable. It is based upon the fact that ammoniacal sub-chloride of copper precipitates completely and perfectly pure silver from a solution of the nitrate of silver, to which a slight excess of ammonia has been added. The ammoniacal sub chloride of copper is prepared by dissolving five parts of the black oxide of copper and four parts of finely divided metallic copper in chlorohydric acid. When the whole is dissolved an excess of the strongest liquid ammonia is added, which produces a clear solution. If it be used to reduce an old photographic bath, add ammonia to it until the oxide of silver is redissolved, then pour in an excess of the copper solution, collect the precipitate of pure silver, and wash and dry it. The same reagent may also be employed for reducing the silver in an old hyposulphite bath of a photographer, but to it a very little ammonia must be added, the mixture must be greatly diluted, and a considerable period of time is required for the finer metallic particles of silver to settle to the bottom of the vessel.

The Confederate Rams in England.

Inquiry shows that the Government has been taking most extraordinary precautions to prevent any attempted departure of the rams. On Tuesday afternoon H. M. S. *Heron* arrived in the Mersey and took up a position in front of Messrs. Laird's dock, in which the least forward ram, *El Monastir*, is lying. The *Heron* did not anchor, but passed her cable through the side of the ferry buoy, so that it might be slipped at a moment's notice. In this position she now lies, with her fires banked and steam up. Marines were landed and sent on board *El Monastir*. Messrs. Laird's workmen were ordered off the vessel, which remains in the exclusive possession of the marines. No one is allowed on board, and the workmen's tools have been sent ashore. About the same time an additional force of marines was sent on board the other ram *El Toussoun*, and all the workmen, with their tools and appliances, were ordered ashore. In her case also, no person is permitted on board. The gunboat *Goshawk* continues to be moored ahead of the ram. It is understood that the iron-plated frigate *Prince Consort* is on her way to Liverpool, but it is difficult to ascertain whether this is correct or not. The authorities are very reserved. H. M. S. *Majestic* is already in the Mersey. These hostile preparations created much consternation, and it is believed Messrs. Laird deem the seizure altogether illegal. The other vessel seized by Government, the *Alexandra*, still lies in the Toxteth Dock, Liverpool, under embargo. Her case will come before the Court of Appeal early in the approaching term.—*Liverpool Courier*.

[The majesty of the law must be the real safeguard; setting a wooden ship to "guard" a ram is like putting a sheep to protect a bulldog.—EDS.

Dummies.

The Philadelphia and Frankford Railroad Co., have, for some time past, agitated the subject of employing dummies for the road, instead of the little horse-cars now in use. The track of the new road, which has been recently constructed in the middle of the plank road leading to Frankford, prevented the employment of these engines sooner. The road was built strongly and substantially, and a line of cubical stone blocks braced against the rails, to prevent them from slipping, extended along the entire track. When the dummies were placed upon the road, the stones were found to be elevated too much for the engines, and workmen were employed to break them down. Recently the dummies ran between the city and Frankford, more as a matter of experiment than for a permanent thing. They succeeded admirably. Up hill and down they ran with the same ease as on a direct track. The shortest curves were turned without difficulty, and when stopped on the curve no trouble was experienced in starting. The usual time between the city and Frankford is forty-five minutes. The dummies did it in nineteen. They have the front platform enclosed, are a little longer and higher than the present cars, and are heated by pipes set in the floor, under the feet of the passengers. An alarm bell is stationed on the top of the engine. The company at present employs three, and more are building.

[A pair of horses that eat their own heads off, take the labor of three men, one to drive, another to feed, and another to *doctor* them, are much better than dummies—in the opinion of our city railroad men.—EDS.

LARGE PAIR OF IRON SHEARS.—A pair of shears weighing 24 tuns has been built at Birmingham, England, for the Russian Government, to be used in large iron works in the neighborhood of St. Petersburgh. It has a power of pressure equal to 1,000 tuns, and can cut to pieces a bar of cold iron half a foot square. The blades are of cast steel and they are operated by hydrostatic pressure. These shears are said to possess double the power of any set heretofore constructed.

Improvements in Burning Fuel.

At a time like the present, when every combustible in use in the arts is largely increased in value, and in view of the universal ignorance of the proper management of fuel which prevails, it is important that those interested should give attention to all apparatuses which promises to reduce the expense of fuel by lessening the quantity consumed for specific duty. Fully one half the coal put into furnaces of the ordinary kind is wasted because the process of combustion is not thoroughly developed, and the gases which might be utilized and made to impart heat, are carried out of the chimney unconsumed, to mingle with the atmosphere in the shape of smoke and invisible vapors. On some of our Sound and river steamboats the gases are burnt, not in the boilers, but at the top of the smoke pipes, some sixty feet therefrom, creating an intense heat, which is not only wasted but tends to injure the pipes by burning them out.

The furnace herewith illustrated is designed to effect a more thorough consumption of the fuel, by graduating the supply of air which enters to sustain the fire, so that the gases are consumed and made to impart their value as heating agents. The mechanical arrangement is as follows:—The boiler, A, is not peculiar, but may be of any form desired; this boiler is set in the furnace, B. There is an iron front to this furnace which has a door, C, and an upper draught opening closed by an arrangement of slats similar to those used on blinds. These slats are all secured to a vertical rod inside of the opening, which, in turn, is jointed to the end of a horizontal lever, G, this lever is connected with a mercury chamber, H, on the pin, I, which is peculiarly constructed, so that when fresh fuel is thrown into the furnace, and the lever turned by hand so as to throw the slats open, the mercury will run down inside of the chamber and gradually close the slats, thus admitting no more air than is necessary to perfect combustion. The door of the furnace is provided with a deep case at the back, and a set of narrow openings on the front, communicating with a series of air passages formed by the vertical pieces, D, set diagonally; the air thus admitted is heated by coming in contact with the hot surfaces, and then passes through small openings, E, at the back of the door into the furnace, where it assists in burning the fuel; the draft being distributed in a series of thin currents, feeds the fire without perceptibly lowering the temperature in the furnace. There are also narrow apertures, J, Fig. 2, opening into the furnace inside of the outer wall and communicating with air passages, so that circulation can also be maintained in this manner for the better consumption of the fuel. Behind the grates there are a series of inclined passages, K, in the bridge walls, L, which are constructed of fire-brick; these bricks become intensely heated in a short time by the action of the fire upon them; so much so, that upon the admission of fresh coal the smoke and gas disengaged therefrom is ignited by them as soon as the requisite quantity of oxygen is furnished through the apertures beforementioned. The grate bars, M, Fig. 2, are also peculiar, and are so constructed that the expansion and contraction are equal. A groove is formed on the top of them through which are small holes, *a*; ashes soon fill up the groove, and the air passing through the holes tends to keep the bars cool and prevent the formation of clinkers, which would destroy them in a short time.

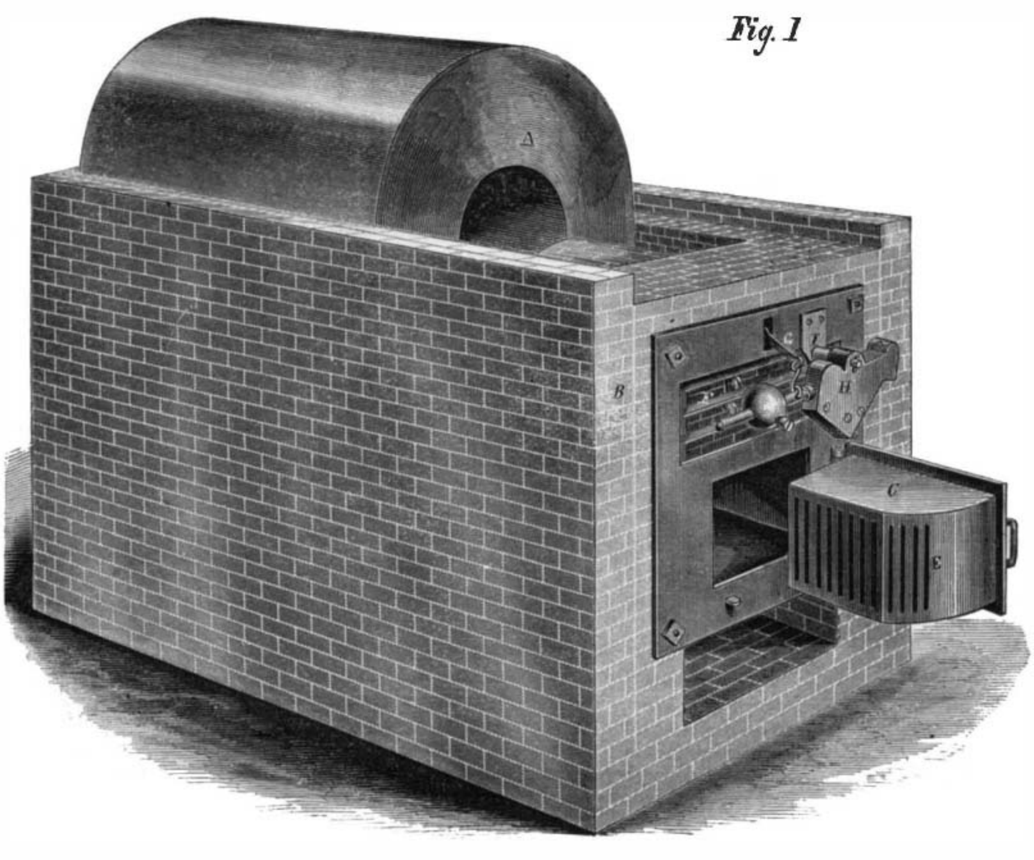

Fig. 1

GERNER'S IMPROVEMENTS IN BURNING FUEL.

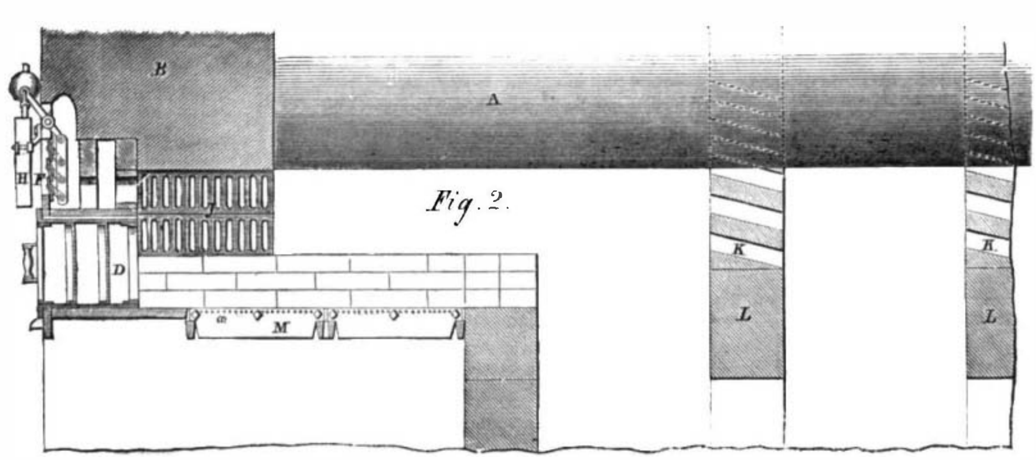

Fig. 2.

These improvements are adapted to all furnaces and any variety of boiler; either with natural or artificial draught, and independent of or fitted with chimneys. No chimney is needed, however (as the inventor states), and the complete and economical consumption of the fuel is accomplished by the action of the regulator and of the regenerating partitions. The improvements are also adapted to different kinds of coal, bituminous or anthracite, and it is only necessary to regulate the supply of air to reap all the benefit of the fuel. Patent ordered to issue, through the Scientific American Patent Agency, to Henry Gerner, of New York city. Further information can be had by addressing him at No. 20 Bleecker street. (See advertisement on another page.)

THE ERICSSON GUN.—The large rifled gun, 13 inches bore, constructed for the Government by Capt. Ericsson, has arrived in this city. The inventor is to receive $5,000 for every pound of powder the gun is able to stand beyond the service charge of 50 pounds, which it is intended to bear. Capt. Ericsson is of opinion that he may be able to burn 100 pounds, and is confident of using a charge of 75 pounds. A cast-iron solid shot, 13 inches in diameter, weighs 302 pounds.

Improved Marine Mail Bag.

A waterproof floating mail bag, invented by Mr. George Mitchell, has been exhibited in the Exchange News-room, Liverpool, under the direction of the inventor. It is a strongly-constructed bag, made of the best "duck," or sail-cloth, thoroughly impregnated by india-rubber (caoutchouc), and consequently completely waterproof. From this quality it is less or more buoyant on account of the quantity of atmospheric air it contains, and so becomes valuable. The specimen exhibited in Liverpool, where we understand it will remain on view for several days, is about three feet long, one foot broad, and about six inches deep. This bag was well filled by a miscellaneous collection of materials, such as may be expected to find their way into a mail bag. They consisted of newspapers, numerous loose papers, a comparatively large number of books, and to give weight in an additional degree, two common building bricks, the whole forming a very heavy mass compared with the size of the bag. The whole, however, was buoyant, and on opening the bag it was found that not a drop of moisture had permeated into it. The inventor also states that he has arranged a means by which the whole contents of a ship's mail-room may be made buoyant, and connected so as to form a raft or buoy in case of necessity.

New Mode of Storing Petroleum.

A model of a proposed plan for the storage of petroleum in the original casks, without leakage, and as a consequence removing the liability to smell, was recently shown at the office of Messrs. Holt & Banner, Sweeting street, Liverpool. Without going into details, we may mention that the leading features of the plan are the sinking of the original barrels in cisterns or tanks of water, so that they may always be submerged. The barrels are introduced into the wells by a shaft with the greatest facility, and when required can be easily recovered. The wood barrels being kept moist by the water, would, it is contended, swell them so as to render leakage impossible. The wells or tanks could be constructed of brick, or in any other way, so that they are capable of containing a sufficient quantity of water. So far as can be judged by the model, the plan appears to possess considerable merit, and is worthy of attention now that the question of doing away with the smell from petroleum is brought so prominently under public notice.

A NEW balmoral shoe factory at Hartford is so arranged that a shoe goes through thirteen different hands and comes out complete in ten minutes.