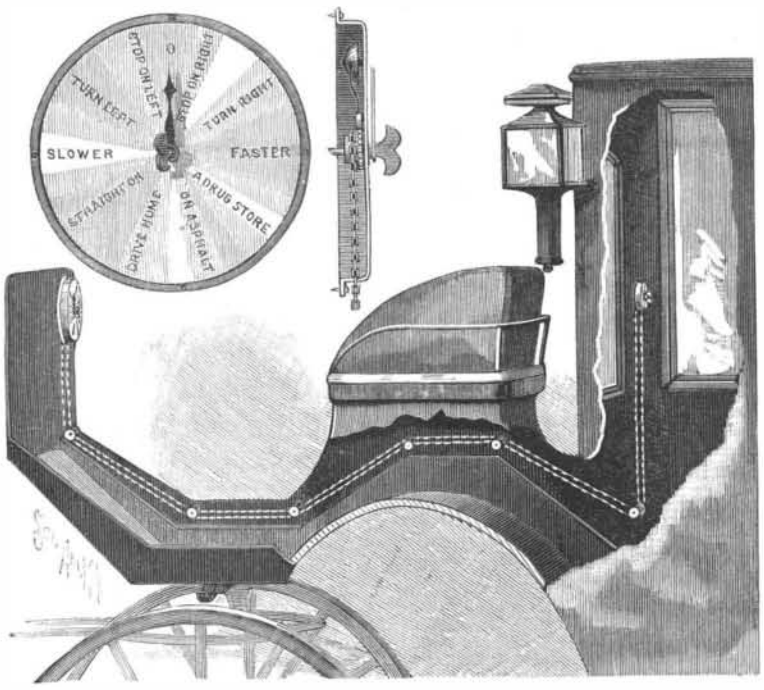
BLAKE'S CARRIAGE INDICATOR.

The difficulty of making the driver hear directions given from within a moving carriage when one is riding in a closed vehicle often causes no little inconvenience, to obviate which is the design of the improvement shown in the accompanying illustration. Attached to the dashboard, conspicuously in view of the driver, is a dial on which is marked a variety of the most usual directions, such as "stop on right," "stop on left," "slower," "faster," etc., as shown in one of the views, there being also on the face of the dial an indicating hand adapted to be moved by the occupant of the carriage to either of the special directions. The shaft on which is the indicator hand is moved by a sprocket chain, which extends downward and beneath the seat (as shown in the broken-away portion of the large view) to the central shaft of a similar dial within the carriage, provided with a thumb screw, whereby the shaft and the indicating hand may be turned to any desired point, such movement simultaneously turning the indicator of the dial on the dashboard to direct the driver. As the indicator hand is turned, a toothed wheel on the shaft of the outside dial, as shown in the sectional view, engages and tilts a dog operating a hammer which strikes a gong to attract the attention of the driver. To facilitate the use of the improvement at night, electric lamps may, if desired, be arranged to illuminate the dials, such lamps being connected with a suitable battery carried in a convenient place in the carriage and arranged to be connected up to light the lamps by the movement of one of the dial hands. In applying the improvement to different kinds of carriages the positions of the dials may be changed as desired, the operative connections being correspondingly arranged.



A CARRIAGE ATTACHMENT FOR SIGNALING THE DRIVER.

Further information relative to this improvement may be obtained of the patentee, Mr. Arthur M. Blake, Washington building, No. 1 Broadway, New York City.

Family Relations in Japan.

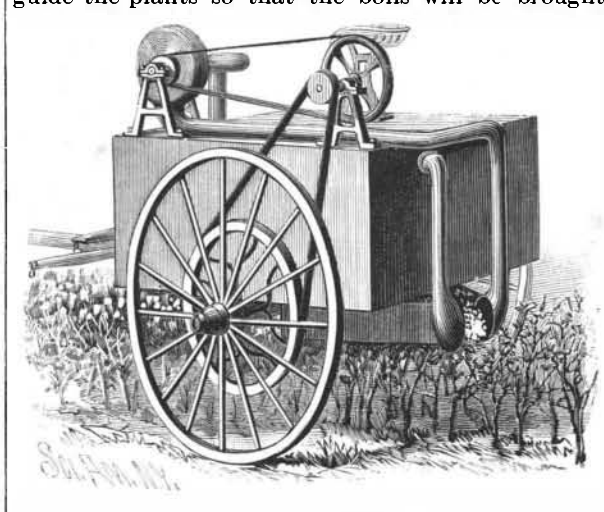
A meeting of the Japan Society was held recently in London, Sir E. J. Reed, M.P., presiding, when Diayoro Goh, the Chancellor of the Imperial Japanese Consulate-General in London, read a paper on "The Family Relations in Japan." The lecturer dwelt in commencing his paper upon the peculiarities of the religions and family systems in Japan, which he described at some length, and remarked that the ethics of the Japanese people were kept up in a great measure by domestic instruction. The family system was founded on love and reverence, as, indeed, was the case in Great Britain, and the only difference between the two countries in this respect was that it was carried out in different degrees. The Japanese reverenced their elders more than the English people did. Referring to the relations of the sexes, he stated that the inferior position of woman in Japan was due to the influence of the Chinese over a lengthened period. Dealing in detail with the relations between parents and children, he remarked upon the importance of the paternal powers and rights, and described the systems of child life and education, the arrangements in regard to marriage, and the laws relating to succession, divorce, and the settlement of family disputes. Amid much laughter, he stated that the mother-in-law in Japan was not the terror to the son-in-law as in this country, but the position was reversed, and the wife stood in extreme terror of her husband's mother. The most important duty of the parents was to find matrimonial companions for their sons and daughters, and the non-fulfillment of that duty was regarded as a disgrace both to the young people and to the parents. The Japanese children were brought up under a compound system of bitter and sweet, under which the father was supposed to be strict, while the mother was benevolent. In fact, according to the Japanese idea, one of the four terrible things in the world, three of which he described as earthquakes, thunderstorm, and conflagration, was the strict father. The lecturer finally alluded to the relations between brothers and sisters, husband and wife, and master and servant.

Diamonds at the Columbian Exposition.

A very complete diamond exhibit is made by Cape Colony, South Africa. The exhibit includes 10,000 carats of uncut stones, a large quantity of very fine cut and polished ones, together with all that is necessary to show the process of mining and washing. For this it has been necessary to transport to Chicago 100 tons of pulverized blue earth, 50 tons of unpulverized earth and a complete washing machine, which will be operated by natives. The exhibit will also include a unique collection of crocidolite and special diamondiferous products.

PNEUMATIC COTTON PICKER.

The illustration represents a machine designed to pick cotton by the simultaneous action of blast and suction pipes, whereby the bolls will be removed from the plants and conveyed through a tube to a cotton box on a vehicle. The improvement has been patented by Mr. Gustav A. Mauermann, of San Antonio, Texas. A blower driven by a belt from the vehicle axle draws the air from the interior of the cotton box, within which a partial vacuum is created, the mouth of the pipe leading from the box to the blower being protected by a screen to prevent the picked cotton from being drawn into the blower. A blastpipe from the blower extends rearward, terminating at a point about as high as the average cotton plant, and directly opposite the mouth of this pipe is a suction pipe leading into the rear end of the box, the space between the mouths of the two pipes being sufficient for the passage of the cotton plants. Suspended by hangers from the bottom of the box are rearwardly converging fenders, their ends reaching very close to the mouths of the pipes, and when the machine is drawn over the rows of cotton plants these fenders are designed to guide the plants so that the bolls will be brought within the powerful air current of the blast and suction pipes, whereby the cotton will be cleanly and rapidly picked and delivered into the box.



MAUERMANN'S COTTON PICKER.

THE 100 TON STEAM HAMMER AND THE LARGE ROLLING MILL OF THE ETAINGS WORKS.

We have already had occasion at various times to point out to our readers the continuous development and the incessant transformations that the *materiel* of large forges is undergoing in view of the preparation of military products. As well known, artillery is daily trying to increase the offensive power of its engines, the rapidity of fire of its guns and the penetration of its projectiles. On their side, military and naval engineering are improving the efficiency of defense by increasing the bulk and strength of the organs of protection that they are capable of opposing to an attack that is daily becoming more dangerous. In order to satisfy the exigencies of this ceaseless contest, the iron-working industry has had to make continuous modifications in its equipment, so as to put itself in shape to handle heavier and heavier ingots and the products of increasing dimensions that are now demanded of it.

We have at various times described the most important of these large tools, and we believe it of interest to return to the subject in calling attention to the recent setting in operation of two apparatus in the works of the Marrel Bros. at Etaings (near Rive-de-Gier), iron masters whose names are justly honored in the industry. We find herein a new proof of the incessant efforts of our great forges and of the continuous sacrifices that they do not hesitate to make in order to ever remain in a position to respond to the needs of the national defense in the preparation of

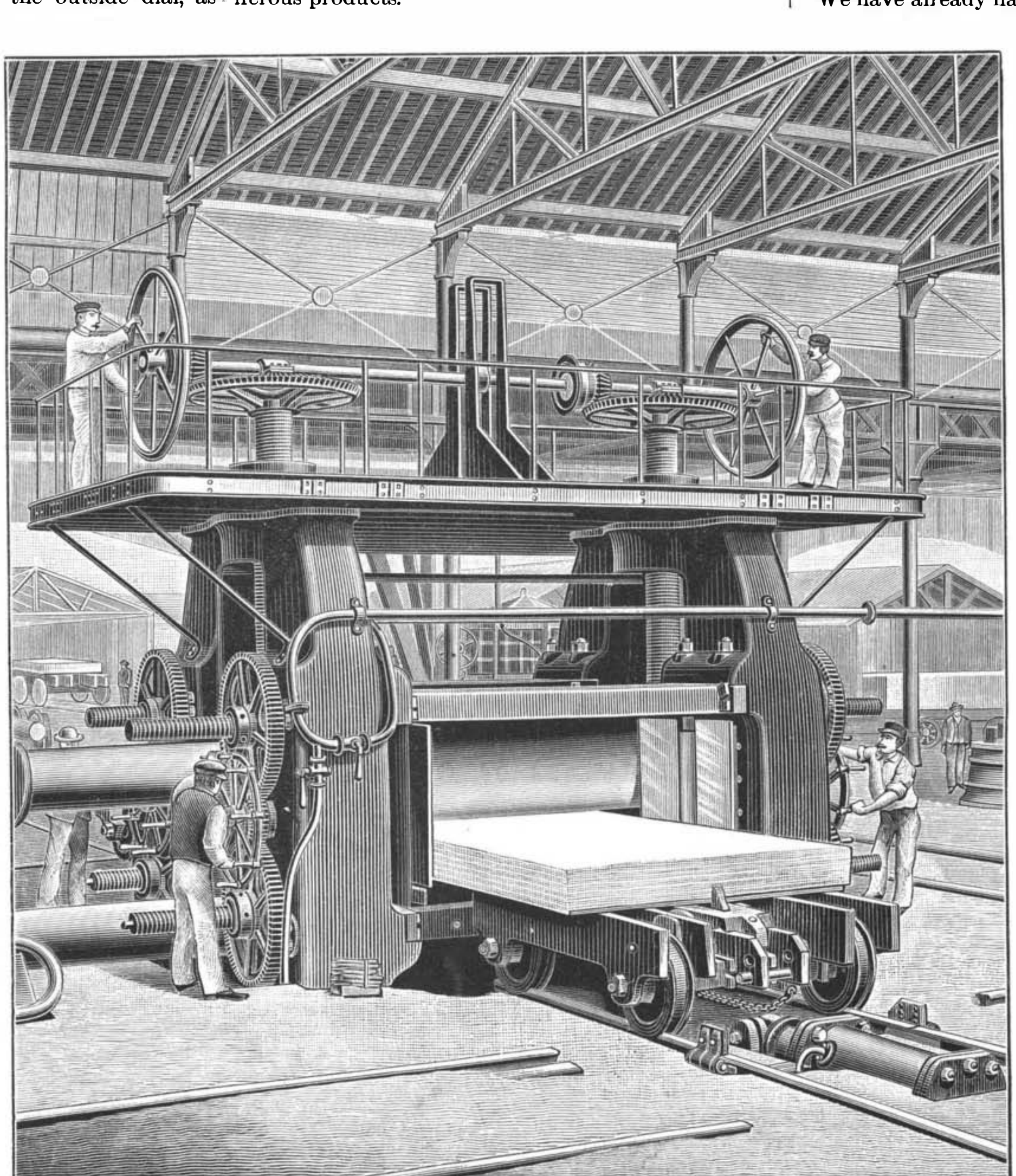


Fig. 1.—ROLLING MILL OF THE ETAINGS WORKS.

the military *materiel* that is destined to play so important a part in the contests that the future has in store for us.

The rolling mill and steam hammer of the Etaings works may both be cited as being among the most powerful of such apparatus now existing. These works, moreover, are provided with a 350-foot chimney, one of the highest that exist in France.

The armor plate rolling mill of the works, which was installed in 1868, has been transformed and enlarged since the month of February last. It is represented in Fig. 1 at the moment of the passage of a large armor plate that it has just finished.

The cylinders of this train, which weigh 66,000 lb. each, are 3·28 feet in diameter, with a table 10·8 feet in length. They are capable of flatting ingots and fagots of all thicknesses up to 4 feet. This apparatus thus permits of obtaining those large plates of 20 inches in thickness, and of a finished weight that often reaches 66,000 lb., that are now demanded for the armoring of ships. Laterally the apparatus includes two vertical cylinders 4·25 feet in height, that are capable of being moved toward each other in order to produce a certain pressure upon the narrow sides of the fagot during the flatting.

The movable journals of the cylinders rest in vertical guides which receive, in addition, the transmissions of motion. The vertical rollers, moreover, are arranged in these cages when it is desired to do the flatting through the whole extent of the horizontal cylinders. The weight of each of these cages is 94,600 lb.

In the figure may be seen the various transmissions of motion that permit of regulating the distance apart of the horizontal and vertical cylinders.

The Messrs. Marrel's large power hammer has a height of fall of 18·4 feet and a total weight of 100 tons. This apparatus possesses an energy of impact greater that that of any analogous hammer in France, and probably in Europe. It can be exceeded, we think, only by the hammer of the Bethlehem works of Pennsylvania, the weight of which is 120 tons, but the height of fall of which we do not know. The rolling mill, by reason of the great length of its cylinders, is capable of working pieces of larger dimensions than can be handled elsewhere. Fig. 2 gives a general view of the power hammer under consideration, as well as the vertical boilers of the reheating furnaces that supply this apparatus. There may be seen, besides, the large crane used in conjunction with it, and the power of which amounts to 180 tons, thus exceeding that of any other lifting apparatus hitherto constructed. At the same time an idea may be had of the huge proportions of this apparatus, the summit of which, situated at 62 feet above the floor, seems as it were to pierce the roofing of the large hall that gives it shelter, while, with its imposing mass, it dominates all the neighboring accessory apparatus, which themselves have had to have their size increased in order to proportion it to its own. It is in the spectacle of the maneuvers of this huge machine that may be especially admired the action of intelligence dominating brute force. This heavy mass obeys, in fact, an impulsion that is insensible in appearance, and one sees it violently strike the glowing ingot, which it works in projecting sparks that form a true aureola to it, while the floor trembles and everything is agitated around it, owing to the vibrations that it transmits. When the docile giant, ever guided by a hidden intelligence, wishes solely to give the last form to the piece that it has just shaped, one sees it descend gently, in restraining its force, in a measure, so as not to injure the metal, and only making the minor corrections that are to bring out the final contour with all its sharpness.

Such oppositeness of effects and such facility of regulation assume so much the more interest when it is a question of larger masses, the least movement of which seems destined to bring about irresistible shocks. The hammer rests upon an independent anvil block, which itself constitutes a colossal mass, for the total weight of this piece amounts to no less than 1,670,000 lb. This block is arranged in a trench formed to this effect between the beds of the uprights. It is placed upon a bed of oak resting upon courses of stone supported by the solid rock, so that it is capable of withstanding, without danger, the violent impacts of the 100 ton hammer. It is composed of blocks connected with each other by hoops and forming four courses, the three lower ones of which include pieces of 90 tons each. As for the upper course, that is in a single piece, the weight of which amounts to 125 tons.

The two uprights are in two pieces and are carried by cast iron plates firmly anchored in the masonry and cross-braced by strong cast iron pieces, so that the support is of absolute rigidity. The uprights are 35 feet in height and are cross-braced at the center by strong plates, and connected at the summit by an iron entablement upon which is placed the steam chest surmounted by the large cylinder that crowns the whole. The piston of the cylinder is connected with the hammer through a rod 15 inches in diameter. The piston itself has a diameter of 6¼ feet and a stroke of 18·4 feet. The mass of the metallic colossus thus constituted represents a weight of no less than 2,970,000 lb. In the figure may be seen the arrangement of the hall, with the central lantern and the two trusses that consolidate the hammer. The span of this hall is 85 feet.—*La Nature.*

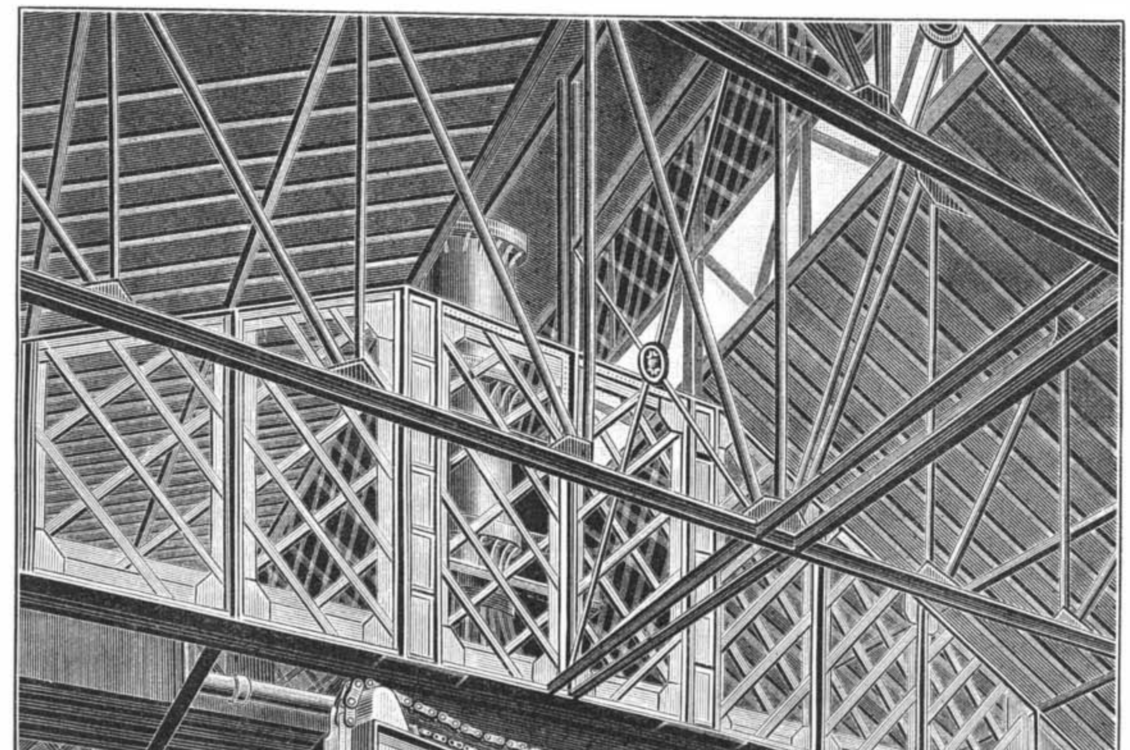


Fig. 2.—POWER HAMMER OF THE ETAINGS WORKS.

Engineering in Mexico.

At a recent meeting of the Engineers' Club of Philadelphia, President Birkinbine referred to some of the engineering features which impressed themselves upon him during a recent trip in Mexico, and contrasted the journey which he made by railroad and in sleeping cars with one covering a portion of the same territory made eleven years ago in diligencias and on horseback, noting the improvements made, but calling attention to the tenacity with which older methods and appliances are still adhered to. He referred to the difficulty of locating and constructing railroads in a country where the supplies, and even the water, had to be carried long distances, and instanced the necessity at present of some of the railroads attaching one or two tank cars of water behind the locomotive tender, so as to cross waterless plains of one hundred miles or more.

He gave a table of the different elevations of the 6,831 miles of railroad in the republic of Mexico, which showed that three-fourths of the entire railroad mileage in Mexico is at elevations greater than are reached by any of our Pennsylvania railroads. About one-half is above a level of 5,000 feet above tide and one-half below that height. Of the higher portion, some 200 miles of the tracks are laid from 8,000 to slightly over 10,000 feet above sea level.

He described the general alignment and profiles of the various railroads, and illustrated this by diagram; referred to the difficulties of construction and cost of some of the roads, and laid stress upon the liberal use of metal sleepers, which meet with favor from engineers, managers, and contractors. He also discussed the measures which had been taken in former times to drain the city of Mexico, and referred to the present canal and tunnel, the former requiring the handling of 12,000,000 cubic meters of earth.

After discussing the existing conditions in Mexico, which lead many investors astray, namely, the cheap labor and high cost of fuel, reference was made to the numerous important aqueducts and the possibilities of irrigation being carried on upon a liberal scale by the erection of large dams on the mountains. The publication of an engineering periodical in Mexico by a former Philadelphian, the National Engineering College and its curriculum were mentioned, and incidental reference was made to the large number of meteorites which have been discovered in Mexico, some of them of enormous size. One mass of meteoric iron now at the museum of the college is in two parts, the pieces weighing together about twenty-five tons.

The address was illustrated by diagrams and by lantern slides, showing some of the engineering structures, crude methods of handling used by natives, and closed with some picturesque views of the mountains and of the growth of and manipulation of "pulque."

IN the British Patent Office, where of all places in the world one would expect to find things ordinarily well "up to date," the steel pen is unknown, and the antediluvian goose-quill supreme.