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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

NEW DEPARTMENT OF THE SCIENTIFIC AMERICAN.

In response to many requests from our readers, we have decided to publish, from time to time, a special department of the SCIENTIFIC AMERICAN devoted exclusively to patents and inventions.

Under this head we shall give the latest news of the day relating to the United States Patent Office; and it will include illustrated notices of recently issued patents, which latter will be selected on account of their interest and promise. There will also be a special section devoted to legal notes, and digests of legal decisions relating to patents and trade marks.

The editors are satisfied that the comprehensive scope of these data, coupled with the publication, weekly, of the index of inventions, will render the new department the most compendious and reliable source of information published on the subject.

FORCED VERSUS NATURAL DRAFT.

The forced draft controversy is still with us, and promises to be a fruitful theme of discussion among marine engineers for many a year to come. No doubt at one time forced draft was a fruitful cause of breakdowns at sea; but that was in a day when the scope and limitations of the system were not well understood. If the doors of a boiler furnace that is being forced under so many inches of air-pressure be suddenly swung open by the fireman, the rush of cold air impinging on the tube sheet will induce severe contraction strains and the tube ends will begin to leak. To-day, however, the modified forced draft which is being used on some of the largest and fastest ships is giving most effective service, and this without any serious increase in the boiler repair bill over what would be expected in boilers fired under natural draft. It is certain that there is a more economical consumption of fuel, and that a higher rate of horse power per ton weight of motive power can be realized. On the other hand, we find that some of the most powerful of the steamship companies are bitterly opposed to forced draft and will not contemplate its use for a moment. Among these may be mentioned the North German Lloyd and the Cunard lines, which, in spite of the brilliant success of the "Deutschland" of the Hamburg-American line, have very little that is good to say of forced draft, even in a modified form. The "Kronprinz," and the huge "Kaiser Wilhelm II." now building for the North German Lloyd, have natural draft, and it is significant that the steamship "Bremen," which was burned a little over a year ago at the Hoboken fire, and has just made her maiden trip to this port after undergoing a thorough reconstruction, has had her old boilers, which were equipped with the Howden forced draft, entirely removed and new and larger boilers operated on the natural draft system installed. Speaking of the latter vessel, it may be quoted as a case of remarkable speed in shipyard work that this great steamer, which was completely gutted at the time of the Hoboken disaster, has within twelve months been towed to Newport News, steamed over to Stettin, been cut in two and lengthened 25 feet, had new boilers and entirely new interior fittings for freight and passengers, and has already completed her maiden trip to this country, steaming, by the way, a good two knots better than her former speed of fourteen knots an hour.

ACCIDENT TO THE 10-INCH BROWN SEGMENTAL WIRE GUN.

Our readers will remember that the 10-inch segmental wire gun, which has been built for the United States army, was found on trial to possess too small a powder chamber for the grade of smokeless powder with which the government tests were being carried on, and that the weapon was returned to the makers for the necessary enlargement of the chamber. The change was made and the gun returned to Sandy Hook to complete its trials. In the first test, with a 575-pound projectile and a charge of 150 pounds of powder, a muzzle velocity of 2,230 feet per second was achieved, and apparently no damage had been done to the gun. In the next round the powder charge was raised to 175 pounds of ntiro-cellulose powder. When the gun was fired the overhang of the steel trunnion jacket at the breech was blown entirely away, carrying with it the breech mechanism. In spite of the fact that part of the energy of the explosion was expended in blowing a mass of metal weighing 2,000 pounds 200 feet to the rear, the projectile, gaged by the indicators, showed a muzzle velocity of 2,364 feet per second. The powder pressure in the chamber at the first shot was 28,700 pounds to the square inch, and it is reasonable to assume that had the breech not been blown away the contract velocity of 2,800 feet per second would have been secured. At the present writing it would seem that the failure does not affect the principle of the gun, which consists in building up the inner tube of overlapping steel plates and wrapping the tube with wire, until the desired initial compression of the tube is secured.

MARCONI TELEGRAPHY ON THE HIGH SEAS.

A recent successful exchange of messages between two vessels of the Cunard Line, when they were passing each other in mid-ocean at a distance estimated at from 50 to 70 miles, must have brought home to a great many of us, once more, a strong sense of the almost weird powers of wireless telegraphy. It furnishes another striking instance of how the wonders of yesterday become the commonplaces of to-day. We well remember, during the "America" Cup contests of two years ago, being in the chart room of the "Grande Duchesse" with Marconi, while the vessel was feeling her way down the Bay enveloped in a dense fog, and how, suddenly, the Morse repeater began to unwind its little strip of dot-and-dash messages, a visible evidence of the fact that fifteen miles away the Marconi operator on the Bennett-Mackay cableship outside Sandy Hook was asking us whether we were tangled up in the fog which he could see hanging over the Upper Bay.

It is all something of an old story now; yet we think the captains of these two ships must have felt just a touch of the old wonderment as they heard themselves accosted far out in mid-Atlantic. Yet, for all we can see, these are but the beginnings of wireless telegraphy.

GAS ENGINE PLANTS.

The use of gas engines in electric plants is one of the interesting features of a paper on "Gas Engines" read by M. Deschamps at the last Congress of Electric Station Syndicates. As early as 1886 the Dessau central station used two gas engines of 60 horse power, and in 1889 the Alimentation Exposition at Cologne was lighted by a dynamo driven by a 4-cylinder 100 horse power gas engine. At the present time a number of large plants are using gas engines. At first the engines were of small power, and in the early stations there was a great number of units and a wide variety of types used. Thus in the Kasan electric plant there are two engines of 50 horse power and six of 80, and in the Saint-Gall station are found one of 150 horse power, one of 100, two of 60, two of 30 and one of 25 horse power. At present the ideas have changed on this point, and stations are laid out on another plan. It is found advisable to have a series of engine and dynamo groups which have as nearly as possible the same power and the same type of machine, allowing the use of interchangeable parts. Thus at Brussels, an up-to-date station, there are six of such groups, of 120 horse power each, and at Valenciennes are installed four groups of 160 horse power. One of the most interesting of the modern stations is that of the city of Bâle, which has its water supply entirely furnished by gas engines, with great economy. This has been running since 1894 with great success, and the city of Bâle has lately decided to use gas engines for the city lighting station, with groups of two dynamos driven by a gas engine. The gas is furnished by generators, using low-grade gas, and piping connects with the city mains, which will be used in case of need. The station has already three such dynamo groups in operation, and is provided for future additions. This disposition renders it easy to vary the energy used according to the different hours of lighting. Another modern station is the Oerlikon plant, which uses monophase alternators in parallel. In this case two gas engines of 140 horse power are used to drive two alternators each.

THE NEW YORK CENTRAL TUNNEL.

The plans for the reconstruction of the New York Central Tunnel beneath Park Avenue, which were recently made public by the company, are distinctly disappointing; for the proposed remedy is, on the face of it, a mere makeshift. The steam locomotives are to be retained, and consequently the noxious gases that are poured forth from every passing train will continue to vitiate the tunnel atmosphere. The company's proposal is to remove the masonry partition walls which separate the two outside tracks from the inside express tracks, and substitute therefor two lines of steel columns. It is claimed that this alteration will permit the gases to escape directly from the engines using the outside track to the openings which already exist above the express tracks. It is true this may prove something of relief to trains that now use the side tunnels, but in just the exact proportion that the side tunnels are relieved, the condition of things will become worse in the center of the tunnel on the main tracks where, at present, in the heat of the summer, travel is scarcely endurable. There is only one way to solve this problem and that is to abolish coal-burning locomotives altogether, and substitute electric traction. The New York Central Company can find plenty of electrical engineers who are prepared to devise a system by which the tunnel, the terminal yard and the train-shed can be operated exclusively by electric power, and in view of the enormously valuable character of the franchises which New York city has granted to the New York Central Company, that corporation should not hesitate for a moment to incur the expense, admittedly large, of putting in an electric installation. The public will never be satisfied with anything short of this, for the reason that nothing less can meet the necessities of the case.

BALLOON AND AUTOMOBILE MATCH.

A rather novel match between a balloon and an automobile occurred not long ago in the neighborhood of Paris. The "Alliance," a balloon of 1,500 cubic yards, started from the gas-works at Reuil, in the suburbs, having on board Maurice Farman and Georges Leys, the well-known chauffeur. At the same time a 12-horse power Panhard automobile, piloted by Marcel Cohen, with four other persons, started to give chase to the balloon. It was thought at first that this would be an easy matter, but the balloon was carried about in so many different directions by the air-currents, that the pursuit became difficult. After covering a distance of 120 miles, the automobile party arrived at the station of La Brosse, but found that the balloon had landed there shortly before them and that the aeronauts had already taken the train for Paris, quite satisfied at having won the match.

RECENT AUTOMOBILE ACCIDENTS.

The frequency with which automobile accidents of a fatal or very serious character are happening is not to be attributed to increasing carelessness among automobilists, but rather to the fact that the pastime is growing in favor, and that with a rapid increase in the number of automobiles, we must look, as in the case of the bicycle, for an increasing chapter of accidents. Without implying that what follows has any special application to the recent accidents near Tuxedo or on Long Island, we wish to draw attention to the fact that a mere acquaintance with the management and control of an automobile under *normal* conditions, does not qualify the owner as an expert under all-round conditions. The mechanical manipulation of an automobile may be learned by any intelligent person, but there are to be considered a thousand-and-one contingencies arising from the accidents of wind and weather, the conditions of the road, as regards its grades, surface, curvature, etc., and also, and most important of all, there are the risks which arise from other traffic in city or country. All these external conditions of automobiling can only be fairly mastered as the result of lengthy experience. Thus, there is the most important question of the condition of the road surface as affecting the steering qualities of the machine. Unless he has been warned to guard against it, or has the good fortune to be an old bicycle rider, the inexperienced automobilist will get into trouble should he endeavor to make moderately sharp turns on wet asphalt, or on a hard road covered with mud of a thoroughly greasy consistency. In any good make of automobile the question of the strength of the parts has been so thoroughly worked out that it is probably a rare occurrence that accidents are attributable to structural weakness. In most cases they are probably due to the craze for extremely high speed which has taken possession, as it was bound to do, of the automobile world. America has entered into the lists of competition for the world's record in speed, and already we understand that a racing machine of the enormous capacity of 125 horse power and a guaranteed speed of 75 miles an hour is about to be built. The question arises what in the world is the owner going to do with this machine when he gets it. There are no roads in this country, not even on Long Island, where such a speed could be attained, except at enormous risk, and we very much question whether the tires of this heavy machine could stand the side-stresses involved in swinging around the ends of a mile trotting track at a gait which is only occasionally reached by the fast-