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Manufacture of Iron and Lead Pipes

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Whoever will examine the various methods of supplying modern cities with water cannot fail to contrast the modern water-main with the ancient aqueducts. Generally speaking, we lose nothing by the comparison. The man of sentiment may deplore the innovations which displace the well or fountain, but the practical, matter-of-fact man or woman will yield more to comfort and economy. A windlass or pump-handle looks well in a rustic picture ; at the same time, they are suggestive of labor, while our hydrants, to employ a Hiberni-cism, " do their own pumping." Has it evcr occurred to the reader to inquire how pipes— common water and gas pipes—are made ? In every large city in the Union there are miles upon miles of large and small pipes under ground. Nearly every resident of a large city is aware of the fact that these pipes are made of iron, but we question if one in a hundred knows how they are made. They are taxed for their construction, taxed for their connections, taxed for every gallon of water and every foot of gas which courses through them, yet further than that they know nothing about them. Here in brief is the process: I 1. A hollow spindle, or tube, the length of the pipe re- - quired, is covered with a rope composed of straw, and the - latter covered evenly with loam about the consistency of f mortar. 2. This spindle, thus prepared, is next placed in a - drying oven, dried thoroughly and washed carefully with a - composition which prevents the loam from adhering to the I metal. At this stage it is now termed the " core," around ; which the pipe is to be cast. 3. A large iron flask, corresponding in length with the " core," in the form of a cylinder, - constructed in such a manner as to open and shut as a hingo is opened, is placed on end (the sides being held together I firmly with clamps), an iron pattern corresponding in size I with the diameter of the pipe inserted, and the intervening . spacefilled with sand. 4. The iron pattern or shaft is then L withdrawn, the mold washed with the composition already - described, and the flask placed in a drying oven. 5. When tlior-) oughly dry, the flask is placed on end in a pit, the ''core " placed , exactly in the center, and the boiling metal poured in from I the top, as in the method of casting bells. 6. The spindle , around which the " core " is formed and the metal flask being , perforated, permits the heated air and gas generated in tho : pouring process to escape. The purpose served by the straw I rope will be better understood when we explain that all met-l als shrink or contract in cooling. If the metal were cast around a perfectly solid cylinder, whether composed of stone, iron, or dry sand, it would crack from end to end, or burst ; into fragments on cooling, from v/liich it will be seen that i the straw serves as a cushion which accommodates itself to the strain brought to bear upon it. When the metal has remained a sufficient length of time in the mold or flask, the latter is taken from the pit, the clamps removed and the pipe turned out. The "core" is afterward pulled out, and the pipe is complete. The pit alluded to is about twelve feet deep. As the iron flasks alone weigh from seven hundred to four thousand pounds, the reader will naturally be curious to know how they are lifted in and out of the pit when full of sand and metal. It sometimes happens that the total weight excpieds eight or nine tuns. This is accomplished by means of a number of cranes or adjustable windlasses, which raise, lower, and move the flasks from one spot to another as easily as a man moves his arm. Operated by a small steam engine, tho cranes perform the work of a regiment of men every day, and are absolutely indispensable. "Swinging around a circle," they hoist, lower,or draw toward or push away from themselves the most prodigious weights with a celerity truly marycdous. They even do their own cleaning, for as tlie pits become full of sand, or dirt accumulates in their vicinity, the moment it is shoveled into a huge "farrow, they lift it up and " dump " it at a respectable distance. Those who are unacquainted with the principles which govern liquids may inquire, " Why not use earthen or wooden pipes under ground, or something less costly than iron ?'* Why, dear sir or madam, it would not stand the pressure. To illustrate this matter, we will state that by. placing a small iron tubo of a given hight in the strongest cask or barrel and filling the same with water, you can burst the latter into fragments at the imminent risk of breaking your ribs. The majority of the iron pipes under our streets sustain from fifteen to thirty pounds pressure to the inch, so, to avoid those accidents wMch flood your streets with a sheet of water in winter, and make ice entirely too cheap for comfort, all the pipes are subjected to a pressure of from two to five hundred pounds to the inch. We presume there are not ten readers of this magazine who have any idea of the manner in which our common lead pipe is made. We aro satisfied that if their iiyes depended upon it, they would never guess the real process. Time was (in the 18th century and until 1820) when lead pipe Avas cast and drawn in a manner similar to the process of wire-draAving. Now, however, it is forced through a cylinder betAveen a " core " and dies, ichen in a solid state. A hollow cylinder is constructed in such a manner as to admit a steel die in one end with an opening of the shape and diameter of the out side of the pipe required. A solid piston or ram fits this cylinder evenly without friction. Attached to this piston is a long, movable " core " or spindle, of the diameter of the inside of the pipe. The cylinder is filled with melted lead, allowed to 'set," and the piston pressed into it by a hydrostiatic pr''ss. Wlien the pressure is applied, the lead is forced forv/ard and out between the orifice in the die and the steel spindle or " core,'* which accommodates its movements to the action of tlic lead in forming the pipe. Still another and better plan is the introduction of a stationary spindle, which produces a superior and more uniform article. As the lead is forced through tho dies in the form of a pipe, it falls over a large pulley or drum, where it is caught by a workman with heavy gloves and guided upon a roll, where it is coiled up and set aside. Lead* pipe is pressed out at the rate of a mile an hour. All sorts of bar lead are made in the same manner. The pressure exerted in the manufacture of bar lead and pipes is enormous, varying from two to three tuns to the square inch.—Once A Month. The French Academy of Science has been considering the subject of burial grounds, and one of its members, Mr. Chas. de Freyemeti, recommends that vaults composed of stone or brick, should be abolished, as they have a tendency to intensify the mephitic exhalations. All coffins should be dcposited in the earth, which, in a short time, will absorb all the noxious gases. Every hurial ground should be thoroughly drained and thickly planted with trees, which purify the atmosphere by the vast amount of oxygen which tliey produce; and finally, no new cemeteries should be allowed to be opened within a regulated distance from any town or village. 75 Tlie Chinaman as a Railroad Builder. It is a significant fact, says the San Vranrisco Times, that at the laying of the last rail on the Pacific Railroad, John Chinaman occupied a prominent position. He it was who commenced, and he it was who finished the great work ; and but for his skill and industry the Central Pacific Railroad might not now have been carried eastward of the Sierras. The experience of this undertaking has proved that the Chinaman is an admirable railroad builder. His labor is cheap, his temper is good, his disposition is docile, his industry is unflagging, his strength and endurance are wonderful, and his mechanical skill is remarkable. There are Chinamen in the employ of the Central Pacific Company who are more clever in aligning roads than many white men who have been educated to the business, and these Mongols will strike a truer line for a longer distance with the unassisted eye than most white men can with the aid of instruments. A good deal of nonsense has been talked about the Chinaman's want of stamina, and his inferiority to the white laborer in point of strength and capacity for work. The Central Railroad has pretty thoroughly settled that point; for numerous experiments have been made during its construction, with a view to test the respective capabilities of the two races. On one occasion a party of Irishmen and a party of Chinamen were pitted against each other in blasting a hard rock for a tunnel. Bets were freely made that the white men would come out winners; but at the end of the day, when the work of each party was measured, it was found that John Chinaman had burrowed further into the rock than his antagonist, and was, moreover, less fatigued. The bands of Chinamen now organized by the Central Railroad Company are as fine railroad builders as can be found anywhere. The officers of the Union Pacific road were amazed at the work these fellows did, and it is by no means improbable that our Eastern friends will endeavor to secure some of these trained gangs for the next railroad enterprise in which they may eng age. Many of the Chinese bosses, or heads of gangs on the-I'acific Railroad are very intelligent men, and a few days since we were present wTien one of these entered a car and engaged in a conversation then going on, speaking good English, and showing an extensive acquaintance with railroad matters. It is well that we should bear in mind the great assistance that the Chinese have afforded to the Pacific Railroad, and that we should remember the difficulties which their presence dissipated. The training they have received on that road has given to California a large body of men peculiarly adapted to this description of work, and it has rendered comparatively easy the carrying out of other enterprises of the same character. They will probably be largely employed in the construction of the California and Oregon Railroad, now about to be entered upon; and, while they do not prevent the engagement of white men, they will facilitate enterprises which might be impracticable, lacking their aid. The Chinaman is a born railroad builder, and as such he is destined to be most useful to California, and, indeed, to the whole Pacific slope. Ballooning in California. In a large hall, near San Francisco, a small steam balloon has lately been tried, with so much success as to excite enthusiasm among the stockholders, and make them think that the great problem of aerial navigation has been solved. We are assured that the first jmcket of a regular line of aerial steamships will start from California for New York within a very few weeks. We should be glad if there were any reasonable basis for this expectation, but we find none whatever. Substantially the same forms of balloon and machinery have before been tried, always with apparent success on the small scale in still air; always with failure when subjected to atmospheric currents. Experience shows that the attachment of wings, tails, and wheels to balloons, tends more to impede than to assist their progress. Aerial navigation will never be reduced to a regular commercial system until some one shows us how to dispense with the unwieldy gas balloon, and replace it with an eff*ective method of generating the requisite buoyant power. The subject is one of great importance, and worthy of diligent study on the part of all inventors. Glorious fame and princely fortune await the successful discoverer. We copy from the San Francisco Times the following account of the recently tried Aerial Carriage: The carriage, which is merely a large working model, is a balloon, shaped like a cigar, both ends coming to a point. It is 37 feet long, 11 feet from top to bottom, and 8 feet in width. These are the measurements at the center of the balloon, from which j)oint it gradually tapers off* toward either end. Around the balloon, lengthwise, and a little below the center, is a light framework of wood and cane, strongly wired together and braced. Attached to this frame, and standing up as they approach the front of the carriage, are two wings, one on each side. They are each five feet wide at a little back of the center of the carriage, and do not commence to n arrow down until they approach the front, where they come to a point. These wings are made of white cloth fastened to a light framework which i braced securely by wires. The main frame is secured in xlace by means of strong ribbons, v/hich go over the balloon, and are attached to corresponding portions of the frame on the other side. To the frame at the hind part of the carriage is attached a rudder, or steering gear, which is exactly the shape of the paper used in pin darts, four planes at right angles. This, when raised or lowered, elevates or depresses the head of tlie carriage when in motion; and when turned from side to side, guides the carriage as a rudder does a boat. At tlie center iiiid ljottoni of the balloon is an indentation, or space left in the material of which it is built, in which the engine and machinery are placed on framework. The engine and boiler are very diminutive specimens, but they do their work handsomely. The boiler and furnace are together only a little over a foot long, four inches wide, and five or six inches in hight. Steam is generated by spirit lamps. The cylinder is two inches in diameter, and has a 3-in. stroke. The crank connects by means of cog wheels, with tumbling rods which lead out to the propellers, one on either side of the carriage. The propellers are each two-bladed, four feet in diameter, and are placed in the framework of the wings. The boiler is made to carry eighty pounds of steam. When not infiated, the carriage weighs eighty-four pounds. The balloon has a capacity of 1,360 feet of gas. When infiated and ready for a fiight it is calculated to have the carriage weigh from four to ten pounds. An engineer's private trial trip was first made in the presence of the constructing engineers, several of the shareholders of the Aerial Steam Navigation Company, a number of the employees and residents in the neighborhood. The morning was beautiful and still—scarcely a breath of air stirring. The conditions were favorable t) success. The gasometer was fully infiated, and the model was floated out of the building. In six minutes steam was got up—the rudder set to give a slight curve to the course of the vessel—and the valves opened. With the first turn of the propellers she rose slowly into the air, gradually increasing her speed until the rate of five miles an hour was attained. The position of the rudder caused her to describe a great circle, around which she passed twice, occupying about five minutes each time. Lines had been fastened to both bow and stern, which were held by two men, who folioAved her track, and had sufficient ado to keep up with her at a " dog trot." As she completed describing the second circle, a pull given to the head line, unintentionally, caused the rudder to shift to a fore-and-aft position when the model pursued a straight flight about a quarter of a mile ; she was then turned round, and retraced her flight to the point of departure; whence, being guided, she entered the building. The fires were drawn, and the first extensive flight of a vessel for aerial navigation was accomplished. The total distance traversed was a little over a mile. The appearance of the vessel in the air was really beautiful. As seen in the building she looks cumbrous and awkward. I'he change of appearance as she is circling gracefully through the air, is equal to that of a ship when first seen in the water. The moment of opening the steam valve was one of susx)ense; as the vessel rose and forged slowly ahead, the suspense was scarcely dissipated; but in a very few seconds her speed increased—in obedience to the rudder she commenced to swing round the curve—the men at the guys broke into a trot, and cheer upon cheer rose from the little group of anxious spectators. The public exhibition was attended by some slight accidents, but elicited much enthusiasm from the audience which had as--sembled in a hall where the trial was made. The wind was so violent and irregular without, that it was considered unsafe to risk the model beyond the shelter. The carriage mounted near to the roof with a firmness and steadiness equal to the movements of an ocean steamer on smooth water. The guests cheered long and loud, and many fairly danced with delight at the success. The trip back and forth across the hall was performed several times with success. AVithin a few weeks the first large vessel will be completed by the Aerial Steam Navigation Company—one calculated to carry four persons—and the principles involved in its construction will then be fully tested. The projectors consider that the model carriage has developed two facts of the greatest importance. First, the eff'ective power developed by the propellers is greater than the estimated power according to the formulse of aero-dynamics; and, second, ativospheric resistance encountered by the vessel was less than had been calculated. Consequently the sp(3ed attained was higher than was estimated, and at the next trial, when the effective healing surface of the boiler will be increased, a further considerable increase of speed will be attained. Some doubt had been entertained as to the facility of steering the vessel. That is shown to be the easiest part of the business. She obeys the deflections of the rudder with extreme sensitiveness, and is under the most complete control. Enamels. The flue enamels of trade are generally prepared by fusing at high temperatures, silica, oxide of tin, and oxide of lead, and spreading the mixture over the surface of a sheet of copper, of gold, or of platinum. The objections to these enamels are, in the first place their high cost, and, secondly, the impossibility of giving them a perfectly flat surface. Mr. E. Duchemin has advantageously replaced them by the following economical and eflacient compound: Arsenic, 30 parts by weight; salpeter, 30; silica (fine sand), 90; litharge, 250. This is spread on plates of glass of the required shape and size, care being taken, however, that the kind of glass employed be not inferior in point of fusibility to the enamel. Enameled glass prepared from the above substances may be drawn or written on as readily as if it were paper, and in less time than one minute the writing may be rendered indelible by simply heating the plate in a small open furnace or muffle. Drawings, autographs, legal acts, public documents, historical facts and dates of importance, labels for horticultural purposes or destined for out-of-door exposure, coffin plates, signboards, show-case signs, etc., may thus be cheaply made, which will resist atmospheric infiuences for ages. First-class photographs, either negatives or positives, may be taken on such enamels without collodion, by using bitumen, or citrate of iron, or per chloride of iron and tartaric acid, or bichromate, or any other salt. A good solution for this purpose is, water, 100 parts by weight; gum, 4 parts ; honey, 1 part; pulverized bichromate of potash, 3 parts. Filter the liquid, spread it over the enamel, and let it rest, after which: 1. Expose it to the camera. 2. Develop the image by brushing over it the following powder: Oxide of cobalt, 10 parts by weight; black oxide of iron, 90 parts ; red lead, 100 parts; Sand, 30 parts. 3. Decompose the bichromate by immersion in a bath formed of: Water, 100 parts by weight; hydrochloric acid, 5 parts. 4. Wash it in clean water and dry it. 5. Vitrify the proof on a clean piece of cast iron, the surface of which has been previously chalked. One minute will sumce for indelibly tixmg and glazing the photograph, wmch must be carefully and slowly allowed to cool. Photographs on enamel of any size, taken in this manner, are perfectly unalterable under all atmospheric conditions, and may consequently and aptly be called " everlasting photographs."

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