THE FAIR OF THE AMERICAN INSTITUTE.

The closing days of the Fair have been marked by still greater throngs of visitors. Indeed, we doubt whether any previous exhibition during late years has met with so large a share of popular appreciation, and certainly none has more richly deserved the same. As a consequence, we hear from exhibitors on all sides self-gratulatory remarks as to the benefits gained. One manufacturer informs us that he has received orders for forty-five of his engines; another traces a large increase in his sales to his representation at the Fair; a company in need of working capital have negotiations well advanced for the same, simply through presenting their products under working conditions; and so on through a number of instances, all tending to show the value of such exhibitions, when rendered really attractive to the public, as a means of bringing together the seller and the buyer.

To the careful student of the gradual growth and establishment of new national industries, there are many evidences of progress which cannot but be gratifying. Two instances occur to us: the fine porcelain and elaborate paper hangings, manufactured respectively by the Union Porcelain Works, of Greenpoint, and Messrs. Beck & Company, of this city. The porcelain will, in delicacy of make and tasteful ornamentation, compare favorably with the best produced abroad. The wall paper presents a series of embossed, gilded, and colored designs, equal in every respect to those of the finest imported. We notice also fine collections of bronzes and chandeliers, also a variety of philosophical, dental, and medical instruments, the workmanship of which it seems hardly possible to excel.

There is a slight difference between swill or sugarhouse refuse and clear, bright honey, and yet the bees contrive to find the latter in the former waste as readily as in the sweetest of buckwheat fields. A neat hive at the Fair contains the comb, insects and all, and the visitor can see for himself that the neglected sweets of New York produce a by no means inferior article.

The Blake stone crusher, a machine which literally chews stone into fragments with a rapidity exceeding that to be found in the geological investigations of a whole regiment of convicts, is in full operation. It has just gained another medal—this time at Cincinnati. Snow's water wheel governor is also exhibited in motion. This device (which we illustrated on page 182 of our current volume), when the water is drawn down to a given point, automatically closes the gate so as to allow the water to regain the lost head, and, when at the available point, of itself resumes its natural action. Hall's universal emery grinder is a tool which will recommend itself to mechanics, on the score of handiness, if of nothing else. It is an emery wheel, arranged at the extremity of a long arm and actuated by elastic belts. By means of counterpoises and suitable attachments of the arm, the wheel can be carried to any point within the radius of the latter, turned upside down, carried to the floor or high in the air, and, when let go, remains in convenient position to be readily grasped.

Messrs. Merrill & Sons' drop hammer has been in operation, forging small articles, the metal being heated in a small portable forge near by. Phillips' corn husker deserves mention as an excellent machine of its class. The stalks, with the ears adhering, are fed in at one end, meeting toothed rollers and other devices which tear off the ear, husk it, and deliver it clean, on an endless band, while the stalk, thoroughly crushed, is thrown out beneath.

Stiles' patent hydrostatic mercury pressure gage is a novelty on which we have heard much favorable comment. Its principle is simply the counterpoising, weighing, and indicating the steam pressure by means of a low mercury column. The construction is quite simple, and there are no springs, levers, or other complicated mechanism.

The Value of Fresh Air.

Dr. Le Bow, of Paris, in a recent work on hygiene, speaking of the hygiene respiration, observes that typhoid fever, anæmia, typhus, and dysentery are the diseases to which those who breathe an atmosphere insufficiently renewed are predisposed. If these individuals are wounded, they are rapidly decimated by purulent infection. Of all the facts that can be cited to show the danger to human life that results from inspiring air vitiated by the products of our own respiration, especially when debilitated by disease, none is more convincing than the mortality which occurs in our American hospitals, and which can only be termed frightful when compared with that of foreign hospitals, where the system, always adopted by us, of immense wards containing many patients, has been completely abandoned. In comparing the mortality of patients operated on during the wars of the Crimea and of the Secession, we see, from the statistics of Chénu and of Woodward, that, while the French army lost 73 per cent of all operations, the English army only lost 40 per cent, and the Federal only 34 per cent. In this case it might be objected that the English and American wounded were, as has elsewhere in this work been stated, well fed, while the French were very badly fed. Insufficient food will always increase the bad effects of imperfect aeration, and it is difficult, perhaps, to assign to each the exact part that it plays. But in the example which follows, this reason cannot be invoked, for the patients were well cared for in time of peace, and in the most renowned hospitals.

In some statistics in which M. Lefort compared those who had suffered from the same lesion, amputation of the thigh, he arrived at the following results, which he communicated in 1868 to the Society of Surgery:

In a hospital containing 100 patients, 25 per cent died; n one containing 200, 31 per cent died; in one containing 300, 37 per cent died; in one containing 400, 40 per cent died; in the hospitals of Paris, there die 74 per cent.

It thus appears that the most dangerous fields of battle are less murderous than for a wounded man to take refuge in one of the hospitals of Paris, and it may well be open to question whether any advantage they afford can counterbalance a sojourn in these dangerous establishments.—*Medical and Surgical Reporter.*

Co-operation.

We have recently had to call attention to several new phases of the cöoperative movement, which has done so much in many countries to induce the industrial classes to economize their means and invest their savings in mills, mines, factories, and stores. One of the largest of such associations (which illustrates the principle admirably, though it can scarcely be considered as a workmen's movement) is the Civil Service Supply Association, of London, England. It was begun by a few government clerks, who united to purchase their own tea by the chest and calicoes by the piece.

In six months just ended, goods to the amount of nearly $2,000,000 were purchased by the Association; these goods were retailed at a gross profit of about 10 per cent, showing a nett result of 2½ per cent on the whole, after payment of expenses. But the remarkable feature about this associated trading is that these large operations sprung from and were transacted on an original capital of $10,890. The profit of 2½ per cent on $2,000,000 is $50,000, equivalent to more than 500 per cent on the original stock of the Association. It would be difficult to find a better illustration of the value of small profits, quick returns, and prompt payments than this.

Substitutes for Rubber Insulators.

Th. du Moncel examines the manner of rendering wood non-conductive—a question of some practical importance, since the only insulator free from brittleness hitherto known, suitable for the construction of electric insulators, is ebonite, a substance both costly and liable, in course of time, to an efflorescence of sulphur.

Ivory and guaiacum wood, which are both relatively good conductors, become nearly non-conductive if stove-dried and saturated with certain oily and resinous liquids, which close up the pores of the bodies in question, and prevent moisture from penetrating within. Other kinds of wood can be modified in the same manner.

Sawdust of hard wood, agglutinated with blood and submitted to a considerable pressure, so as to mold it into a solid tenacious body, like the hardened woods of M. Latry, is a good insulator for voltaic currents. After remaining six days in a damp cellar, it showed no galvanometric deviation.

Samples of wood baked and soaked in paraffin, and then exposed to moisture, were sensibly conductive.

Wood, stove-dried and soaked in different varnishes, proved also still capable of re-absorbing moisture, and, consequently, of becoming conductive. Compression diminishes the conductivity of wood for the time being.—*Chemical News.*

Albumen.

Albumen is an organic compound found both in animal and vegetable substances. Its properties are best studied in the white of an egg, which is a very pure form of albumen. It also abounds in the blood and chyle, and more or less in all the serous fluids in the animal body; it also exists in the sap of vegetables and in their seeds, and other edible parts. Albumen forms the starting point of animal tissues. The chief component elements of albumen are carbon, hydrogen, nitrogen, and oxygen, with small proportions of sulphur and phosphorus. It is believed to be a definite chemical compound, though the exact proportions and the rational formula have not been definitely ascertained. Carbon forms fifty-four per cent of it, nitrogen sixteen, and sulphur two. The disagreeable smell arising from the decomposition of eggs is from the generation of sulphuretted hydrogen.

Albumen is capable of existing in two states: in one of which it is soluble, in the other insoluble, in water. As soluble in water, it is found in the egg, the juice of flesh, the serum of blood, and the juice of vegetables. Soluble albumen may be converted into the insoluble form in the following ways:

1. *By the application of heat.*—A moderately strong solution of albumen becomes opalescent and coagulates on being heated to about 150° Fah., but a temperature of 212° is required if the liquid is very dilute.

2. *By addition of strong acids.*—Nitric acid coagulates albumen perfectly, without the aid of heat. Acetic acid, however, acts differently, appearing to enter into combination with the albumen.

3. *By the action of metallic salts.*—Many of the salts of the metals coagulate albumen completely. Bichloride of mercury, acetate of lead, sulphate of copper, and nitrate of silver form insoluble compounds, and the egg is therefore used as an antidote to these poisons. The white precipitate formed on mixing albumen with nitrate of silver is a chemical compound of the animal matter with protoxide of silver, and has been termed albuminate of silver. Albumen also combines with lime and baryta. When chloride of barium is used with albumen, a white precipitate usually forms. By long keeping, albumen loses its alkaline reaction and becomes sour and more limpid than at first. Mucous threads like cobwebs form in it, which appear to be caused by oxidation.

Ammonia added to albumen is said to preserve it for a longer time, and a lump of camphor floated in the liquid has a good effect. Alcohol, ether, creosote, and tannic acid likewise cause the coagulation of albumen.—*Western Photographic News.*

Recent American and Foreign Patents.

Improved Heating Furnace.

Adolphus F. Bishop and John H. Aiken, Norwalk, Conn.—The boiler contains two air chambers near the ends of the cylinder, the faces of which are concentric rims. Said chambers are connected by air tubes extending all the way round, except in front, where the fire doors are. In a central space is placed a furnace, above which is a smoke chamber. The furnace, air and fire tubes, air and smoke chambers, are watertight. and the air and fire tubes are sufficiently apart to permit an easy circulation of the water between, around, and among them.

Improved Car Coupling.

Frank W. Rowe, Hardwick, Vt.—A frame is placed a little below and in the rear of the draw bar, and a bar is connected with it, so as to have a small longitudinal movement. The forward end of said bar receives a hinged block. The forward end of the block projects a little in advance of the drawbar, and has a flange, the upper edge of which has two notches formed in it to receive the link, so that the link may be raised into a horizontal position by raising the forward end of the block. To a lever is attached an arm which projects forward into such a position that, when the free end is moved forward, the said arm may pass in beneath the hinged block, and raise its forward end to raise the link into a horizontal position. With the lever and frame is connected a spring, which, when the lever is released, forces the said lever back, withdrawing the arm and allowing the flanged block to drop away from the link and the drawbar.

Improved Animal Clipping Machine.

Warren S. Burgess, Norristown, Pa., assignor to himself and Charles P. Bickings, same place.—The cutter is attached to the end of a vibrating lever, and vibrated on the cutter plate. An air engine gives the vibrating motion to the lever. The machine is connected with the pump or compressed air reservoir by a flexible tube, so that it may be conveniently moved over the animal. By means of a fly wheel, the cutter is given a steady and regular motion, and the machine is guided with great ease and accuracy.

Improved Crosscut Sawing Machine.

Jefferson Thompson, Mexico, Ind.—The saw is supported on guides or ways as it is moved back and forth by a pitman, clasps serving as slides on the ways. A cord attached to the forward end of the ways extends upward, and passes between pulleys in a stand, consisting of the two inclined posts. From this stand the cord extends through a plate, which is adjustably attached to a back post, and thence to an adjustable arm. The arm is adjusted on a circular plate, so as to arrest the downward movement of the saw at any desired point by means of a pin through the plate. The saw is also lifted up and supported by the cord when it is not in operation.

Improved Manufacture of Glass.

Hugh Percival, Bishop Wearmouth, Eng.—This invention consists in the adaptation of covered pots or coverings to be used in connection with ordinary tanks, and also in the adaptation of ordinary tanks to be worked in connection with covered pots or coverings. Said pots or coverings are constructed with an opening at or near the bottom for the inflow of refined glass, as well as an opening at the upper part, where the glass is gathered and worked into merchantable articles. Two or more tanks are also connected together, and with the tank containing the pots, by conduits below the surface of the glass.

Improved Cotton Planter.

Oliver H. Trout, Honey Grove, Texas.—The opening plow is attached to the lower end of a standard inserted and pivoted in a slot in the rear end of the tongue. The draft strain upon the standard is sustained by a brace bar which is curved and passes through a slot in the tongue, and has a number of holes formed through its upper part to receive a pin which rests upon the tongue. The lower end of a forked lever receives the upper part of the brace bar, and can be operated by the driver from his seat to raise the opening plow from the ground in passing.

Improved Cotton Tie.

Alexander A. Szabo, Houston, Texas.—This invention consists in a block for holding the ends of bale wire, it having an open cross slot on each side leading to an inner aperture, as well as a cramping groove running longitudinally from the latter to the end of block. This enables the baling to be effected very rapidly, while the tie is reliable under all contingencies.

Improved Grain Separator.

Hermann Kurth, Milwaukee, Wis.—This invention relates to certain improvements in machines for cleaning grain of cockle, garlic, and other impurities. It consists in the combination of a perforated revolving cylinder with an internal oppositely rotating reel, and the relative adjustment of the two, through friction wheels. Also in the combination, with the reel, of an internal and external spiral conveyer, and furthermore in the combination, with the perforated revolving cylinder, of an endless apron passing over adjustable rollers.

Improved Reel or Carriers' Aprons of Threshing Machines.

George C. Dodge, Millburn, Ill.—This invention consists of a reel with a hand crank arranged at the rear of a thrashing machine, so that the carrier can be readily rolled upon the shaft, so as to save the labor and time lost in taking it off and packing it when the machine is to be moved from place to place, or when it is necessary to put it under shelter from rain and snow.

Improved Washing Machine.

George D. Berdan, Saddle River, N. J.—This invention consists in the application of circular guards to the lower head of a vertical revolving rubber having fluted rollers, which act on the clothes placed between them and the corrugated sides of the tub. The guards are of galvanized wire, and keep the clothes away from the pivot of the head, forcing them out against the sides of the tub.

Improved Ironing Table.

Francis Harvey, Renovo, Pa.—A bracket is attached to the wall for supporting a knuckle which has a pivot passing through a plate, and secured by a pin which allows it to revolve a quarter of a turn, and arrests its further movement by stops. The table is connected to the knuckle by a vertical pivot projecting from its under side. The leg is pivoted at the outer end of the table, so as to be folded up and secured by a button. The plate turns on its pivot to swing the table to or from the wall when folding up or down, and the knuckle turns in said plate, for shifting the table to a horizontal or vertical plane.

Improved Grubbing Machine.

George E. Reyner, Clay, Iowa.—Power is applied to this device by attaching a horse to the outer end of a beam, which end is supported by a wheel. The mechanism at the other extremity is adjusted and operates as follows: The machine is raised from the ground, and a loop is dropped over the stump. A ring is then placed upon the stump, and a wedge is driven into the top of the said stump, which spreads it sufficiently to fasten the ring. The ring prevents the loop from slipping off the stump, and at the same time serves as a band to prevent the wedge from spreading the lower part of the stump, so as to tighten said loop. The knife is then forced into the ground five or six inches, more or less, and the horse is driven around the stump, the knife cutting off the side roots that may be in its path. At each round the knife is forced deeper into the ground until all the side roots have been cut off. A hook between the knife and staple or loop is then dropped to the ground, and is held down with the foot until it catches upon a root, when a few rounds will twist off the top root, and allow the stump to be raised from the ground.

Improved Ice Creeper.

George F. Lemon, New York city.—The upper and lower plates are cut of soft rubber, corresponding to the shape of the shank or hollow of the shoe, the upper plate being made tapering toward the front part for fitting the curve of the shank, and producing a nearly horizontal position of the studded plate, which projects slightly with the points of its studs below the level of the base of the heel. Both plates are rivetedto a latcralstrap which is interposed between them, and applied by a buckle at the ends to the foot.