Lead Pigments.

The manufacture of lead paint was begun in America by John Harrison, of Philadelphia, a young man, who, according to the *Glassware Reporter*, believed that a large number of chemical products which were being procured from abroad might be made here as well. Having finished a thorough education in chemistry under the celebrated Joseph Priestley, of England, Harrison started a factory of sulphuric acid and white lead in Philadelphia in 1798, and prospered from the very first. The house of John T. Lewis & Brothers, founded in 1807, afterward went into the same business. The manufacture soon extended all over the country. It became particularly successful in Brooklyn, N. Y., owing to the growth of the communities in that immediate vicinity. At the present time there are 145 factories engaged in the production of paints, the manufacture of lead pigments being a part of their business. They employ 3,000 hands, and produce $17,000,000 worth of goods annually, in average years. Of the total number, 34 are in Pennsylvania, 16 in Massachusetts, 11 in New York, 14 in Ohio, 10 in Missouri, and 4 in Illinois.

The principal pigments made from lead are minium or red lead (which is easily produced by exposing litharge at a continued low red heat to the action of the air), white lead, a carbonate of the metal, chrome red, and chrome yellow. They are all beautiful, brilliant, and valuable pigments. Oxide of zinc now contests with white lead the favor of builders; but the importance of the pigment is scarcely affected by the competition.

White lead was originally made in Holland; and invention has thus far failed to supersede the "Dutch process" of its manufacture. Some variations in the details have been made in America, but the process is essentially the same in principle as that invented by the people who taught Northern Europe the arts of industry.

To prepare the pigment, the purest metallic lead is obtained. Originally it was subjected to the chemical operation in the form of loose rolls of sheet lead. The American method is to cast the lead into circular gratings looking very much like shoe buckles. In whichever shape prepared, the lead is put into earthen jars, with a little vinegar at the bottom, the lead being supported by earthen ledges from coming into contact with vinegar. Sometimes the pots have openings in the sides to permit a free circulation of the vapors set free in the process. An immense collection of the jars, tens of thousands in number, is then packed in alternate layers with layers of some fermenting material which will give out carbonic acid gas. Originally stable manure was employed. Now tan bark is preferred. The layers of jars and bark are carried up sometimes twenty feet high, the bark being kept out of the jars by sheets of lead and by boards. A large building being filled in this way is then closed. The fermentation sets free a large quantity of carbonic acid. Basic acetate is first formed on the surface of the lead in the pots, which is decomposed by the carbonic acid gas, forming carbonate and free acetic acid. The latter acts again on the lead. Very little vinegar is required; and the process goes on continuously, assisted by the heat of the fermentation, until, at the end of ten or twelve weeks, fermentation stops. The process is then at an end. The stack is taken to pieces, and the lead is found in its original form, though increased in bulk and weight, and converted into a very white and soft carbonate. If the conversion has not been thoroughly done, a can of metallic or blue lead will be found in the interior of some of the pieces. The pieces of lead are now thrown into large tanks filled with water, in which they rest upon shelves of copper full of holes. They are beaten to separate and pulverize the carbonate, the water preventing the fine dust from poisoning the air and injuring the workmen. Grinding and washing in water then follow, until the carbonate is reduced to an impalpable powder. It is then dried in steam pans or upon tile tables, and put up for the market. The carbonate obtained in this way is superior to that obtained in any other; but a very fair article is made by boiling solutions of nitrate or acetate with litharge, and precipitating the solution with carbonic acid. White lead is not alone employed as the best white paint; but it constitutes the body of almost all other paints, it being colored by intermixture with other pigments.

Chrome yellow is obtained by precipitating a solution of nitrate of lead with chromate of potash, and washing and drying the product. The red, a bright powder, is obtained from the yellow by boiling it with lime or some other alkaline; also by digesting levigated litharge, by boiling with neutral yellow chromate of potash, etc. A green lead is also made.

Considering how far a pound of oil paint goes in coloring a house or fence, the consumption of pig lead in paint making must be regarded as enormous. It now amounts in the United States, yearly, to about 50,000 tons. Notwithstanding the cheapness of lead paint, it is largely adulterated for the market, by small dealers, with sulphate of baryta. This is absolutely white and is not easily affected by gases, but it does not make so brilliant a paint.

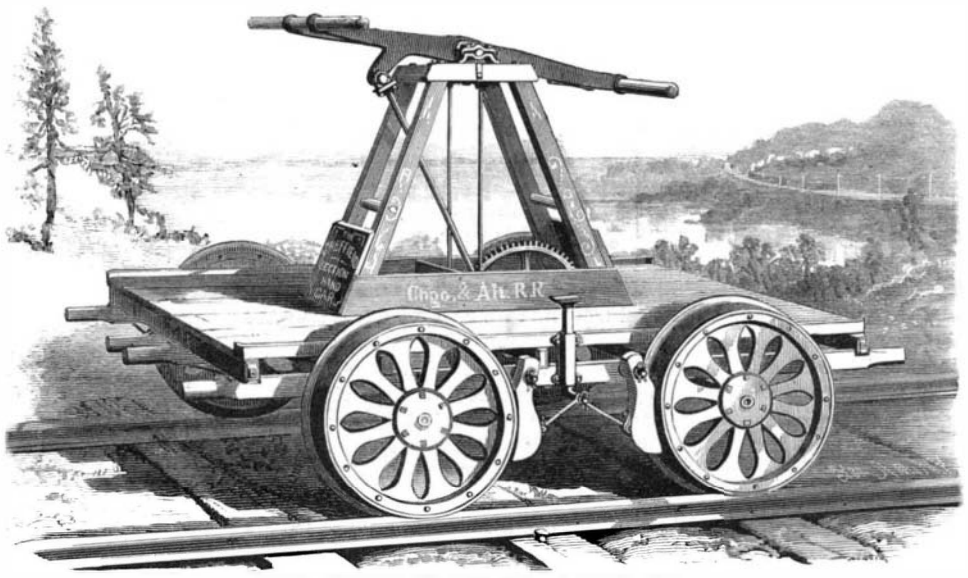
Litharge, frequently alluded to above, is protoxide of lead, produced by exposing melted lead to a current of air. It fuses readily, and, on cooling, forms a mass consisting of glistering, semi-transparent, yellow or reddish yellow scales. It generally contains more or less red lead, whence the variations in its color. It is used in the composition of flint glass.

Solar Cannon of the Palais Royal.

Strangers in Paris who have happened to be in the garden of the Palais Royal at noon on a fair day, will have noticed groups of persons watching intently at a not very conspicuous object in the garden, but all eyes seem turned toward it. The object which attracts their attention is a small cannon of antique pattern, which is automatically fired at midday by the arrangement of a sun glass so adjusted as to concentrate the sun's rays upon the priming powder, and produce an explosion at exact noon. Referring to this little cannon *L'Astronomie* says it dates from a greater antiquity than is generally known. It thundered during the Commune, under the Empire, during the days of '48, under Louis Philippe, under the Restoration, during the wars of the Grande Armee, during the guillotines of the Reign of Terror, on the day when Camille Desmoulins harangued the people, under Louis XVI., under Louis XV. In his charming "Journey from Paris to St. Cloud, by Land and by Sea," published in 1751, Néel makes his young tourist regulate his watch by it. The pillar on which it is fixed stands at the point where, in 1641, a year before his death, Cardinal Richelieu established a bound between the manors of St. Honoré and of the Archbishopric.

SHEFFIELD SECTION HAND CAR.

The Sheffield patent section hand car shown in the engraving is superior in many points to other section hand cars now in use. It is made light, yet very strong and durable.



SHEFFIELD SECTION HAND CAR.

It is easy to handle, and at the same time serviceable. The walking beam or hand lever of this car is of wrought iron, and is connected to the drive gear by a rod provided with devices which enable all lost motion to be readily taken up.

The rock shaft of the walking beam is removable and adjustable. The crank shaft is attached to the crank by a new method which dispenses entirely with the use of the ordinary key and key way, thus obviating all trouble relating to that style of fastening. The axles, 1¼ inches in diameter, are made from the best open hearth steel, and run in brass boxes.

The construction of the brake is readily understood from the cut. It brakes both wheels, and is very efficient. The wheels are made under a patent granted September 5, 1882, and combine lightness with great strength and durabilty.

Though placed on the market less than six months ago, this car has already gained great popularity, and has been adopted by such roads as the Chicago and Atlantic, Central Iowa, and many others.

For further particulars address the Sheffield Velocipede Car Company, Three Rivers, Mich.

Heavy Rainfalls.

It is a heavy rain in this latitude when an inch of water falls in one day, yet this amount is occasionally exceeded. According to the Signal Service Bureau, the greatest falls in the last twelve years have been as follows:

March 24, 1871, 2·37 inches; July 26, 1872, 3·80 inches; August 21, 1873, 2·24 inches; September 17, 1874, 2·41 inches; August 12, 1875, 3·34 inches; March 25, 1876, 3·45 inches; October 4, 1877, 4·2 inches; August 1, 1878, 2·39 inches; May 19, 1879, 1·11 inches; July 22, 1880, 1·81 inches; March 19, 1881, 2·40 inches; September 23, 1882, 6·17 inches.

A FEW weeks ago, during a heavy storm, the Rio Grande River suddenly changed its course by cutting through a bend near Camargo, and thus placed several acres of inhabited territory within the legal limit of the United States.

A Nitro-Glycerine Factory.

Near the village of Tweed, Ontario, and at the water's edge of Stoco Lake, is a fair sized, unpretentious, isolated, wooden building, the appearance of which would cause a stranger to inquire why such a good building was erected in such an isolated locality, and why it was so closely guarded, as a solitary watchman, day and night the year round, checks the steps and inquires the business of the curious as they stray near. As the eye passing upward reads "Nitro-glycerine factory, very dangerous!" in big letters above the door, the use for which the building is intended and the necessity for watchful care over it is apparent. At the door were seen lying iron casks sheeted inside with lead, and in these casks are imported the pure glycerine and mixed acids used in the factory.

A cask of mixed acid is hoisted by machinery to the upper story and dumped into a mixing tub, in which the mixing blades are moved by a crank turned by a man who is stationed in a tight box and has in front of him a thermometer. As the glycerine runs into the acid, a vapor is engendered in which life is scarcely supportable, hence the man turning the crank is stationed in a close box. The acid and glycerine in their admixture rapidly heat, and the compound has to be toned down by cold water or ice, hence the greatest watchfulness is necessary at this point; as the heat is allowed to run up to 80°, and as nitro-glycerine explodes at 90°, there remains but 10° of heat between the known and eternity, or, as the manager remarked, if the heat was allowed to run up to 90° they would not have time to pucker their mouth to say good-by.

It is needless to say that, while the work is going on, strangers are never allowed to enter the building, as it is necessary that every man should have his individual attention at such times upon his work. "Strict rules govern our men," remarked the manager, "as the least venture at experimenting would leave no one to tell how the accident happened." The nitro-glycerine thus manufactured has an explosive force ten times greater than that of blasting powder, and is used on very heavy work, but we sell very little in that shape, remarked the manager, as it is run down a tunnel to the room below, where it is manufactured into dynamite, dualin, or vigorite, all of which have nitro-glycerine as their basis, but are known by different names to designate the degree of power. As rapidly as possible the nitro-glycerine is mixed with charcoal, wood pulp, or other mixtures, and reduced into a commodity more readily handled; for although dynamite is understood to be extremely dangerous to handle, it is rammed into the cartridges with a stick, with as little apparent fear of the result as would be the case were the substance so much dirt.

The cartridges are made to hold from a pound to two pounds each, and are carefully packed each day and taken to an isolated magazine owned by the company. The output of the factory is about 1,000 pounds daily now, but the owners expect shortly to increase the capacity to meet the requirements of a rapidly increasing demand, as this is the only factory of the kind in Ontario, and the development of the mines has rapidly increased the demand, as blasting with powder has been almost entirely superseded by the use of dynamite, which is not only more efficacious, but also safer to handle. The manager remarked: "I have to pay my men large salaries, although the work is comparatively light, as a very slight accident would put them out of the way of drawing their salaries. I have worked at the business for the past seven years, and own a mill in Algoma as well as this one here, but in this business life is the result of vigilance."—*Manufacturers' Gazette.*

How to Stop the Echo.

A subscriber in Mississippi writes: "We have a large hall in this city, one hundred feet by fifty, twenty feet from floor to ceiling; the echo is so great that conversation cannot be understood. We have tried stretching wire across the hall, but it does not have the desired effect."

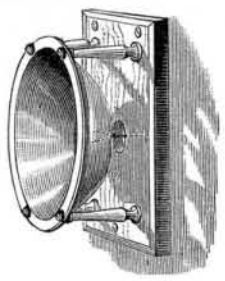
Where the rectangular form of a hall cannot be changed to advantage or economically, much may be gained by hanging draperies at the ends of the room for preventing reverberation. The rostrum should be placed in the middle of one side of the room for the best effect. This arrangement is supposed to break up the reflected waves of sound, which is the cause of reverberation.

Our correspondent might make a trial by hanging a few pieces of cheap goods upon the end walls.

SINCE referring to the death of Mr. Desnos a few weeks ago in these columns, we learn that Madame Desnos will continue the business established by her late husband at 11 Rue Magenta, Paris. Mr. Chassenent will have the direction of the engineering department, and Mr. Guion is advanced to the post of administration director, as well as secretary. The latter position he held under Mr. Desnos for more than twenty years.

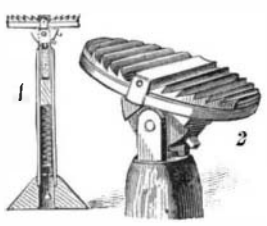
Mechanical Telephone.

This telephone allows the operator to remain in the same position while giving and receiving messages, so as to avoid the necessity of alternately applying mouth and ear to the instrument; and it eliminates the reverberations which take place in telephones in which the diaphragm is inclosed. The diaphragm is of dish form, made from a single piece of thin metal pressed or spun into shape. The bottom or base of the diaphragm is flat. Its sides are concaved outward from the bottom, and their outer edges are formed with a narrow rim. A call button is fitted at the center of the diaphragm, and the line wire is connected to the button and passes through an aperture in the base. The instrument is to be attached to the wall. A similar instrument is to be placed at the point to which it is desired to communicate, and the two connected by the line wire, which is to be drawn tightly. The call button is struck with a pencil or other hard substance, and the speaker, standing in front of the instrument, talks directly into the dish-shaped diaphragm. The hearer stands in the same position. This invention has been patented by Mr. Harvey E. Huston, of Monticello, Ill.



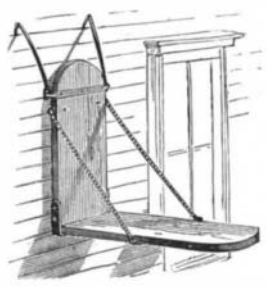
Improved Peg Cutter.

This invention is an improvement in the class of peg cutters or floats mounted on a fixed standard, and having a device for maintaining the cutter proper in the required angular position. The hollow iron standard is screwed into a fixed base. The plate that carries the cutter is attached to a bar that is free to slide vertically in the upper end of the standard, its movement being limited in each direction by means of an abutment or stop-piece that enters a slot in the bar. The latter rests on a spiral spring whose tension may be adjusted by means of a set screw. The cutter is detachably connected with the plate at the top of the bar by means of spring clamps attached to its sides and fitting in notches formed in the corresponding edges of the plate. The object of making the cutter removable is to enable the plate at the top of the bar to be used for clinching nails in the heel or toe of a boot or shoe. As an additional means for preventing movement of the cutter in any direction parallel to the surface of the plate, it is provided with a pin, which projects from the center of its under side and enters a hole in the plate. This instrument has all other required adjustments, and is strong and serviceable. Further information may be obtained by addressing the patentee, Mr. William R. Stringfield, of Pineville, Mo.



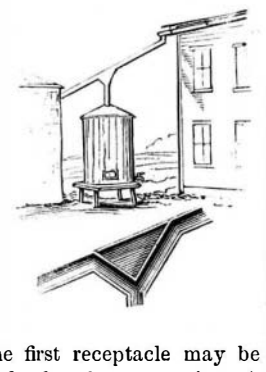
Portable Scaffold.

The engraving shows a new folding scaffold which can be held to a house, bridge, tree, bridge post, mast, etc., at any desired height, and will form a safe and reliable platform for the laborer. The invention consists of a vertical board provided at its lower end with a stirrup, between which and the lower end of the upright board the end of a horizontal board is placed, which horizontal board is braced by chains attached to the vertical board. Grabs or hooks for holding the vertical board in the desired place are attached to the upright board. This invention has been patented by Mr. Robert M. Googe, of Fleming, Ga.



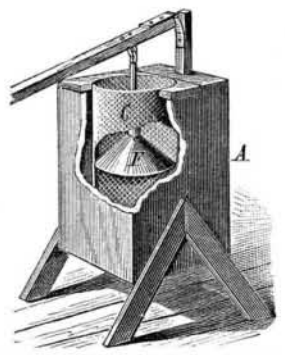
Rain Water Cut-off.

This is a cut-off attachment to rain water conductors leading from the house to the cistern, the object of which is to prevent the introduction into cisterns of impurities from the roofs of houses by receiving the first washings containing the impurities, and allowing only the pure water to enter the cistern. It will be readily understood by reference to the engraving that the first washings from the roof in a shower will fall into the smaller receptacle, taking along the dust, leaves and other deposits on the roof, also any stagnant water that may be trapped in the eaves troughs, all of which pass off with the first washings. When this receptacle fills, the pure water will then pass on into the cistern. When the shower is over, or at any time before another rain, the first receptacle may be drawn off by the cock, to be ready for the next rain. A hand hole is also provided in the lower end of the receptacle, for convenience in removing any matters that may settle therein. The water collected in the first receptacle will be useful for many purposes about a house and garden, and will not therefore be lost. Of course, the cistern and the smaller receptacle may be placed in the cellar or underground if desirable. This invention has been patented by Mr. George Lemle, of 169 Baroune Street, New Orleans, La.



Improved Washing Machine.

We give herewith an engraving of an improved clothes-washer recently patented by Messrs. Robert J. Biggerstaff and Leonard Hilpert, of Blanchard, Iowa. The machine is provided with a perforated cylinder, C, inclosed by a tub, A, provided with a an open cover. In the perforated cylinder there is a conical plunger, F, which is operated by a lever at the top of the machine. In using the machine a suitable quantity of soap and water is placed in the tub, A, and the clothes to be washed are placed in the perforated hollow cylinder, C. The plunger, F, is then placed in the cylinder, C, and is worked up and down by the lever. This machine, although very simple, is claimed to be more effective and more rapid in its operation than the more complicated and more expensive devices.



Oven Thermometer.

The object of this invention is to provide an improved combined clock and thermometer to be attached to cooking stoves and ranges and bakers' ovens, for the purpose of indicating the heat in the oven and the time the article is exposed to the heat in the said oven.

The invention consists in the combination of a clock attached to the upper end of a thermometer casing. The latter and the clock are combined with a cooking-stove, and arranged in such a manner that the lower end of the thermometer casing projects into the oven, and the clock is above the top of the stove, so that the thermometer will indicate the number of degrees of heat in the oven, and the clock will show the length of time the article is exposed to the heat in the oven.

The inventor has published a "Scientific Cooking Instructor and Key" to be used in connection with the above described improvement. In this key is given the required temperature for cooking or baking the articles, and also the number of minutes or the time that the said articles must be exposed to the heat. The articles can thus be cooked or baked without once opening the oven door to ascertain the condition of the article. This invention has been patented by Mr. Joseph C. Waller, of Plattsburg, N. Y.

A Business Man's Travels Abroad.

Andrew Carnegie, Esq., of the great Pittsburg iron firm Carnegie Brothers, has recently written and published for private circulation a very entertaining volume of travels in England, under the title of "Our Coaching Trip."

As the title implies, the author relates his experiences in coach traveling with a party of friends whom he had selected for his traveling companions, and whose names he familiarly uses in relating incidents of the journey.

The excursion was by coach from Brighton to Inverness; but the author does not confine his description of events to his travels by land alone, but he relates some amusing incidents which occurred on shipboard from New York to Liverpool. Mr. Carnegie is very practical as well as facetious, and his book contains a great deal of information that should not be confined to the few friends into whose hands the book may chance to fall.

Referring to the character and ability of the men in charge of the Cunard steamships, it is probably not generally known what small wages these brave, intelligent, and capable men get for their services. According to Mr. Carnegie, the captains of these magnificent ships, with the responsibility of providing for the comfort and safety of several hundred persons, receive only $3,250 per annum; the first officer, $1,000; the second, third, and fourth officers, $600 each. The chief engineer, a man capable of controlling and keeping in order, in all weather, the ponderous machinery of the Servia, receives $1,250 a year, and the firemen at work down among the coal bunkers, amid stifling coal dust and almost intolerable heat, shoveling into the capacious furnaces one hundred tons of coal per day, receive only $30 per month.

Mr. Carnegie, referring to the advance which has been made in ocean navigation during the last twenty years, in the matter of speed, cost of transportation, etc., makes the following comparison: The Persia, once the favorite ship of the Cunard line, required the expenditure of $35 against her successor, the Servia, $1; in other words, the latter will carry thirty-five tons of cargo across the ocean for what one ton cost on the Persia twenty years ago; and so in every other department of a steamship's economy; such improvements have been made in their construction and machinery as renders the carrying of our products so much cheaper than formerly as to seriously impair the prosperity of the English farmer.

A Costly Cellar.

The cellar under a block of apartment houses, now building on Seventh avenue near Central Park, resembles a great quarry. In some parts of the block the rock towered twenty-five feet above the adjacent street level, necessitating an excavation thirty-six feet. The grade of the cross streets is such that in the length of the building, 425 feet, there is a rise of fourteen feet in Fifty-ninth street and nineteen feet in Fifty-eighth street. Consequently, the level of the parlor floor, which is seven feet above grade at Seventh avenue, will be twenty-one feet above grade at the eastern extremity of the building, and in the four houses toward the end will be the second story. The houses are spoken of as separate, and they practically are so, but in appearance they will all form one structure, arched colonnades connecting and binding them together.

The cellar starts four feet below the grade at the eastern end, and is eighteen feet below grade at the western—that is, for a space 405x200 feet. Around this is a vault under the sidewalk, fifteen feet wide, at a uniform depth of sixteen feet below grade, to afford perfect drainage as well as to give space for boilers and coal storage. The central tunnel, entered from the eastern end, will have a depth of twelve feet in the clear below the courtyard, and its floor at the entrance will be only six feet below the grade of the cross streets at that point. By this tunnel access will be given to the servants' and freight elevators. Messrs. Hubert & Pirrson, the architects, the *Sun* says, estimate approximately the total amount of rock removed at 45,123 cubic yards, which, at $2.50 per cubic yard, the ordinary price for such excavation, would bring up to $112,800 the cost of merely digging this big hole. The foundation walls required to support the ten story construction to be reared upon them, the cementing, etc., will increase the expense of this cellar by about $320,000, so that the total cost up to the top of the cellar wall will be not less than $430,000.

Improvement in Chimneys.

The best chimneys are made by inclosing hard baked glazed pipe in a thin wall of bricks. Such chimneys will not only draw better than those made in the usual way, but there will be less danger from "defective flues." A four-inch wall of bricks between us and destruction by fire is a frail barrier, especially if the work is carelessly done or the mortar has crumbled from the joints. To build the chimneys with double or eight-inch walls makes them very large, more expensive, and still not as good as when they contain the smooth round flues. To leave an air chamber between them for ventilating, is better than to open directly into the smoke flue, because it will not impair the draught for the fire, and there will be no danger of a sooty odor in the room when the circulation happens to be downward, as it will be occasionally. The outside chimney, if there is one, should have an extra air chamber between the very outer wall and the back of the fireplace to save heat, a precaution that removes to a great extent the common objection to such chimneys. A very large per cent of fires comes from defective chimneys.

New Safety Lamp.

M. Tricot, the Manager of the Mons Gas Works, at the recent meeting of the Association des Gaziers Belges, described a new fixed lamp, invented by M. Lechien, for burning safely while surrounded by an explosive mixture of air and gas, such as may be present in gas works. It consists of a metal bracket (with an orifice in connection with a pipe leading a supply of pure air from a safe distance) securely fixed to the wall, and provided with a groove, filled with sand for receiving a projecting collar at the bottom of the lamp, so as to form an air tight joint. In the bottom of the lamp is a valve, opening inwards, which keeps it closed until placed in position, when it opens automatically. The cover, made separate for facility of cleaning, is also provided with a sand joint, and the trunco-conical chimney is of such dimensions that no air or gas can enter the lamp by its means; while a sheet of perforated metal or wire gauze, placed across it, affords an additional safeguard. When the source of light is a vegetable or mineral oil, the lamp has simply to be lighted, in a pure atmosphere, before being placed in position, as it contains sufficient air to support combustion for two or three minutes, when the air valve opens. When ordinary coal gas is used, the simplest method is to light a small piece of taper near the burner before fixing the lamp and making the connection with the gas supply pipe; or the gas may be lighted by electricity, or by a fulminating capsule.