Engineering Notes.

The Baltimore & Ohio Railroad Company has built four miles of line in Pennsylvania, which is believed to be the crookedest railroad in the United States. This little road will extend from Boswell, Pa., to Friedens on the Somerset & Cambria branch of the Baltimore & Ohio. The air-line distance is about five miles, but the peculiar conformation of the country makes it necessary to loop a number of hills in order to get an easy grade. The new road doubles on itself four times, and at one point, after making a loop of about five miles, the road comes back to within 300 feet of itself on a grade 50 feet lower.

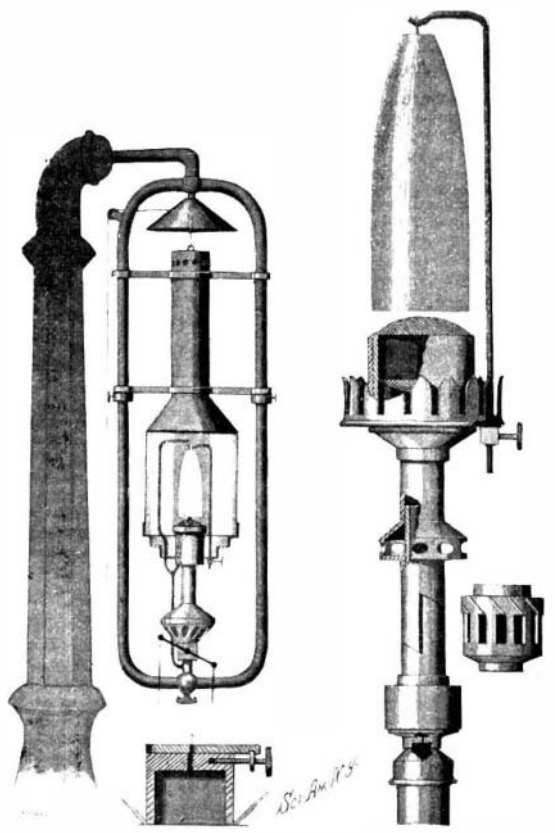
The southern press dilates upon a new plow, the invention of which is accredited to Dr. Gatling, famous for the gun that bears his name. Dr. Gatling has devised a motor plow driven by a gasoline engine. The truck is said to be constructed like the trucks of traction engines, except that the steam boiler is displaced by a strong platform on which is mounted the motor connected with the traction gearing. A set of disk plows is attached to this truck, and these plows can be made to run at any depth or any angle required. It is estimated that with this machine one man can plow from thirty to thirty-five acres in one day.

The city of Bahia, which is situated on the coast of Brazil, South America, has a population of about 200,000 inhabitants who are housed in 17,000 dwellings. The water supply for these people has been furnished by a local company ever since 1852. It is brought from the nearby mountains, and thus far the expenditure for the works, including the pipe system, fire plugs, etc., has amounted to $1,500,000. According to the Municipal Journal and Engineer, the supply is not adequate to the needs of the city, and for a long time negotiations have been going on between the company and the city for the purpose of increasing the supply. The monopoly has been renewed for a period of forty-five years and some valuable franchises and privileges have been awarded the company. On the expiration of this contract the city will have the option to buy the company's plant at the valuation of expert engineers. Every dwelling in Bahia must use water, and the municipal officials of the city regulate the price. For the average dwelling for 422 quarts a day, ten cents is charged; twenty-one quarts of water is furnished to the public fountains and hydrants, at a low price. The improvements contemplated by the company will cost in the neighborhood of $600,000, but owing to the financial crisis prevailing in Brazil, the company has been unable to obtain the money required to complete the water system and therefore desires to sell its plant and privileges. The price asked is $1,100,000. It is estimated that the earning power of the water works, when completed in accordance with the new contract, will be $300,000 a year, and the company purchasing its rights will doubtless be awarded a contract for establishing a drainage system in the city and for furnishing the houses with sanitary plumbing.

One of the original locomotives, writes a correspondent of the London Railway News, built by George Stephenson in 1822 for the opening of the line of the Hetton Colliery, near Durham (England), between their works, a few miles northwest of Durham, and the shipping staiths on the Wear at Sunderland, is still employed hauling the trucks at Hetton, and is now, after eighty years' continuous service, claimed to be the "oldest working locomotive in the world." The principal dimensions of this "old-timer" are: Diameter of the cylinders, 10¾ inches; piston stroke, 24 inches; diameter of the wheels, 3 feet. The weight of the engine is 15 tons, and it has a haulage capacity of about 129 tons at a speed of 10 miles an hour on a fairly level track. Its general design (excepting the cab) remains as originally constructed, while some parts, notably the steam dome, are actually portions of the engine as constructed in 1822. After this long and faithful service, it is not surprising to learn that the engine is at last becoming unequal to the ever-increasing demands made upon it, and the directors of the Hetton Colliery, therefore, and with commendable appropriateness, shortly intend to withdraw the relic from Hetton, and it will in the course of a few weeks find a permanent resting-place at the Durham College of Science, Newcastle-on-Tyne, where it will be preserved to this and future generations as a worthy example of the earliest period of locomotive engineering. It may be noted here that Stephenson's "No. 1 Locomotion," built for the opening of the Stockton and Darlington Railroad in 1825, continued in working on "the first public railway" until 1850, when it passed into the hands of Messrs. Pease & Partners, by whom it was used for colliery purposes until 1857, at which time it was placed on a pedestal for exhibition at Darlington Station, where it is to be seen to-day, so that not only in point of date of construction, but also as regards years of "active service," must the engine used at the opening of the first public railway give place to that constructed for the Hetton line by George Stephenson fourscore years ago.

TWO NEW INCANDESCENT GAS BURNERS.

Two important improvements in incandescent gas burners are herewith illustrated. The burners are designed to insure a perfect mixture of the air and gas and at the same time use but a minimum of gas in the mixture. The arrangement causes a proper burning of the mixture, producing a complete and brilliant incandescence of the mantle and hence a light of great strength, brilliancy and softness. The burner shown at the right is adapted for ordinary use in rooms of limited size; that on the left is intended for street lighting or the illumination of halls, large rooms and the like. The former type is adapted to be placed upon the tip of an ordinary gas supply pipe. The supply pipe is covered by a cap having a small outlet opening which admits gas into the mixing chamber just above. This chamber is provided with apertures in its side wall, as shown in the small detailed view. A nut having an internal thread is adapted to be screwed down over these apertures. By adjusting this nut the apertures may be more or less uncovered to admit more or less air into the mixing chamber. A tube extends upward from this chamber, and is surrounded near its upper end by an annular chamber having large inlet openings to admit the air. On the bottom of this chamber is a sleeve extending downward over the tube referred to, and provided with a spiral engaging a corresponding spiral on the tube, so that by turning the sleeve the annular chamber is raised past the upper end of the tube and more or less air is admitted thereto. From the top of the chamber a conducting pipe extends to the main mixing chamber. This is provided with two wire screens spaced a



NEW INCANDESCENT BURNERS.

suitable distance apart. The gas and air in passing through the fine meshes of these screens become thoroughly mixed, forming an easily combustible mixture which, when ignited, renders the mantle incandescent and produces a powerful light that combines brilliancy with softness. Since so small an amount of gas is admitted into the burner, it is evident that great economy of gas is had.

The second type of incandescent burner, which is illustrated on the left, embodies certain novel features by which it is adapted to produce a much more powerful light. The gas supply is connected to a service pipe, preferably made in the shape of an elongated loop. A feed pipe extends upward from the bottom of this loop, and enters a mixing chamber. Mounted on the top of the feed pipe is a slide-valve controlled by a thumb screw, as shown in the small detail. An inlet port in the mixing chamber is formed by a small opening in the top of the feed pipe, which registers with a similar opening in the slide-valve. By moving this valve inward or outward, the inlet port is more or less closed, and thus the flow of gas may be regulated to a nicety. The mixing chamber is provided with openings for the admission of air which thoroughly mixes with the gas in passing up the long conducting tube to the burner. The burner is provided with a screen of fine mesh which minutely divides the mixture and prepares it to be properly burnt in the mantle. The chimney carrier is provided with openings which admit air to the outer surface of the mantle, thus insuring high incandescence. A tube with a flaring bottom rests upon the top of the chimney and is provided with lugs mounted to slide on the side arms of the service pipe. The tube is provided with openings at the top to permit the escape of the products of combustion. The purpose of the tube is to create a draft and cause the air and gas to be forced up under additional pressure, thus affording a brilliant light. When it is desired to remove the chimney, this tube may be raised out of the way by pulling the cord or chain fastened thereto, which passes up over a pair of pulleys and hangs down within easy reach.

Just below the mixing chamber is a valve carrying on the valve-stem the usual lever, from the ends of which the operating chains depend. From a point immediately below this valve a pilot pipe leads upward and projects through the screen at the top of the burner. A branch from this pipe extends upward to the top of the mantle. By this means when the valve is closed, two small flames continue to be fed by the pilot pipes, and when the valve is again opened the gaseous mixture is again ignited by these flames, both from the top and bottom of the mantle. The pilot pipe is made in two sections which are joined together by a coupling within the mixing chamber. By this arrangement the parts may be readily disconnected to give access to the regulating valve in the mixing chamber.

Patents on these improved burners have recently been granted to Mr. James Buchanan, of 203 Broadway, New York.

The Finding of the Revolutionary Prison Ship "Jersey."

In building a section of the new ways for the construction of the battleship "Connecticut" at the Brooklyn navy yard, the famous English prison ship "Jersey" was discovered. She was one of six prison ships used during the Revolution. Probably built somewhere around the year 1720, she saw some thirty years of service, fought many a battle and was then condemned to be used as a receiving vessel for American prisoners of war.

Of the six prison ships, the "Jersey" was by far the worst. She was a kind of floating Black Hole of Calcutta, and in her damp, leaky hold half-starved American patriots perished miserably. In her palmy days the "Jersey" had a crew of about 400 men, huddled together as crews were in those days. How appalling were the conditions to which American prisoners were subjected may be gathered from the fact that 1,200 prisoners were kept on board almost constantly. One historian says: "She was never cleansed, and lay in that condition seven years. No fires warmed her occupants in winter, no screen sheltered them from the August sun, no physician visited the sick, no clergyman consoled the dying there. She remained throughout the contest a center of sickness and death, always replenished with new victims. The bones of her dead, estimated at 11,000, lie buried on the Brooklyn shore." When the war ended, the "Jersey" was burned at her moorings.

For years historical societies and government officials have tried to locate the ship. The half-burned hull lies in about two fathoms of mud and water about 500 feet from the dock. Unless the hull is removed the battleship "Connecticut" must be built directly over it. Whether the hulk will be raised seems doubtful. About $500 would be required, and the delay in the construction of the battleship would be considerable. The ways are already behind time as it is.

Interest in the old ship reached its height when, some years ago, the skeletons of 300 men were found in the yard. That these were the remains of the men who had died in the "Jersey" was definitely established. The bones were afterward buried in Fort Greene Park with impressive ceremonies.

The Current Supplement.

The current SUPPLEMENT, No. 1399, contains a wide range of interesting articles. The first article deals with a novel block signaling system in which electric semaphores are used. Mr. S. D. Mott explains a novel plan of mechanical aerial flight or air suspension based on well-known ascertained facts. The machine for this purpose he terms an "aerodrome." For manufacturers and exporters an explanation of the business opportunities in Portuguese colonies should be valuable. The coal strike has brought home to the dwellers of large cities the need of some device whereby it is possible to burn soft coal without smoke. Therefore an article on a locomotive stoker which has been successfully used on railways should prove of interest. The value of alcohol as a fuel has been more than once commented upon in these columns. A further discussion of the subject will be found in the current SUPPLEMENT, the occasion for which is the International Alcohol Exposition of Lighting and Heating Apparatus, recently held in Paris.

Mr. Frank H. Mason, our Consul-General at Berlin, tells much of the German processes and machinery for briquette manufacture. Dr. Peter T. Austen concludes his paper on the "Chemical Factor in Human Progress." The usual Trade Suggestions from the United States Consuls as well as Trade Notes and Recipes are also published.