

several hundred feet around with fragments of the wreck. I instantly started on a run, hoping to render some assistance. Having looked up hurriedly to see if anything was above me, I saw what seemed a mere speck nearly overhead, and very high, coming down. After running two or three rods I looked up again, and saw another thing of nearly the same appearance as the first coming down, and then both fell but a few rods apart. The first object I saw proved to be a piece of boiler, which weighed about 330 lbs.; it struck the brick sidewalk, in which it made a very large hole. This piece was taken to a museum in the city, where it remained several years. The other was also a piece of boiler, but much larger; I think it was 9 or 10 feet by 12 or 13, nearly square, but very much bent up. It fell on the gable end of a stone stable, and demolished the wall. I concluded that the second piece had gone up so high that it was out of sight when I first looked up, otherwise I must have seen them both at once. The weather was clear, and I don't remember seeing any clouds overhead. It was said at the time that the engineer of the steamboat was drunk, and had allowed the water to get down while the fires were kept up. The persons said to be scalded did not look so to me; their skin was quite brown and crisp, and it looked more like a burn from gunpowder. Query, was it steam or gas that exploded? There were five boilers, all burst with one deep, heavy sound, and not as if several explosions had taken place in rapid succession. I suppose no other human eyes but mine saw the phenomenon described.

DANIEL EDWARDS.

Little Genesee, N. Y., Jan. 20, 1861.

Inflating Balloons.

MESSRS. EDITORS:—In looking over my file of the SCIENTIFIC AMERICAN, I noticed, on page 280 of your last volume, an article headed "A French Apparatus for Lighting Cities with Hot Wire." I intend building a machine on this principle for the purpose of manufacturing hydrogen gas, provided I can gain sufficient knowledge to insure me some success. Can you give me any more information than what I have already found in this article? I wish to ascertain the figures and proportions of a machine capable of manufacturing 2,000 feet of gas per hour, and also any other information which will aid me in building such a machine. My intention is to manufacture gas for inflating balloons on this principle.

JOHN LA MOUNTAIN, Aeronaut.

Lansingburgh, N. Y., Jan. 24, 1861.

[It is a curious fact that the article which we translated did not give the dimensions of the apparatus though it did give the amount of gas which it would produce. We are not surprised that our aeronauts are making arrangements to use hydrogen gas instead of illuminating gas to inflate their balloons, as a balloon for the same lifting power will require to be only about half the size; 100 cubic inches of atmospheric air weighs 31.01 grains, being $14\frac{1}{2}$ times heavier than hydrogen, and not quite twice as heavy as illuminating gas. Hence, it would require about 14 cubic feet of hydrogen to raise 1 lb. in the air, and about 28 feet of illuminating gas.—Eds.]

Chemical Analysis by Spectrum Observations.

MESSRS. EDITORS:—This is one of the most important inventions of the present century.

Professor Robert Bunsen, of Heidelberg, one of the most ingenious chemists of our cotemporaries, has now published the first precise investigations in this direction, the consequences of which can scarcely yet be realized; their beginning though is sufficient to indicate that they may probably lead to the solution of hitherto inaccessible problems.

The following experiment speaks best for the sensitiveness of the reaction:—3 milligrammes of nitrate of soda were exploded with a little powdered charcoal in the corner of a large room, while in the other corner was placed an apparatus containing a lamp and a camera, for the production of the spectrum. In a very short time, the smoke of the soda-salt peter reached the flame and exhibited in its spectrum the peculiar lines and colors which result from the burning of this substance. From the weight of the deflagrated salt and the size of the room could be calculated what quantity of it was contained in the air, and as the reaction was observed every consecutive second, and calculating the access of the air to the flame, only the three-millionth part of a milligramme of sodium could there-

fore have penetrated and be indicated by the flame. This minimum, then, can yet be recognized! To give a better definition, it might be added that a milligramme is somewhat less than the thirty-fourth thousandth part of an ounce. Similar experiments demonstrated that chloride of sodium (common salt) is a scarcely-ever-failing ingredient of the atmospheric air—a fact very easily understood when we consider that two-thirds of our globe is covered with salt water, which, by evaporation as well as mechanical force, is scattered through the air. We may, with right, expect that by spectral analysis of the air we shall yet succeed in acquiring information on the progress of epidemic diseases, as they are perhaps due to the absence or presence of such substances as have hitherto escaped our observation. The incandescent luminous vapor of lithium combinations gives two very distinct and sharply defined lines; the one very feeble yellow—the other of a red shining color. By the aid of this process, the unexpected fact was demonstrated that lithium, which was believed to be one of the rarest elements, pertains to the most distributed substances of nature, as small particles of it were found in many minerals, in sea and spring waters, in the ashes of plants, in the air, &c. We possess already the full assurance that substances which have hitherto been unknown to us are present in water as well as in the air, and only by these means we are enabled to discover their presence. Once the cause of certain injurious influences on the organism is discovered, the second step, their separation, gives comparatively little trouble.

A. L. FLEURY.

F. R. RUSCHHAUPT.

24 $\frac{1}{2}$ Third-avenue, New York.

A Subscriber for Life—Singular Proposition.

We have received a letter from a correspondent in Georgia, saying that, from the peculiarities of his position, it is very inconvenient for him to mail his subscription money every year, and that he should like to make one job of it, so that it will give him no further trouble for the remainder of his days. He therefore proposes to send us \$20, to be received by us as payment for his subscription for life. [He is 50 years of age, and probably a bachelor, for he says he would not like our lady readers to be informed upon this point; but as we omit his name, we trust he will pardon us for this breach of confidence.] We have written, accepting his proposition, on condition that he will write to us every year to let us know that the term of his subscription has not expired. Among all the thousand newspapers in the country, is there any, except the SCIENTIFIC AMERICAN, that has a subscriber for life?

It will be observed that this proposal, coming from the heart of the secession movement, shows the most absolute faith in the continued friendly and business intercourse between the North and the South, whatever may be the fate of our political connection. We are happy to state that it is only one of innumerable evidences which we are constantly receiving of the same feeling, and which are the most gratifying of anything that is occurring in the present eventful period of our history.

ALLEGED CURE FOR HYDROPHOBIA.—The *Presse Médicale Belge* states, on the authority of Father Legrand de la Liray, late interpreter to Admiral Rigault de Genouilly, one of the oldest and most venerable missionaries in Tonquin and Cochinchina, that in those countries hydrophobia is cured with complete success by boiling a handful of the leaves of datura stramonium, or thorny apple, in a litre of water, until reduced to one-half, and then administering the potion to the patient all at one time. A violent paroxysm of rage ensues, which lasts but a short time, and the patient is cured in twenty-four hours. For the benefit of our readers we may state, that the leaves of the stramonium are highly narcotic, and, as such, are recommended in asthma under the form of cigars, to be smoked as usual; but that the same leaves, taken in large quantities, whether in powder or under the form of decoction, will produce temporary idiocy. As to its efficacy in confirmed hydrophobia, it seems to be earnestly recommended by Father Legrand, who declares that he has tried it several times, and invariably with success. The great difficulty will, of course, consist in administering the remedy to the patient, which probably must be done by main force, with the aid of a horn; but on this subject the *Presse Médicale* is silent.

Column of Varieties.

The immense appetite of London is fed every year by about 270,300 oxen, besides 30,000 calves, 1,500,000 sheep, and 30,000 swine.

The enduring odor of musk is astonishing. When Justinian in 538 rebuilt what is now the mosque of St. Sophia, the mortar was charged with musk, and to this very day the atmosphere is filled with the odor.

On the river Clyde, Scotland, 88 iron vessels were built during 1860, the gross tonnage of which was 47,700 tons, and there are now on the stocks 46 vessels, the tonnage of which will amount to 44,900 tons.

The Massachusetts Arms Company's manufactory at Chicopee Falls, was consumed by fire on the night of the 18th ult. The loss was \$60,000, of which \$30,000 was covered by insurance.

Take an ordinary paint-brush or sponge, and run over the glass once or twice a day a little alcohol, and it will keep the glass as free from ice as in the middle of summer, and it will also give as good a polish as can be got in any other way.

A portable sundial, recently patented in Berlin, consists of a hollow metallic hemisphere, representing in its shape the visible firmament. By means of a pendulum and a sort of meridian circle, it may be so placed at any moment, in the sunshine, as to indicate the hour and minute of the day.

Among the curiosities of London life is the appearance of Lord Caithness in that metropolis, guiding his steam carriage. He has driven through the most crowded parts without frightening the horses, and threaded the vehicles, thickly strewn as they are in the city, with ease and elegance.

Our country has increased in size more than three-fold since the close of the Revolutionary War. The United States have a territorial extent nearly ten times as large as that of Great Britain and France combined. The American republic is one-sixth only less in extent than the area covered by the fifty-nine empires, states and republics of Europe.

The sensibility of the nerve of smelling is blunted and perverted by all irritating odors and substances. Hence those who would preserve all the senses which God has given them should avoid snuff, smelling-salts, &c., as is manifest to those who have been troubled much with cold in the head.

Along the coasts of the Atlantic and Pacific Oceans and the Gulf of Mexico, the United States have 223 lighthouses, exhibiting 369 lights, and 42 light-boats, with 55 lights, making a total of 365 stations and 421 lights. The whole number of stations 466, number of lights, 539.

M. Duroy, of Paris, announces the discovery of a new neutral colorless iodide of starch. When iodine and starch are mixed together they form an iodide of starch of a blue color. Iodine has therefore been considered a chemical test for the presence of starch in any substance. By bringing a starch iodide into contact with yeast, it is deprived of its blue color, and becomes sweet, gummy, and very soluble in water.

Col. Foster, the head of the land department of the Illinois Central Railroad Company, estimates the wheat crop of Illinois last year at not less than 25 millions of bushels. At a low estimate the corn crop of Illinois will amount to 110 millions of bushels, worth at least \$25,000,000 to the producers, being of wheat and corn more than ten times the quantity produced by the whole of New England. The value of live stock is estimated at one hundred millions of dollars.

Tin is increasing in value yearly. The British exports last year amounted to 2,804 tons, and the mean average price for the year has been £130 18s. (\$634.46.) There has been an increased speculation in the tin mines of England. The whole of the metallic tin trade of the world is in the hands of the Dutch and English, but the latter control the former.

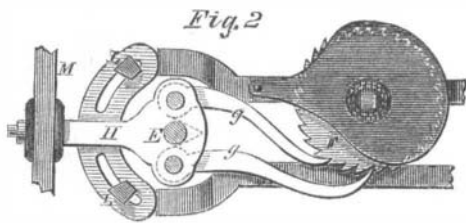
The produce of Scotch pig iron during the past year was 1,000,000 tons, being an increase of 50,000 over the previous year. This augmentation has not been due to an increase of furnaces, but intrinsic improvements in the process of manufacture. Our molders have not yet found a true substitute for this kind of iron for castings, but it appears that some of the American iron ores—for they are very numerous—should yield similar iron if heated with the hot blast and coke fuel. The shipments to the United States of Scotch pig iron amounted to 77,632 tons in 1860.

Improved Sawmill Head Blocks.

The advantages of a perfectly accurate, easily and quickly operating, and readily adjusted head block for circular sawmills, will be sufficiently obvious to any one at all acquainted with the operation of these mills and the rapidity with which they can be made to cut lumber, and any improvement calculated to facilitate their operation will be of interest to those either manufacturing or using them.

The cuts, of which Fig. 1 is a perspective view of the carriage with the head blocks as in use, and Fig. 2 a sectional view of the same, showing the arrangement of the working parts, illustrate an improvement for which a patent was granted to E. G. Dyer, of Hamilton, Ohio, on the 13th of November, 1860.

The improvement consists in producing a continuous forward movement of the knee (against which rests the log) by both the forward and back motion of the hand lever, D. This is done by means of the two pawls, *g, g*, Fig. 2, attached to the vibrating arm, H, so as to act alternately upon the ratchet wheel, F. This wheel is fastened upon a shaft upon which is the pinion, J, working in the rack, K, upon the knee, and imparts to it its proper movement. This movement is regulated by the stops, L, which may be set so as to allow more



or less play to the vibrating arm, according to the thickness of the lumber to be sawed. As ordinarily constructed, this arrangement allows the operation to move up the log any desired distance from $\frac{1}{8}$ to $1\frac{3}{4}$ inches at one forward and back throw of the hand lever.

Motion is communicated from the hand lever to the vibrating arm, H, by means of the longitudinal bar, M, which, acting endways upon the arms, can have no lost motion by torsion or otherwise between the two head blocks. Upon this bar are clamps, N, fastened to it by set screws, and pivoted to the ends of the vibrating arms, H, so that the head blocks can be quickly moved to any distance apart to suit the length of logs to be sawed. As is easily seen, two or more head blocks upon the same carriage are operated by one lever, and the movement of the knee must be exact upon them all. In moving the knees back, or when it is desired to move one independent of the other, the pawls are thrown out of action by an eccentric plate which is thrown round upon the center of the ratchet wheel, and acts upon the points of the pawls which extend below the face of the wheel. The pawls are held against the wheel by springs fastened to the side of the head block. Thus the movement is certain and exact, and at the same time easily effected.

For the purchase of these head blocks, or the right to manufacture them, information may be had by addressing Owens, Lane, Dyer & Co., Hamilton, Ohio, to whom the patent has been assigned, and who are engaged in the manufacture of them in connection with their patent sawmills.

ANOTHER NAPOLEONIC REFORM.—Whoever has traveled on the continent of Europe is prepared to pronounce an emphatic judgment upon the passport system that so generally prevails. It is, in fact, regarded as an unmitigated nuisance, and the source of imposition, extortion and annoyance to all who travel abroad. As one step in the right direction, the Emperor Napoleon has abolished the passport system, so far as British subjects are concerned. *Punch*, in noticing the event, represents the French emperor approaching the

seat by the spring, G, and keeps the whole water-tight. The spring, G, acts against the cylinder cap, E, and the top of plug, C. A recess, *g*, of triangular or other suitable shape, is formed in the front of the plug, C, for the key, H, and when it is desired to open the faucet, and let the liquid flow through it, the key is put through a keyhole, made in the front part of cylinder, E, shown in Fig. 1, and by turning the key the plug will be raised and the valve orifice opened. When the key is taken out, the plug will be forced

down with its end upon the valve-seat again by the spiral spring, G, and the flow of the liquid will be stopped. It will be seen that a self-closing and self-locking faucet is thus formed, which can be opened only by means of the key.

The patent for this neat and useful improvement was procured through the Scientific American Patent Agency, Sept. 25, 1860, and further information in relation to it may be obtained by addressing the inventor at Linns Mills, Jasper county, Mo.

MAGNETIC MASKS FOR OUR NEEDLE WORKERS.—In needle manufactories, the workmen who point needles are constantly exposed to minute particles of steel and

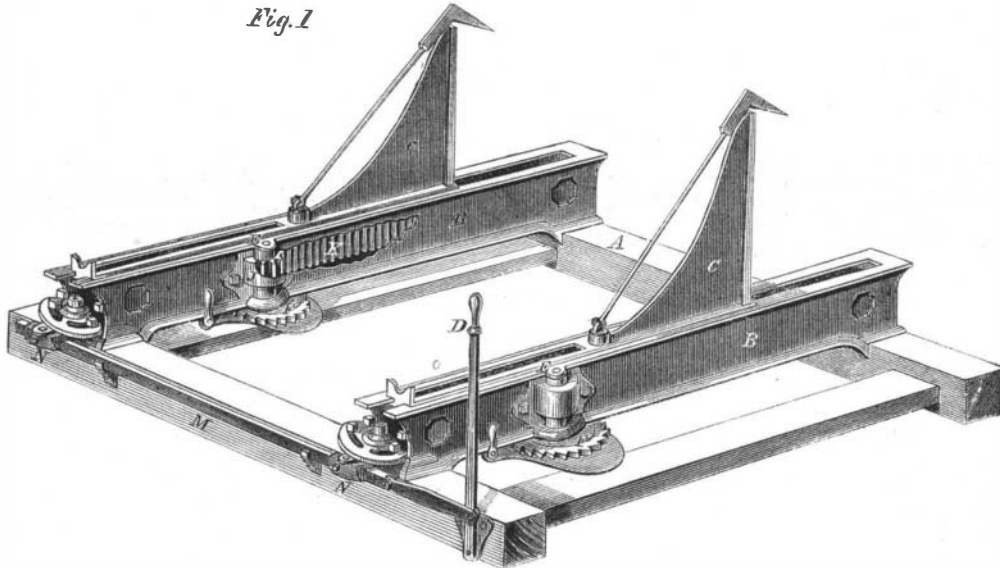
dust which fly from the grindstones, and are inhaled with their breath. These will produce constitutional irritation, sure to end in pulmonary consumption, inasmuch, that persons employed in this kind of work, scarcely ever attain the age of forty years. Many attempts were made to purify the air, before its entry into the lungs, by gauze or linen guards; but the dust was too fine and penetrating to be obstructed by such coarse expedients, until some ingenious person be thought himself of the motions and arrangements of a few steel filings on a sheet of paper held over a magnet. Masks of magnetized steel are now constructed, and adapted to the faces of the workmen. By these the air is not merely strained, but searched in its passage through them, and each obnoxious atom of steel is arrested in its progress.

NEW PROCESS OF SETTING JEWELS.—Among the recent applications of electro-metallurgy, we may instance the happy idea of Mr. Gaudin in employing it in setting jewels. This is a very delicate and expensive branch of jewelry, and so difficult that the setting of a jewel can seldom be fully relied upon. The inventor first takes a mold in wax of the ornament that is to receive the jewels, then places on it, at the proper points, the jewels, imbedded in the wax to a sufficient depth; the wax model, rendered a conductor of electricity by fine plumbago dusted upon it, is placed in the gold solution, and the metal deposit upon it. When the deposit is completed, the jewel is found firmly encased in the metal, from which, if the process has been properly conducted, it will be impossible for the jewel to escape. The saving of time effected by this process is also very considerable.

the ordinary process, a jeweler can scarcely set 60 jewels a day, but by the new process as many as 1,500 to 2,000.

We notice by the Boston *Commercial Bulletin* that most of the large manufacturing corporations of that State are paying handsome dividends upon the last six months business. It must not be forgotten, even in these dull times, that the consumption of goods in the country is as great as ever.

Fig. 1

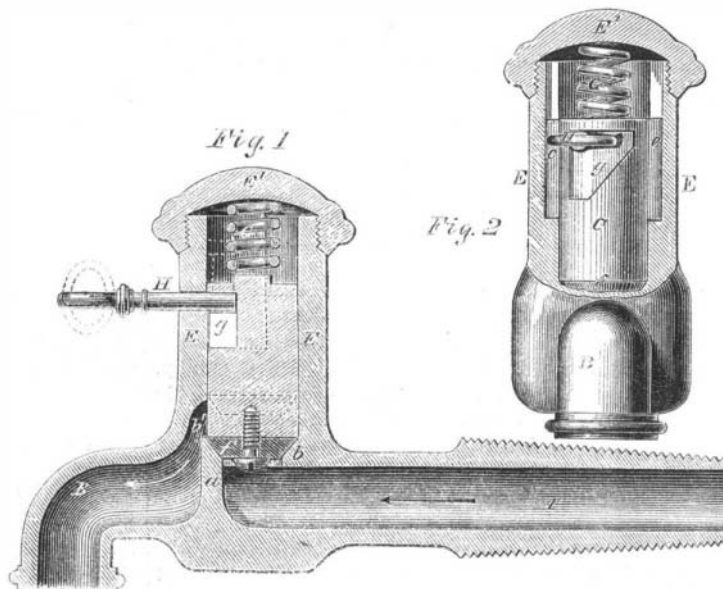
**DYER'S IMPROVED HEAD BLOCKS FOR SAWMILLS.**

venerable John Bull and tendering to him a night key, whereby he may at all times enter the French dominion without asking permission of the lord of the household.

Improved Faucet.

The accompanying engravings illustrate a faucet, invented by Levi L. Alrich, of Carthage, Mo., which is self-closing, and which can only be opened by a key adapted to it; thus effectually locking the cask in which it may be inserted.

Figure 1 represents a longitudinal section, and Fig. 2 a cross section. A is the pipe or tube of the faucet, and B its nozzle. The pipe and nozzle are divided by

**ALRICH'S IMPROVED FAUCET.**

a partition, *e*, which, with a flange portion, *b*, forms a suitable valve-seat for the plug, C. The communication of the tube, A, with nozzle, B, is thus up through the valve-hole, *b*, and this communication can only be effected by raising the plug, C. The plug, C, fits into a cylinder, E, and is capable of being moved up and down in this cylinder; but it cannot turn in the cylinder on account of the tenons, *e, e*, projecting into grooves formed in the inside of the cylinder. A leather valve, E, is secured to the bottom of the plug which is pressed down on its valve-