

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The gross receipts of the American Institute Fair were \$59,216.87; expenses, \$37,312.52. Profits, in round numbers, \$21,000.

The new Blackfriars Bridge and the Holborn Viaduct, London, were opened by the Queen on November 6. Crowds of people thronged the streets, and the neighborhood was gaily decorated.

During the last fiscal year 760,000,000 letters passed through the United States mails—forty millions more than during any previous year, and an average of twenty for every man, woman, and child in the land.

Mr. Thornton, the British Minister at Washington, has intimated that the British Government is prepared to reduce the single rate of postage for prepaid letters between the United States and the United Kingdom to three pence. There is little doubt, therefore, of the early adoption of this measure of postal reform.

According to a Paris dispatch, dated November 6, the concession for the proposed cable between the United States and Belgium was signed on the 5th inst., in that city by the Belgian Minister. The grantees are W. C. Barney, E. E. Paulding, and J. S. Bartlett. The cable is to be laid from Ostend to some point between Maine and Georgia by an American company.

It is estimated that by the end of the year 1869 there will be laid in the United States, in round numbers, 110,000 tons of steel rails, equal to 1,100 miles of steel road; and of this amount about 36,000 tons, equal to 360 miles, will be laid during the present season. These rails are in use on more than fifty different roads, and are partly of American, principally of English, and to a small extent of Prussian manufacture.

A dispatch from San Francisco states that the restoration of public lands heretofore reserved for the Southern Pacific Railroad Company, will probably cause the Company to make its location through the San Joaquin Valley, connecting with the Western Pacific near Stockton, thus constituting the California and Oregon and the Southern Pacific Road, a grand trunk line from Columbia river north to Colorado south, passing through the richest agricultural valley of the State.

The New York Commercial Advertiser calls attention to the conflagrations that have resulted near Cairo, Illinois, and at other places from locomotive sparks. It says that farmers along the line of the North Missouri Road have been compelled to keep a constant watch to prevent their buildings, fences, stacks of grain, and fields of stubble from being ignited. Some effective contrivance, it suggests, should be employed on railway engines to confine the sparks which now fly about hither and thither along the path of the fiery locomotive.

While on a visit at a manufactory on the upper part of the river Saale which flows through Thuringia, M. Reichardt noticed a dark-brown colored incrustation appearing almost to consist of an oxide of iron and manganese. The analysis gave—Water, driven off at 100°, 210 per cent; insoluble in hydrochloric acid, 17.12; soluble therein, 80.78. Full analysis, in a hundred parts, gave the following results: Water, at 100°, 2.10; white clay and sand, 8.81; oil and pitch, 8.25; sulphate of lime, 1.30; peroxide of iron, 1.20; protoxide, 0.22; carbonate of lime, 68.52; carbonate of magnesia, 9.60. The dark color was due to the organic matter, decomposed by the high temperature and converted into a kind of pitch.

It is announced that England alone consumes every year at least two thousand tons of beeswax valued at \$2,100,000. With gold at 131, the best bright pressed yellow American beeswax is now selling in England at from 45 to 51 cents a pound. Wax candles are used extensively in the royal palaces of Europe, and in one palace alone it is stated that ten thousand wax candles are burned every night. The method of lighting this large number of candles instantaneously, is to connect the wicks by an inflammable and scented thread of gun cotton. On touching the end of the thread with a torch, the flame flashes like lightning round the connected candles, an agreeable odor is emitted, and the apartments are illuminated and perfumed as if by magic.

An investigation has recently been instituted in Paris with regard to the exemption from cholera of men engaged in working with copper. Statistics, obtained in such a way as to warrant entire reliance on their accuracy, appear to show that wherever the manipulation of copper was carried on, the men engaged in it almost invariably escaped unharmed, and, further, that the preservation varied in accordance with the degree in which the metal was handled by the operatives. During the epidemics in 1865 and 1866, the number of deaths was in the proportion of 3 to every 20,000 of the adult workmen employed in working copper in some form or other. Of goldsmiths, silversmiths, and watchmakers, there died one of every 719 employed; among founders, tap-makers, lamp-makers, workers in bronze, sham jewelry, and copper utensils, the mortality was 1 in 2,000; and among opticians, makers of mathematical instruments, dry polishers, stampers, turners, and musical instrument makers—the number of whom was 5,650—there was no case at all. The society known as the Bon Accord, founded in 1819, and entirely composed of bronze workers, had not a single death, and had been only called upon to pay for 106 days of sickness divided among ten members. If further inquiries establish the truth of the theory, results exceedingly valuable from a hygienic point of view will follow.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address correspondents by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

D. G. O., of Mass.—Deby, in his "Steam Vade Mecum," gives the following rule for calculating the temperatures of steam at different pressures: "Subtract the Cen. units of latent heat from 6065 and divide the remainder by 0.695. This gives the temperature in Cen. degrees of the thermometer. This rule is based upon a law which that author claims to have discovered, namely, that the pressure of steam in atmospheres in a close vessel increases in a geometrical progression, the ratio of which is two, while the latent heat (so called) decreases (is in reality converted into other modes of motion) in a compound arithmetical progression, the constant of which is 17 Cen. units or 30.6 Fah. units, and the multipliers, respectively, as the numbers 1, 2, 3, 4, 5, etc. We do not regard this law as fully established. Since its publication, on page 246, Vol. XX., of the SCIENTIFIC AMERICAN, it has, however, met with neither denial nor confirmation. It is certain, however, that the rule above given, secures results which coincide with the results of previous experiments to within a very close approximation. You will find these results in tabular form, in the work above mentioned, published by Willis, McDonald & Co., 141 Fulton street, New York, and nearly the same in other works on heat and steam. Loose sawdust would, we think, be more likely to take fire from proximity to hot steam pipes than solid wood.

J. T. K., of Wis.—The horse power of a boiler is computed from the extent of its heating surface. In good boilers, with furnaces so arranged, that good combustion and utilization of the heat is secured, it is common to allow for marine flue boilers, 8 square feet of heating surface per horse power; for marine tubular boilers, 9 to 10 square feet; and for locomotive boilers 6 square feet. Stationary boilers vary greatly in this respect. They oftener, we judge, require twelve feet of heating surface than less; and it is evident that the results attained with any boiler must depend in great measure upon collateral circumstances. The best constructed boiler might give poor results under unfavorable circumstances of setting, etc. You will now see that you have not given us the data for computing the heating surface of your boiler, and that we can not therefore give you the horse power. The amount of water which can be raised from 50 deg. Fah. to 212 deg. Fah. per horse-power of a boiler, by the use of a pipe and steam jet, is approximately six cubic feet per hour.

M. S., of Ill.—The horse-power of an engine is equal to the mean effective pressure per square inch of piston area in pounds multiplied by the number of square inches in that area, multiplied by the length of stroke in feet, multiplied by the number of strokes per minute, and divided by 33,000. It is rare that in engines worked non-expansively, the mean effective pressure in the cylinder can be considered as equal to the boiler pressure; but assuming it to be nearly so in your case, where the cylinder is 14 inches internal diameter and stroke 20 inches, boiler pressure 80 pounds, and number of strokes per minute 101.25, the horse-power would be $80 \times (14^2 \times 0.7854) \times 1.666 \times 101.25 \div 33,000$, which you can work out for yourself.

S. R., of N. J.—You can bleach your ivory veneers by exposing them to the action of chlorine. To make this gas, put into a glass retort or flask, a mixture of 18 parts common salt and 15 parts finely pulverized binoxide of manganese, and pour upon the mixture a cold mixture of 45 parts strong sulphuric acid and 21 parts of water. The gas will immediately come over, and you may conduct it into a close cask, set out of doors and away from your shop, as this gas is injurious to inhale. When the evolution of gas slackens, a gentle heat applied to the retort will immediately increase it. The veneers should be laid on racks, or otherwise kept apart, so that they may be uniformly acted upon.

G. T., of Tenn.—Ink cannot be considered as a solution. It is a fluid containing coloring matter in suspension: Usually this coloring matter is gallate of iron, or a compound of gallic acid, extracted from the nutgalls employed in its manufacture, and the oxide of iron.

T. D. G., of Ohio.—The black color of caoutchouc (gum-elastic india-rubber) is acquired from the smoke of fires used in its desiccation after the juice is extracted from the trees. It is not a natural property of this substance, which, in a pure state, is of a white color.

J. K. A., of Mich.—The terms "nucleus" and "nebulosity," are used in astronomy to denote entirely distinct parts of a comet. The nucleus is what is commonly known as the head, and the nebulosity is the attenuated matter which surrounds the true nucleus.

R. M. Van N., of Neb.—A patent was taken out in 1823, for the use of cork tree bark, for dyeing cotton, wool, and other tissues, nankeen. We do not think the process was ever extensively used, and we see nothing new in the method you employ.

H. C. P., of Texas.—Your application of horn plates to a "coat of mail," a term which is hardly applicable, is very ancient. Such plates may be made quite effective as a protection from sword thrusts or bullets, but there is nothing new in the idea you have conceived.

D. B. L., of Ala.—Your toy gun is, we think, a decided novelty, and of course, as such, patentable. Large sums have been realized by patentees of toys. A unique and taking affair like yours would be sure to have a run.

R. T. M., of Mo.—The fact that sour apples attack the teeth more than vinegar, is owing to the presence of malic acid in such apples, which acts upon the enamel of the teeth much more than dilute acetic acid—vinegar.

A. B. F., of Mass.—As a "working engineer," you should be able to obtain the different brands, trade marks, etc., of boiler iron without expecting us to do a liberal amount of gratuitous advertising for your especial benefit.

A. C. B., of Mass.—We can recommend nothing as being better than plumbago, for coating insects, and other small and delicate objects, in the process of electro-plating.

J. R., of —, "Pallett's, Millers, Millwrights, and Engineers' Guide," is the book you need. Published by Henry Carey Baird, Philadelphia.

R. B., of Ala.—One part of Portland cement and eight of sand would make a good lining for an artificial duck pond.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

BLADE GUARD.—Thomas T. Woodward, Ansonia, Conn.—This invention relates to a new and useful improvement in a detachable guard for cutting blades.

STEAM TRAP.—Samuel Bonser, Dover, N. H.—This invention relates to a device for discharging the waters of condensation from a steam-heating or other steam apparatus.

CORN PLOW.—W. H. Bott, York, Pa.—The object of this invention is to construct a simple, light, and convenient plow, adapted to cultivating, plowing corn, etc., and which shall be readily adjustable to suit the work required of it.

MACHINE FOR TURNING RAKE HEADS.—A. T. and N. M. Barnes, Tiffin, Ohio.—The object of this invention is to provide for public use a machine for turning heads for horse hay rakes and other shafts of similar construction, which shall perform the work more expeditiously and conveniently than any machine heretofore employed for the purpose.

ELEVATED RAILWAY.—Wm. H. Rand, Brooklyn, N. Y.—The object of this invention is to improve the construction of elevated railways so as to reduce their cost and render them stronger and safer, more beautiful in appearance, and better adapted to the different methods of propulsion than any heretofore brought into public use.

MACHINE FOR CUTTING OFF THE ENDS OF CIGARS.—J. G. Maler and G. W. Schaeffer, Baltimore, Md.—The object of this invention is to provide for public use a neat, simple, cheap, and easily operated machine, which will cut off the end of a cigar without breaking it. In connection with this machine are arranged a box for holding the cut-off cigar ends, roughened surfaces for igniting the match, and one or more match holders.

WIND MILL.—Isaac H. Sutton, Coon Rapids, Iowa.—This invention relates to improvements in wind mills, and has for its object to provide a wind-regulating, and stopping and starting device, or gate for increasing or diminishing the area of the buckets exposed to the wind.

ATTACHING RUDDERS TO PROPELLERS.—A. A. Scanl, Nyack, N. Y.—This invention relates to improvements in attaching rudders to propellers, and consists in attaching two rudders in advance of the propellers, one under each quarter, for the better protection of the same against striking upon bars and rocks, and for insuring a better action of the water on the rudders before it has been disturbed and set into cross currents by the propeller.

GOVERNOR.—M. Murphy, Charlotte, N. C.—This invention relates to improvements in governors for valves of engines, water wheels, etc., the object of which is to provide a simple and cheap device, also to provide an arrangement whereby the same may be adjusted, while in motion, to vary the action for increasing or diminishing the speed of the engine or wheel.

MACHINE FOR GUMMING, PUNCHING, UPSETTING, AND CUTTING.—S. D. Hicks, New London, Wis.—This invention relates to improvements in iron workers' apparatus, and consists in the arrangement, on one portable base, of gumming devices, punching devices, tire-upsetting devices, and shearing devices, the gumming and shearing devices being arranged to be operated by one and the same hand lever, and the upsetting and punching devices by another lever.

PORTABLE STOVE.—John Bannhr, Hempstead, N. Y.—This invention has for its object to furnish a simple, convenient, effective and inexpensive portable cooking apparatus, which may be used in the house or out of doors as may be desired or convenient.

WATER WHEEL.—J. G. Frensburr and W. V. Andrews, Newcastle, Cal.—This invention consists in the form of the buckets and the manner of connecting them to the rim of the wheel. The faces of the buckets receiving the water represent spiral concave forms, so shaped as to give the water which is discharged against them when at the lowest position, first, an upward or radial direction, and then a lateral direction away from the wheel, calculated to utilize as much as possible the unspent force of the water, which is commonly lost in these wheels by the immediate escape of the impact, and also calculated to discharge the water away from the wheel so as not to clog or impede its motion.

ANIMAL TRAP.—J. L. Tusten, Winona, Miss.—This invention comprises the combination, in a box or case, of two compartments with a hinged and vertically swinging door between them, of a horizontally swinging door opening into the first compartment, a hinged platform within the said first compartment, suspended from a pair of knuckle-jointed bars, one of which is connected to the outer door for closing and opening it by the action of the weight of the animal on the platform, a counter weight for closing the door and a drop catch for securing it, under a simple and efficient arrangement whereby the animals secured are caused to reset the trap.

TRACTION ENGINE.—George N. Tibbles, Hudson City, N. J.—This invention relates to certain new and useful improvements in the construction of a traction engine, which is intended to take the place of the ordinary dummy engines now in use. The object of the invention is to avoid the necessity of putting on an extra pressure of steam to ascend a steep incline, by the use of a movable fulcrum in a slotted lever connected with the cross-head.

WINDMILLS FOR PUMPING.—L. D. Parsons, Tremont, N. Y.—This invention relates to new and useful improvements in windmills for pumping water and for other purposes.

ATTACHMENT TO SPOOLS OR BOBBINS.—Marcus Brown Westhead, and Robert Smith, Manchester, England.—This invention relates to a revolving drag placed upon the end of the spool or bobbin, and through which the thread or twine passes, whether such drag be adapted to the spool or bobbin or so as to be detached therefrom and applied to another spool or bobbin.

SHEET-METAL HOOPS FOR TUBS, BUCKETS, AND OTHER SIMILAR VESSELS.—L. A. Fleming, New York city.—This invention consists in forming one end of a metallic hoop with rivet clips struck or cut from the end of the hoop, which fit into slots in the other end of the same hoop; these clips are then driven to a head like an ordinary rivet, and the hoop is firmly joined thereby; thus the use of rivets is avoided, and the hoop secured in a rapid and economical manner.

THRASHING MACHINE.—William H. Perry, Ripley, Ohio.—This invention relates to a new and useful improvement in upper shoes for grain-threshing machines, and it consists in a novel construction of the same, whereby the blast is made to act more efficiently upon the grain than hitherto, and the grain deprived of smut and other light impurities, which are directed from, or not allowed to pass into the face of the feeder or operator, as is now the case.

CAR BRAKE.—M. S. Borthwick, Montana, Iowa.—This invention relates to improvements in car brakes, and has for its object to provide a simple arrangement of devices, whereby the car brakes as now commonly arranged for operation by hand may be brought to bear, by power derived from the moving wheels of the truck, when required, the said devices being so arranged that they may be brought into contact with the wheels, either by the brakeman on the platform of each car or by one at either end of the train.

MANGLE.—James B. Westwick, Galena, Ill.—This invention relates to new and useful improvements in mangles, and consists of improved arrangements of devices for working a table reciprocatingly under a pressing and smoothing roller, on which table the clothes to be mangled are spread, the pressing and mangling roller being provided with adjustable weights for varying the pressure.

APPARATUS FOR SHAPING EARTHEN JARS.—Joseph H. Baddeley, Greensboro, Pa.—This invention consists in the employment of a molder jar, wherein the clays molded to the required exterior form, and in the employment therewith of a tool adapted to shape the interior of the jar, and to form the channel for the cover; also, in an arrangement of the support of the said tool for holding it while turning, and for removing it from the finished jar, for the removal of the latter from the lathe.

SECURING TYPE IN FORMS.—Samuel Anderson and Thomas J. Folan, Stapleton, N. Y.—This invention relates to improvements in means for securing type in forms irregularly for fancy printing, and it consists in accomplishing the same by casting plaster of paris or other similar substance while in a plastic state, around the same when arranged in the order required, which solidifying so as to be true sufficiently for the work required, and which may be readily broken up and separated from the type when they are to be changed.

BACK STRAPS FOR HARNESSES.—Charles Drew, Newark, N. J.—This invention relates to improvements in the construction of back straps of harnesses for horses and other animals, and has for its object to provide an improved manner of attaching the binding for the same.

ENDLESS CHAIN WATER WHEEL.—H. S. Stewart, Yreka, Cal.—This invention has for its object to furnish an improved water wheel, which shall be so constructed as to utilize a much larger proportion of the power of the water than can be done with water wheels constructed in the ordinary manner; and which shall also be so constructed that it may be taken apart and transported from place to place as required.

FIRE SHOVEL.—John Fox, New York city.—This invention has for its object to furnish an improved shovel, so constructed that it may be made with one blow, instead of its being necessary to strike it several times before it is brought to the proper shape, as is the case when the shovels are made in the ordinary manner, and which shall, at the same time, be a stronger and better shovel.

SASH FASTENING.—Samuel Reed, Rising Sun, Md.—This invention has for its object to furnish an improved wire saw sash fastening, by means of which the sash may be fastened, closed, or opened to any desired extent, either at the top or bottom, or both, and which shall be simple in construction and effective in operation.

GANG PLOW.—James B. Hunter, Ashley, Ill.—This invention has for its object to furnish an improved gang plow, simple in construction, effective in operation, and adjusted for larger or smaller plows, as the character of the plowing may require.

CAR STARTER.—T. S. E. Dixon, Janesville, Wis.—This invention has for its object to furnish an improved device for attachment to horse cars, and other wheeled vehicles, by the use of which the power will be first applied to revolve the wheels of the vehicle, and thus start it with less effort than when the draft is applied directly to the body of the car.

FURNACE FOR CONVERTING PIG IRON INTO STEEL AND FOR PURIFYING AND OXIDIZING OTHER METALS AND MINERALS.—Alois Thoma, New York city.—This invention has for its object the construction of a converting furnace, which allows a continuous operation, and in which, therefore, a much larger quantity of material can be treated in a given time, than can be done in those furnaces which require removal of old contents before the new can be put in.

ORGAN STOP HANDLE.—William Boyrer, New York city.—This invention has for its object to so construct the handles of organ stops, that the notices painted or printed upon the same, can be readily seen by the organist.

MACHINE FOR SHAPING BOOT AND SHOE SOLS.—S. D. Tripp, Lynn, Mass.—This invention comprises a method of compression, by rolling the soles between a last and former of peculiar construction, specially adapted for action upon all parts of the soles, whether of uniform or varying thickness.

CHURN.—C. J. Miller, Jr., Richmond, Ky.—This invention relates to a new churn, which is so constructed that it will serve to produce butter with great rapidity and without loss of cream. The invention consists in the use