Completion of the Jeddo Tunnel.

The Jeddo Tunnel, five miles long, driven for the purpose of draining coal mine workings near Hazleton, Pa., has just been finished. These mines, says the Railroad Gazette, were flooded by the breaking through of surface streams, and have been abandoned for seven years. The working did not extend more than 450 feet below the top of the mountains upon which they were located. This made the tunnel a possibility, the plan being to drive in from Butler Valley, five miles off. Two shafts were sunk and boring was done in five sections. Work was begun in the spring of 1891. The progress was slow, the rock being very hard. Red, green, and gray sandstone, conglomerate, fine grain, large pebble, and black sandstone were met during the boring. Ingersoll-Sargent rock drills were used and the blasting was done with forcite, a refined form of dynamite, less powerful, but giving out but little fumes and smoke. Of this 350 pounds were used. As originally planned the tunnel was 8 feet by 8 feet, but this was changed to 7 feet by 9 feet. Many streams of water were met with, which was pumped from the different sections. The bore hole from the flooded workings was cut with a jump drill and rope. For 250 feet a 12 inch hole was worked. Then the bore was changed to 6 inches for 170 feet, and from here to the tunnel, 20 feet, was reduced to 4 inches. Iron pipes surrounding the drill keep the water out of the tunnel. The 4 inch hole is now stopped with a hickory plug. When the iron casing and plug are removed, about 8,000 gallons per minute will empty into the tunnel. About two months will suffice to empty the 500,000,000 gallons now in the workings. Not a man was killed during the progress of the work, and only four were injured.

Comparison of the Navies of the World.

Some interesting statistics have been compiled recently by Secretary Herbert concerning the number and the types of the war vessels of the leading navies of the world. The tables show that England has, at the present time, some 43 battle ships, 12 coast defenders, and 18 armored cruisers, and 10 battle ships building. The French navy contains 43 armored vessels built and 20 authorized and building. Russia has 40 such vessels, Germany 32 and Italy 18. These navies have, in addition, many unarmored vessels. The number of war vessels in the service of England, including protected cruisers, ordinary cruisers, gunboats and torpedo vessels, exclusive of torpedo boats, is 238, and some 48 additional ones authorized and building. The French navy contains in all 147 vessels, with 24 building. Germany has altogether 39, Russia 32, and Italy 72. Torpedo boats have come to take a very important part in naval warfare. France has 217 torpedo boats in service and 42 authorized and building; England has 165 and 64 respectively; Italy 178 and 11; Russia 163 and 14, and Germany 119. The comparison between the United States and foreign navies afforded by this table is very significant. At present the United States has 3 torpedo boats and 3 building. Such a comparison needs no comment. It is to be hoped that the United States navy may be more adequately provided in the future.

CHARACTERISTIC RAILWAY STATION IN SOUTHERN CALIFORNIA.

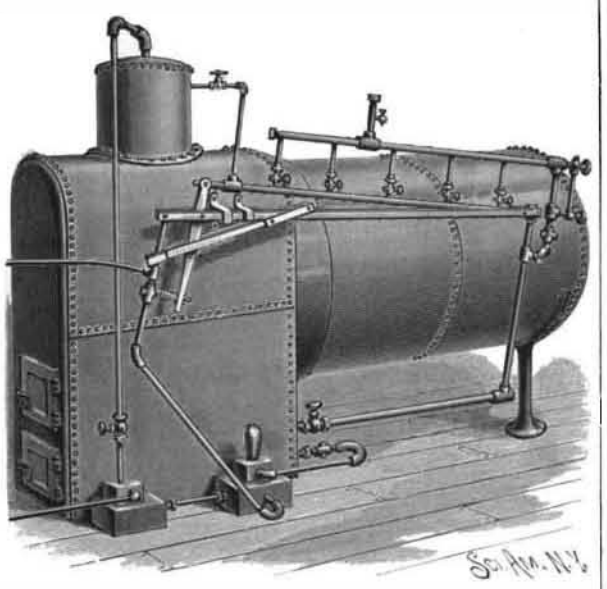
That railway corporations as well as railway men are not altogether devoid of sentiment is attested by the construction of a station at Capistrano, on the Southern California road, a good illustration of which is shown herewith. This station in its exterior is a reproduction of the old Spanish mission located at that point, the site for which was selected on the first of November, 1776. The new station, which is built closely adjacent to the site of the old mission building, follows it not only in form, but is built largely of the material taken from its ruins, while the timbers in the roof and a large portion of the flooring were brought from the Todos Santos mission at a cost fully equal to that of new timber, so that the new building will possess a historic value much beyond that of an ordinary station.

This station was opened to the public on October 22, 1894. There were present on the occasion General Manager Wade and several other of the officials of the road, together with many prominent citizens of Los Angeles and San Diego. The enterprise of the management of the road in thus preserving the ancient landmarks is to be commended and cannot fail of bringing them closely in touch with the inhabitants of the country.—Railway Review.

CAPISTRANO STATION, SOUTHERN CALIFORNIA RAILROAD.

AN IMPROVED FEEDWATER REGULATOR.

This improvement is designed to insure uniformity in the feeding of water to boilers, the regulator working without the jerks and jars frequently characteristic of feedwater regulators. It has been patented by Messrs. Charles A. and Henry F. Straub, Rouseville, Pa. An expansion pipe is arranged outside the boiler, its lower end below low water mark and its upper end above high water mark, and its lower end being connected by a vertical and a horizontal valved pipe with the water space of the boiler, while its upper



STRAUBS' FEEDWATER REGULATOR.

end is connected by a small valved pipe with the steam dome. The lower end of the expansion pipe is bolted to the end of a nearly parallel iron strap extending forward through brackets, and near the forward end of the strap is fulcrumed a lever pivotally connected with the upper end of the expansion pipe, the lower end of the lever being pivotally connected with the stem of a valve in the water supply pipe. The steam pump is in this case directly connected with the boiler, and the water supply to the pump is regulated, but instead of this arrangement the pivoted lever actuated by the expansion pipe may be connected with a valve in the steam pipe to regulate the supply of steam for working the pump. Above the expansion pipe, and connected with it by vertical pipes each having a pet cock, is a condenser pipe provided with a glass water gage, by means of which the expansion pipe may be relieved of steam, and kept constantly charged with steam directly from the boiler, whereby it will be heated more uniformly, according to the temperature of the steam and water in the boiler.

As will be seen, the lengthening or shortening of the expansion pipe, by the changing conditions in the boiler, causes a swinging of the lever to close or open the valve to admit more or less steam or more or less water to the pump, or to shut off the steam or water completely.

A Tubular Frame House.

M. Caron, of Chamounix, has just built a most peculiar house, for which he claims, first, a constant temperature and incidentally strength, durability, comfort, and beauty. The change of temperature in the valleys of this mountainous region is frequent and severe, and the building of such a house was prompted by the severity and instability of the climate. Mr. Caron first put up a frame of steel water tubing, allowing continuous circulation to a stream of water. Around this frame he put up his house in the ordinary way, the entire structure being a very pretty specimen of the early Italian Renaissance. The peculiarity is that all floors and ceilings are likewise crossed and recrossed by the water pipes. The water, after passing through the horizontal tubes first, that is under the floors and ceilings, passes through the vertical tubes until all have been gone through. In summer, spring water, fresh as is only the water of the snow-capped Alps, circulates under pressure through the network of tubes, cools off the walls, and, after having run its course, flows off considerably warmer than when it entered. But in its course it has absorbed much heat, which it carries away. During the long and severe winter the water, entering through the basement, is first heated to nearly 100 degrees, and then forced through the tubing. Of course, much of the heat is left all over the house, and at the outlet the temperature of the water is about 40 degrees. The speed of the circulation of water can be regulated so as to allow the fixing of a certain temperature for the house, which is equal throughout. The house has been put to a practical test through the last eight months, and has stood the trial well. The builder claims for it cheapness, solidity, and elasticity, giving it immunity against earthquakes. The house measures about 6,000 cubic yards and weighs 120 tons, or 36 pounds per cubic yard inclosed. It is fireproof, having running water in every room, and fire can be drowned out in a remarkably short time.—La Nature.

A Frenchman's Views of American Manufactories.

M. Pierre Arbel, of the Saint-Etienne Chamber of Commerce, was sent to this country, with a number of fellow experts, to examine, among other things, our factory methods. His report, recently published, shows that three principal factors condition the superiority of the American manufactory. The first is the more intelligent equipment of the plant and the greater facilities for transporting material; the second is the use of the most perfect apparatus obtainable; and finally, the labor is more efficiently organized in the workrooms.

In a very cool, judicial and matter-of-fact way M. Arbel estimates that under like conditions American factories produce two and even three times as much as the French. The latter are trying to wage industrial warfare with weapons of the stone age. The successful French manufacturer, in lieu of enlarging and strengthening his plant, straightway invests his surplus in government bonds or railway stock.

And even when the need of improved apparatus and machinery is driven home by competition, and the plant is suitably equipped, the main endeavor of the European manufacturer seems to be the preservation of the costly acquisition. A radical mistake. The American machine must work more rapidly as well as more efficiently, and it is utilized to the very utmost, without concern for its duration. Ere the old machine is discarded, a better will have been invented, and the profit on the old will more than pay for the new. An American can hardly conceive of the vast mass of rubbish retained in European shops on sentimental grounds, and handed down religiously from father to son.

The American organizes his labor in a more efficient manner. Paying his help better wages, he seeks, as far as possible, to make of each workman an intelligent operator of the machinery provided. Steam power and electricity are used in every possible way—for machines, lighting, hauling, welding, etc. Subdivision of labor is carried to its extremest limits and the output astonishingly increased. Messengers and errand boys are in constant attendance, removing all pretext for leaving one's post, and economizing valuable time to the utmost.

Thus it is manifest that the great development of American manufacture is not due solely to courage and capital: its secret is the maximum use of all available resources—the employment of the good machine at the right time, working it for all it is worth, and then pitilessly discarding it for a better.

THE first Bible printed in the point alphabet for the blind has just been issued in Louisville, Ky. It contains 1,839 pages.