

men of high scientific attainment, and the works under their management present a perfection of plan and an elaboration of mechanical appliances not to be found in any other similar manufactories in the world. The foundry in the Elswick Works (Sir W. Armstrong's) is regarded as the most perfect in Europe. The cranes for lifting heavy work are operated solely by hydrostatic power, and a boy stationed at a lever controls their action perfectly. Another remarkable peculiarity is the large steam hammer, weighing 10 tons, but which, by having the steam admitted over the piston, can give a blow of 65 tons, the heaviest of any in use in Europe, except perhaps, at the great steel works of Herr Krupp, in Russia. Under this ponderous instrument the famous Armstrong guns are welded. Experiments were some time since made here with the object of heating iron by gas, which would prevent the deleterious action of sulphur, always contained in coal. The subject is an important one, but we don't know the result of the trials.

The establishment of Messrs. Whitworth is, par excellence, the tool factory of Europe. The machinery is of the best description, and contains many peculiar and very ingenious tools invented by Mr. Whitworth or his workmen. The guns of this celebrated mechanic now rival closely those of Sir William Armstrong, and a long series of trials have closed in almost a "dead heat."

THE FAIR OF THE AMERICAN INSTITUTE.

On revisiting the Fair, this week, we found many things worth looking at, some of which we shall give a brief notice of.

APPARATUS FOR THE RUSSIAN TELEGRAPH.

In the southwest corner of the building may be seen a sample of the instruments that are to be used by the Collins Russian telegraph line, 75 sets of which have been manufactured in this city. The instruments are fixed in a box, which is quickly converted into a table by screwing on the four legs at the corners. For transportation, two of the boxes are fastened together in one package; and when these reach the station the operator has merely to screw on the legs and connect the proper wires with the air and ground lines, when he is ready to receive and transmit messages. The manufacturers expect orders for an additional supply of these instruments, as some 200 or 300 will be required for the whole line.

BESSEMER STEEL.

Messrs. Winslow, Griswold & Holley, of Troy, N. Y., exhibit Bessemer steel in various forms—in rails, cross heads, connecting rods for marine engines, boiler plates with flanges turned to show the endurance of the metal, crank pins, bolts with knots tied in them; in fact, all conceivable shapes.

This steel is exceedingly fine grained in texture, and closely approaches the finest cast steel known to general machine work. A chipping chisel made from it was tried by us, and stood very well, although it is not recommended for tools. The flanged boiler plate has the advantage of being much lighter for the same strength of boiler, and also a greater facility for the transmission of heat, by reason of its thinness. Some of the specimens of flange turning were not only interesting as examples of the quality of the metal, but also for the good workmanship displayed. One three-sided aperture, about twelve inches long on each angle, had a flange turned around it as neatly and as square as if cast in a flask.

This steel will effect a great revolution in the proportions and weight of machines if properly applied. Among other curious examples of its toughness and tenacity a car axle bent double, cold, is shown.

GAYLOR'S COUPLING.

The American Coupling Co. exhibit a neat and useful coupling for hose or pipe, which can be connected or detached in a few seconds. It is perfectly airtight, is used on steam or water, and is highly appreciated by those who use it. No. 33 Dey street, New York.

BEACH'S DRILL CHUCK.

This is one of those instruments which the introduction of twist drills has rendered indispensable. It is a highly-finished tool, is made of steel, and will take any-sized drill, from three-eighths to nothing at all; one of them will last a life time. It has three

steel jaws in it, which move to and from the center by being forced against inclined planes by a screw in the end. By catching hold of the chuck as it revolves, the jaws can be screwed tightly so as to hold against any common work. An engraving of this chuck is all ready for publication in the SCIENTIFIC AMERICAN. All sizes, from five-eighths to three-sixteenths, made by Clark Brothers, West Meriden, Conn.

WEBSTER'S WRENCH.

This is a most convenient little instrument. It is an ordinary screw wrench, with a socket outside the lower jaw. A tool fits this square socket, and is fed up by screwing on the nut that ordinarily changes the size of the wrench. For cutting off gas pipe, holding a round bolt, or screwing up pipe, it is just the thing. The wide range this tool has gives it a great advantage over the ordinary pipe tongs. The wrenches are made purposely for the admission of the patentable portion. Webster & Co., No. 17 Dey street, New York.

MURDOCH'S STAVE SAWER.

This machine is on exhibition at the Fair, and saws two staves at once, by a saw arranged like a crown gear, except that the teeth are on the lower side. The saw runs horizontally, and seems capable of doing excellent work. The saw also acts as a plane, and leaves a neat finish on the stave.

ART ROOM.

The display of art works is not very extensive. There are a few paintings, but none of distinguished excellence.

The show of photographic pictures is meager, but the specimens furnished are for the most part good.

Rockwood & Co. present some very fine and large architectural and mechanical views. Their prints of locomotives are superb.

Williamson, of Brooklyn, shows some excellent life-size portraits.

Gurney & Son exhibit a variety of excellent portrait specimens, among which is a splendid group of military officers—Gen. Dix and others.

Gutenkunst, of Philadelphia, has a fine collection of card portraits of marked superiority, with specimens of porcelain pictures that are truly beautiful. A splendid picture of Gen. Grant graces this collection.

S. A. Holmes, of New York, exhibits a fine collection of large out-door views—public buildings, Niagara, Central Park, and a series of oil-region pictures. All the mysteries of boring, pumping and tanking petroleum are here to be seen in perfection.

Messrs. Anthony present a number of fine Worthleytype prints. This process has been lately patented in the United States. The paper is covered with collodion containing salts of uranium and silver, and then printed. We have before fully described the process.

ROTATING BELLS.

Mr. Harrison, of the American Bell Co., has a number of their composition bells, with his attachment for causing them to rotate as they are swung. The bell is hung loosely upon a round bolt, which is surrounded by a spur wheel made fast to the bell; this wheel communicates by a simple train of gears to a lever on one side, which is actuated by a cam as the bell swings, and which turns the gears by means of a pawl and ratchet wheel. The object of rotating the bell is to prevent it from being broken by the continuous pounding of the tongue in one place. Mr. Harrison says that this is the most common cause of the cracking of bells, and that giving them a very slow rotation prolongs their durability indefinitely.

THE AMERICAN BARREL MACHINE.

This company exhibit some barrels, made by their patent machinery, which are very handsome specimens of workmanship. The machines consist of an apparatus for compressing the stave so that it takes a permanent "set" in the shape desired, and also in another machine, whereby the staves are jointed and finished. The barrels are subsequently set up by hand. Flour barrels made by this process are very tight. We were informed that, of a mixed shipment of flour to Cuba, in hand and machine-made barrels, the former were subjected to six or eight cents reclamation for short weight, while the machine-made barrels lost nothing. Thomas Richardson, No. 68 Broadway, is the agent.

IMPROVED ELECTRO-MAGNET.

Samuel F. Day, of Ballston Spa, New York, exhibits an electro-magnet, which he claims to be an improvement over any at present in use. Mr. Day has made hundreds of experiments with various forms of electro-magnets, and he says these have led to the discovery that the nature and action of the residual magnetism remaining, after breaking the circuit, is modified by the proportions of the magnet; in long and slender spools the scope of its power extends much further from the pole than in short thick spools. As the armature must be adjusted beyond the reach of the residual magnetism, any arrangement by which the power of this is circumscribed, is of great service in operating a telegraph. Mr. Day, therefore, makes his spools very short and of large diameter, the exact proportions having been determined by his numerous experiments.

A CHEAP FRUIT CUP.

J. F. Whitney & Son, of Milton, Ulster Co., N. Y., exhibit a fruit box, which they sell at \$20 per thousand—two cents apiece. It is made of a wooden splint, bent in a hoop and riveted, with a wooden bottom fastened by brads.

FOREIGN SUMMARY.

Dr. Ponowski, of St. Petersburg, proposes powdered hellebore (*veratrum album*), as a remedy for the cholera; it is to be taken by the nose, like snuff. This is an infallible remedy when the patient sneezes eight or ten times after a pinch; but if the patient does not sneeze his case is altogether hopeless.

The effluvia which escapes from sewers, in the very attempt to ventilate them, are of a very pernicious character, and have often been productive of mischievous effects. M. Robinet, a French chemist, has devised a very effective means of freeing the sewers from them. His plan has already been carried out on a small scale. He proposes that the furnaces of factories shall derive their supply of air from the sewers; the latter will thus be emptied of their mephitic gases, which will be destroyed by combustion, fresh air from the atmosphere supplying their place. He calculates that if the combustion of only 70,000 tons of coal can be thus economized annually in Paris, or only one-tenth part of what is burned there, the sewers will be supplied with about 140,000,000 cubic feet of fresh air—that is, more than seven times their contents—daily.

It is said that the impression produced on the officers of the British fleet during their late visit to Cherbourg, is that the iron shops at Portsmouth might be contained within the smallest basin in the Cherbourg docks, while the building, refitting and repairing works of the French iron marine occupy a space of many acres. It is evident that large establishments for iron ship building must, for the future, assume the most prominent position in British naval dockyards.

From Berlin we learn of the death of Astronomer Enke, whose name will ever attach to the comet he described and traced through its recurrent orbit; while other important additions to our knowledge of the firmament secure him immortality.

At the mineral works of MM Perret, of Lyons, on emptying an old cistern which had for some time been filled with water charged with sulphates of copper and iron, moderately thick coverings of metallic copper were found attached to the wood which had served to support the roof of the cistern, and among the stones forming its floor. The debris of the wood had doubtless acted by reduction on the cuprous solution. The reducing gases developed in the cistern had also acted.

The operation of fixing the 8-inch and 6 inch armor plates which will protect the reconnoitering tower on the upper deck of the *Bellerophon* has been commenced. The port and starboard portion of the tower will be protected by armor plates 8-inches in thickness, but as this portion will be of conical form, the chances of any hostile shot effecting any injury to it, although obviously more exposed than the other portions of the tower, are reduced to a minimum. All the 8-inch plates have stood the bending, slotting and planing processes to which they have been subjected without exhibiting any flaw. The 8-inch plates are the largest yet operated upon at Chatham dockyard; but arrangements are now being com-