

**BARROW-IN-FURNESS (ENGLAND) AND ITS FOUNDER.**

The rapid rise of Barrow-in-Furness, on the east coast of Lancashire, England, from a little fishing village to a port, a commercial and manufacturing town, and the center of an iron-making district of enormous wealth and prosperity, has been already described on page 22 of our volume XXX. Barrow has recently been the scene of the annual meeting of the Iron and Steel Institute; and it is seen that, even since our recent account of its industries, many important extensions and improvements have been made.

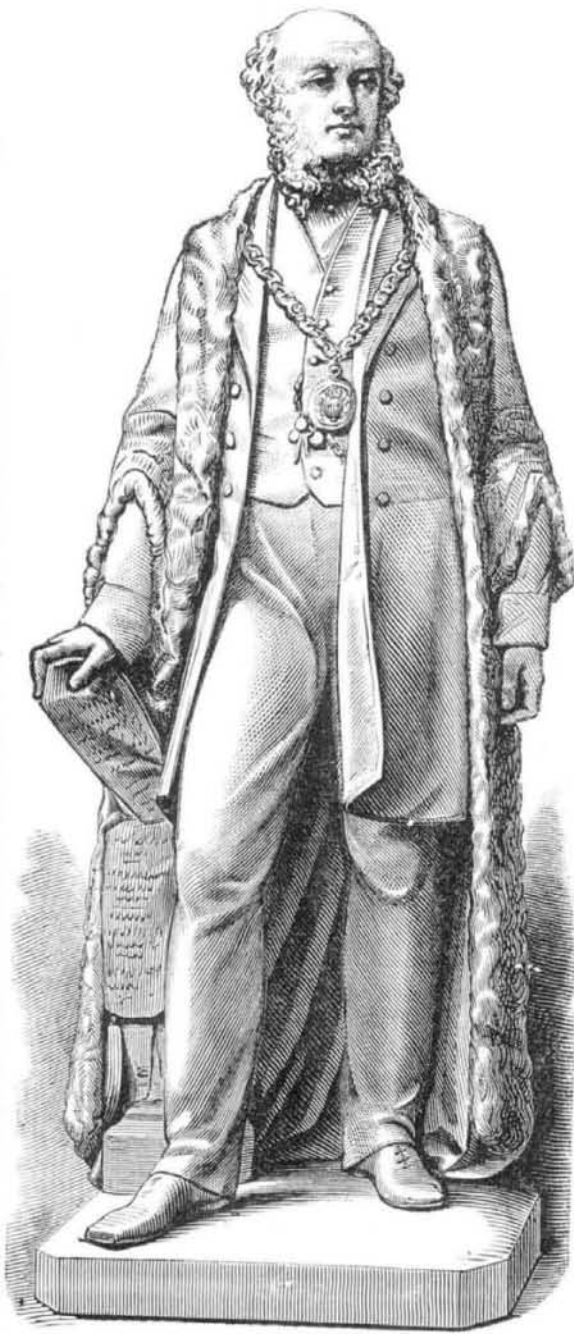
The iron business at Barrow has undoubtedly been called into existence by Mr. Bessemer's renowned invention, for which the Cumberland hematite ores are especially adapted. The wealth of two mighty landowners has been brought into the trade, but the brain and soul of the enterprize (for its various manufactures must be looked upon as one) has been James Ramsden, the manager of the local railroad, who projected the Barrow Steel Company, enlisted the necessary capital in the cause till its works became the largest Bessemer refinery in the world, constructed the docks, brought the jute manufactory into operation to employ the females of the ironworkers' families, and remained, throughout, the central figure of the busy scene. More than two years ago, Mr. Ramsden became Sir James, the Queen having knighted him in recognition of his services to manufacturing industry. He became Mayor of Barrow; and during his year of office, his fellow townsmen commissioned an eminent sculptor to execute a statue of him, in his robes of state. The statue (of which we publish an excellent representation) is of bronze, and is 11 feet high. At the same time, a portrait of the same gentleman was hung in the town hall.

One of the most flourishing enterprizes at Barrow is the yard of the Barrow Iron Shipbuilding Company. The works are arranged for the construction of fifteen vessels at one time, and a large graving dock is completed. Two thousand men are employed here, and the full force of the works will number seven thousand. An ocean steamship company is already incorporated, and six steamers of 4,000 tons each are being built for it; five more of similar size for the East Indian trade, are contracted for by the company. The extent of the shipbuilding works and yards, and their proximity to the ocean and to the railroads, are well shown in the excellent engraving (from the London *Graphic*) published herewith.

**The Early Days of Daguerrotyping.**

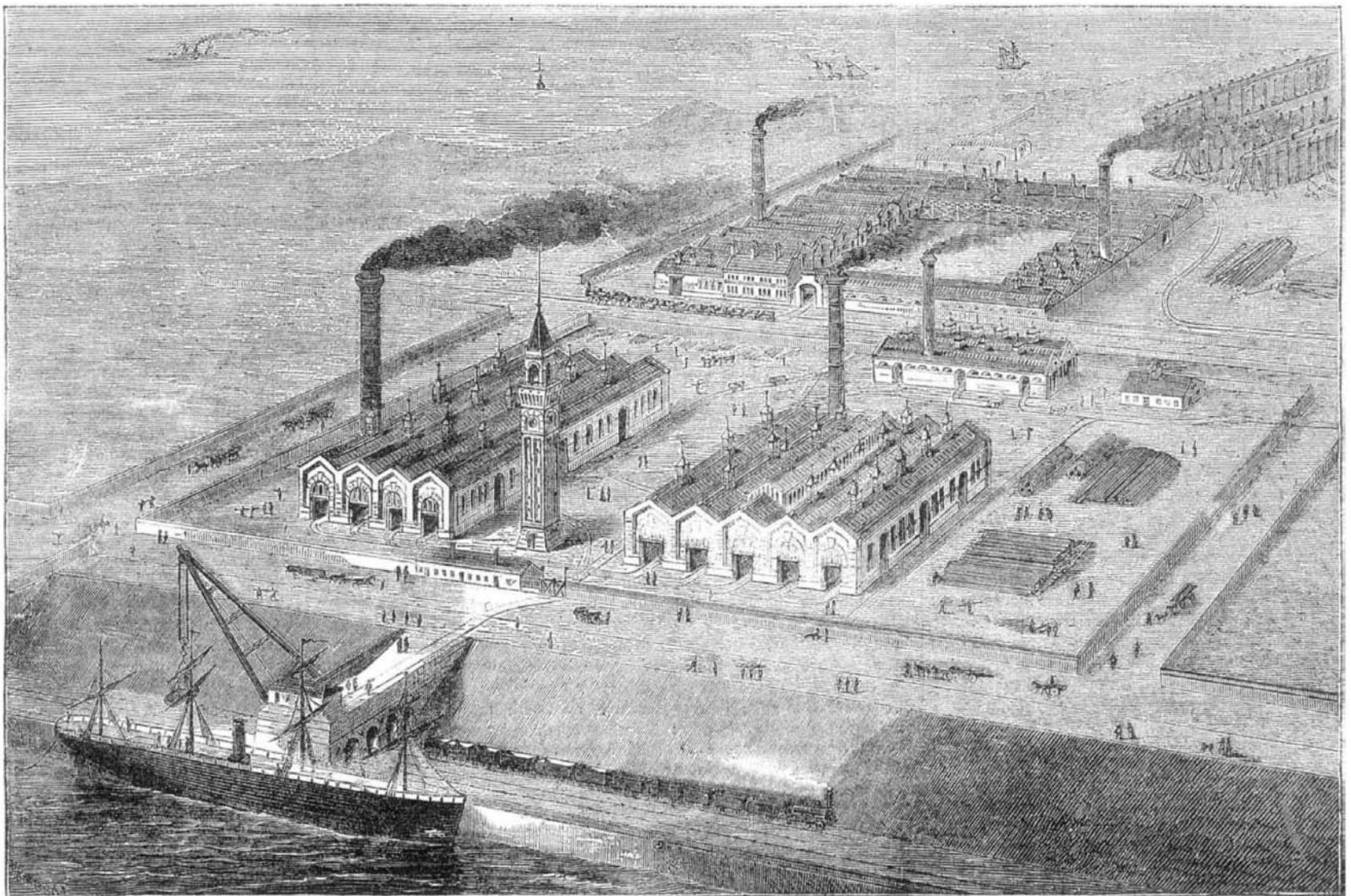
The following amusing account of the early practice of taking sun pictures (from the pen of Mr. M. P. Simons, in Anthony's *Photographic Bulletin*) will doubtless bring to mind the similar experiences of some of our readers:

"I will give, as they occur to me, a few thoughts and incidents touching the early days of daguerreotyping. Whilst Daguerre was still in his laboratory working out his magic picture-making process, almost every mail from Paris brought over something of this mystery of mysteries, which was soon translated and studied out by the curious experimenters attracted by its novelty. No one after seeing the first



STATUE OF SIR JAMES RAMSDEN.

of these smoke-like pictures could possibly have anticipated that Daguerre's process would ever reach the dignity of an art. The process was then, of course, still an undeveloped mystery; and then for some cause or other the published accounts of it received were not clear nor definite, and, as a matter of course, those who took hold of it in its early stage had a good deal to contend with, being obliged to fill in and work up a picture (so to speak) from indistinct outlines. Ah! those were the days of trials and many tryings of contingencies, of slow iodine, slow cameras, and consequently long sittings; when an artist might very easily have taken his dinner while his sitter was sweating out a picture in the sun. This, then, should have been called "long" as well as "high" art. Few were able to sit long to be "taken off" quietly, and fewer still could go through the mysterious operation without receiving a bunged eye or having some other feature knocked into a condition not the most flattering to be handed down as one's facsimile. But these long, tedious, distorting sittings are now past, thanks to sensitive bromine and the science of optics. Long before I ever thought of becoming an artist, I recollect hearing one day that some one in the city was making a very curious kind of likeness, described to me as being on looking glass or steel, and very true to life. My curiosity soon led me to the mystic establishment of Mr. Cornelius to see these marvelous mirrors of Nature. The first one I took in my hand to examine must have had an electric effect upon me. I was perfectly amazed, and for the time being completely entranced with their odd and novel appearance. I could not imagine how under, or rather how in the sun they were made without hands or pencil. It seemed to me the very height of jugglery, throwing likenesses from the face and catching them upon polished plates. It was a mystery then; how much less of a mystery is it now? A few years later, while I was preparing to go in to the art business myself, in connection with "Old Sol" as a silent partner to do the light work, Mr. Langenheim was busy fitting up for the same purpose his *atelier* in the Philadelphia Exchange, which he did in good style for that early day. His fittings up, art appurtenances, and furniture were useful and comfortable. But the most important of all was that the lenses he used were the best that had yet made their appearance. Mr. Voigtlander, of Vienna, had just introduced his celebrated lens, and had constituted Mr. Langenheim, his brother-in-law, sole agent for this country. This gave Mr. L. quite a start and a decided advantage over his contemporaries. I at once saw that he was getting ahead of me fast, much faster than suited my youthful aspirations: so one day I took it into my head to make him a professional visit to ascertain if possible the cause of his great success, for up to that time I was not aware of there being any difference whatever in the quality of lenses. I supposed (as the most of our patrons did, and, it would seem, some do still) that the whole thing depended entirely upon the sun, ignoring skill and quality of tools as mere moonshine. I found Mr. L. quite busy making better pictures, and in much shorter sittings, with his quarter size Voigtlander than I was able to do with my half size Plumb. My second visit



THE WORKS OF THE BARROW-IN-FURNESS IRON SHIPBUILDING COMPANY.

to the rooms of Mr. L.; a few months later still, was on a dark, rainy afternoon. I found him this time without sitters, though as busy as ever in that mysterious "no admission room," finishing up his day's work and preparing for the next. This suited very well, as it gave me a fine opportunity to scrutinize more carefully his little lens, without being in anybody's way. There were quite a large number of these tubes and lenses of the different sizes, as they are usually gotten up, lying about on shelves and tables, waiting for lucky purchases. But the one Mr. L. himself used interested me the most of all; it was tube, lens, and camera box combined, done up in brass, and reminded one of a small telescope—the only one of this description I have ever seen—and although, as it appears, not a success, it was to my notion a perfect beauty from head to foot, and I fell dead in love with it at first sight. No child ever looked with more covetous eyes at toys in the shop windows than I did at this unique, brass-clad camera. The price of it was not extravagantly high either; yet I could only look at it, wishing all the while it were mine. I never in the whole course of my life felt so much the real want of the wherewithal as then, nor so effectually broke the tenth commandment. I left the Exchange that day with a heavy heart, though with a fixed determination to have without delay a Voigtlander lens, even if I had to sell my almost anything I possessed; and I went to work with renewed energy to that end, which was soon accomplished. Our business in those days did not fortunately lie altogether in making faces, but also (as you are aware) in teaching others how to make them, or how to spoil them (whichever is the most proper.) Of this sort of thing I already had my hands full, and it now steadily increased. I frequently have had under my own special care at one time six or eight young and old aspirants to high art, some rubbing or scratching away at plates, some polishing and coating, while others were sitting as patient models to those more advanced in the mysteries of the art. This state of things kept going on until I at length became quite alarmed, fearing that the art I had adopted as a profession would soon be completely ruined by too much competition, and in order to check it a little I advanced my terms for tuition. But this, strange to say, had the contrary effect. My valuable instructions, as it seemed, were appreciated according to the price I put upon them, for they flocked in upon me thicker and faster than ever (let those who think to increase their business by making cheap pictures take a hint from this). Here was a dilemma for me, and how to get out of it I did not know. I was afraid to raise my price again for fear it would have the same effect, and I had no room for any more. I often look back to those dark, foggy days of the art, when the teacher not infrequently was in turn taught by his pupil, and wonder how we made out so well as we did, for it was certainly "the blind leading the blind" over again. We stumbled and fumbled more over our dark experiments than we ever did in our dark room, and yet with our feeble assistance a great many managed to grope their way into the art, who in a little while made for themselves no ordinary name in the profession. But then there were also many others who promised much and performed but little. It was quite amusing to see the big worded signs that were so plentifully swung out about the city by these freshly made artists. I will here give a description of one which will answer for the most of them: "John Smith, artist, daguerreotyping taught, and improved apparatus for sale. N. B.—Likenesses taken in cloudy weather." This last was useless information for anybody who had ever seen John's pictures hanging at his door, for they were all more suggestive of clouds than of anything else. John was one of my promising young pupils. It had been but a few weeks since he had left the profession of dentistry to woo the sun, preferring drawing faces to drawing teeth. On some of these signs was the following liberal invitation: "Free exhibition; walk up"—but they didn't say how high up which I suppose was on account of their extreme modesty; they would rather that their patrons should find out for themselves how high their art was, though they should lose their breath in the effort of reaching it. These few casual incidents and recollections of the art, occurring under my own notice, and although not by any means a complete picture of the times, but only a sketch and, as the artists say, merely rubbed in with neutral colors, may still serve to give some little idea of the Daguerrean art and its pioneer profession, prior to the year 1842. At that period or thereabouts the art received a new value by the timely discovery of the gilding process, which gave to the daguerrotype a rich golden tinge, and, as we now well know, an unquestioned permanence, falsifying all prophecies to the contrary. This was an auspicious era in the daguerrotype art, and thenceforward it made greater advances than ever towards the perfection to which it ultimately attained. Between the years 1844 and '54 there were a great many most excellent daguerrotypes made—I think (I hope I may be excused for thinking so) that I made some few myself, and have only to refer to my early patrons to prove that I also got off many that were poor; I rather suspect that they were too Rembrandtish for the time. I often think of my first sitters with of pleasure and sorrow: sorrow that I was compelled to sit many of them so often to so little purpose (artistically speaking), and pleasure because they were such patient sitters, ever ready to make allowance for the many failures incident to this bewildering, soul-stirring process; and if such a thing were at all possible, I would gladly retake many of them, as a sort of conscience-soother, not that their pictures were so far below the then average, but because the then average was so low. But alas! this cannot be. My old register reminds me that most of them are now, like the old camera I then used, laid by in the dust."

## THE FRANKLIN INSTITUTE EXHIBITION.

No. I.

If the measure of the success of the approaching Centennial is at all to be gaged by that which has been achieved by the Exhibition now open in Philadelphia, the impossibility of its failure is assured. A single city, representing but a fractional part of the nation's manufacturing powers, has produced an exhibition of which the country at large may well be proud. The same has been done in a number of other cities throughout the country. Any single one of the most successful of them might fairly be taken as representative of the characteristic industries of our land. What then may we not fairly expect when the combined wealth of all sections of the country is collected in the huge exhibition grounds at Fairmount, and contrasted with the products of the entire civilized world?

On the 14th of September the Franklin Institute, having obtained the temporary occupancy of the immense building at Thirteenth and Market streets, formerly occupied as a freight depot by the Pennsylvania Railroad Company, opened an exhibition of arts, manufactures, and machinery. Notwithstanding the openly expressed fears of the timid, the energy and good sense of the managers succeeded in transforming the previously unsightly building into one of the most convenient and beautiful temporary exhibition halls ever occupied in the city. The full confidence which the managers had in its success was shown in the liberal expenditures that were incurred in order to make the buildings not only suitable for the Exhibition, but also beautiful and attractive to the visitors. At first the size of the building, covering, as it does, over two acres of ground, led to the belief among the less prudent that ample space could be obtained up to the time of opening. Too late, however, have they discovered their mistake. The applications came in so rapidly that soon all available room was appropriated, and at the present time over five hundred applications have been rejected for want of space.

Those who recollect the Exhibition building only as a freight depot would be surprised at the marvelous change that has been effected in so short a time. Entering at the main door on Market street, the visitor finds himself in a broad aisle, the roofing of which is gaily decorated with flags of all nations. The exhibits or gas fixtures and chandeliers, which occupy the two extremities of this aisle, add much to the general effect of the decoration. At night, when all two thousand odd lights are burning, the general effect is exceedingly fine. The entire right hand side of the building, occupying rather more than half its area, is devoted to the exhibition of machinery in motion. Two lines of shafting of 2 $\frac{1}{8}$  inches diameter supply the requisite power. One line is driven at the speed of 120, and the other at 240, revolutions per minute. The inconvenience often experienced at former exhibitions in regard to a want of uniformity of motion has been obviated by all the driving pulleys being supplied by the Institute. The steam power is furnished by the various boilers that are on exhibition, of which there are quite a number. At the extreme southeast corner of the Exhibition, a large leaden tank has been erected to hold the water for a full exhibit of steam and other pumps, which are all in active working. The left hand side of the building is devoted to the exhibition of household goods, philosophical instruments, drugs, dyestuffs, and chemicals, fine arts, printing establishments, sewing machines, carpets, fancy goods, mantels, carriages, and hosts of other articles. Steam heaters, stoves, and ranges occupy the extreme northeast corner of the building.

Having now obtained some idea of the ground plan of the building, we will now examine in detail some of the most interesting features of the Exhibition. As it will be impossible, in the necessarily restricted limits of a single letter, to describe all the exhibits, we will select here and there those which we believe will be the most interesting to the general run of our readers.

Beyond all doubt the feature of the Franklin Institute is the machinery. This fairly outstrips all other classes of exhibits. Nor should this occasion surprise. Not only is the Institute mainly designed for the promotion of the mechanic arts, but Philadelphia is unquestionably one of the centers of the country for the production of machinery and machine tools. In this way, then, has been produced the finest exhibition of machinery in motion ever shown in Philadelphia, perhaps in America.

The steam boilers are all placed on the ground floor, some dozen odd feet below the general level of the Exhibition floor. In the space thus appropriated are collected some of the most interesting features of the Exhibition. The Pennsylvania Diamond Drill Company have on exhibition one of the Leschot diamond-pointed steam drills. The drill of the one exhibited contains ten diamonds, and bores a two inch hole through marble at the rate of one foot in sixty seconds; through sandstone, at the rate of one foot in fifty-five seconds. The actual working of the drill always attracts crowds of the curious. The following important advantages are claimed for this drill over the ordinary steel drill, driven either by hand or steam power: The diamond drill, furnishing as it does a solid core of the rock penetrated, is of great value in prospecting mineral or other lands, since it brings up an actual section of the strata. In this way a far more accurate idea of the nature of the rock is obtained than when it is brought up either broken or pulverized, as in the ordinary methods. This feature gives the drill great advantages over all others for coal and mineral lands. The drill is also well adapted for the boring of artesian wells. The bore is round and true, and will admit of the introduction of a tube nearly as broad as the hole itself. A nine inch hole, 357 feet

deep, has been successfully bored for the Wilkesbarre Coal Company, in the Empire mine.

## THE HYDRAULIC BRAKE.

Nearly opposite the diamond drill is a large working model of the McBride hydraulic brake. Ordinary sized car wheels are run at a rapid rate by belting, and stopped at will by the application of the brake. The principal advantages claimed are simplicity and hence diminished cost, and general efficacy, the brake being very powerful. The power is taken directly from the boiler. Under each car is placed a cast iron cylinder of suitable size, furnished with a piston, to the rod of which the brake levers are attached. To prevent the freezing of the water in the brake cylinders and pipes, mixtures of glycerin and water are employed, the relative proportions of the two being determined by the severity of the climate of the country through which the road runs. The cost of rendering the water non-freezing is comparatively slight, since but a small quantity of the glycerin is required: and when the pipes, etc., are once filled, no more is required except in case of accident or leakage. A peculiar feature of the brake is the almost instantaneous transmission of the power and its undiminished efficacy at the end of a long train. The very slight compressibility of water allows the same force to be applied to the last car of a long train as is applied directly to the car in connection with the engine. No other limit can be found to the number of cars the brake can thus stop, except the power of the locomotive to draw them. Since the power employed to work the brake is derived from the steam pressure against the water in the boiler, the locomotive boiler being tapped below the water line, the power is not actually less. During the operation of the brake, the gage does not indicate the loss of as much as half a pound of steam. We understand that the hydraulic brake is in successful operation on the West Chester road.

## THE BOILERS.

In this portion of the Exhibition building, as we have already mentioned, are the boilers which furnish the steam for the various engines. Among a number of others we notice the following, namely: Shearman's improved upright tubular boiler, which claims as its distinctive features economy of fuel and space, cleanliness, convenience, safety, and cheapness. It claims to produce one horse power with twelve square feet of heating surface.

The well known Harrison steam generator is represented by a large boiler. The advantages of this form of generator, as our readers are probably aware, are security from destructive explosions and economy of fuel. A combination of cast iron hollow spheres, each eight inches outside diameter, and connected together by curved necks, with rebate machine-made joints, are held together with wrought iron bolts with caps at the ends. Each boiler is tested up to 300 pounds to the square inch by hydraulic pressure. The safety of the boiler is to be found in the number of joints that can give, in case the pressure of the steam becomes too great; while at the same time, the mode of connection of the hollow spheres of cast iron allows of great pressure without leakage. Experiments have been made in which a pressure of 850 pounds per square inch failed to rupture the boiler or start the joints. This boiler gets up steam quickly and can furnish superheated steam without the addition of extra apparatus. The number of small parts of which it is constructed offers great facilities for transportation and erection, no large opening being required for the introduction of the boilers. The largest can be put through an opening one foot square, when desired.

The Wiegand patent safety sectional steam generator also exhibits a large working boiler. The peculiar advantages it possesses are safety from dangerous explosions, economy of fuel, and a rapid generation of steam. The practical test for the efficiency of the boilers is to be found in the fact that they are now in use by a number of large manufacturing establishments throughout the country who know the requirements of a good steam generator, and who would not permit a poor instrument to remain in their works. With an hourly consumption of ten pounds of coal per square foot of grate surface, the area of which is 22 square feet, an hourly evaporation of 117.8 pounds of water is effected for every square foot of grate surface. The total evaporating power of one pound of coal equals 11.22 pounds of water. The Aetna grate bars are attached to this boiler, and apparently give general satisfaction. It is exhibited by Mosely & Metzgar.

The Keystone Portable Forge Company have an excellent display of portable and stationary forges, either for hand or power. They also exhibit their rotary positive pressure blowers, which they claim to be the most powerful blowers known. Lovegrove & Co. have a fine display of gages, etc.

## THE STEAM HAMMERS.

Quite a lively effect is produced in the basement by the working of the steam hammers, one exhibited by W. Bement & Son, and the other by Wm. Sellers & Co. The latter is peculiarly light and graceful in appearance, when its power is taken into consideration. It is the old "Morrison steam hammer," with a number of improvements which the Messrs. Sellers have since added. The hammer is formed of a long bar of wrought iron to which the piston is welded, forming, in fact, a part of the piston itself. No side guides are employed, the bar being guided by the top and bottom cylinder heads only. The advantage thus gained is apparent. The entire space below the cylinder is free, and the workmen is enabled to handle his work more effectually than when two of the sides are occupied. At the same time the hammer head and die are more effectually guided