New Method of Casting Iron.

The American Architect and Builder copies from La Revue Industrielle a description of a new method of casting iron. It is well known, the editor adds, that iron castings are very liable to "blowholes," "cinders" and so on, which occur in the middle of the mass and destroy its strength, or at least its appearance. These defects are caused by particles of scoriæ, oxide or other impurities, which flow out of the melting furnace into the ladle, or are formed by the contact of the hot metal with the air or with the sand of the mould; in fact, if the molten iron is watched as it is drawn from the furnace, the surface is soon seen to cover itself with dull lumps of scoria and impurity, which rise to the surface. It is usual to fill the moulds more than full, so that the lighter substances may float to the top and collect in the portion to be subsequently cut off; but this does not entirely remove them. M. Van Riet, to give the impurities time to separate from the melted iron before it runs into the mould, sets on top of the flask a sort of little bath tub, lined with some refractory substance, and presenting three cylindrical hollows of different sizes, communicating with each other by tangential channels. The iron is poured from the ladle into the larger hollow, where it whirls around for a time and then escapes into the second basin, where it revolves in the opposite direction. From this it reaches the third compartment, which has a hole in the bottom, and, as this hole is set over the pouring hole in the flask, the iron then runs out into the mould. When the metal is poured into the large end of the tub, it is seen to whirl around until the surface is covered with the larger particles of impurity, which collect near the middle, the centrifugal force developed by the whirling serving to separate the purer and more liquid iron from the light and spongy scoriæ, very much as cream is separated from milk by a centrifugal churn, or molasses from sugar in the centrifugal tanks of a refinery. By the tangential channel the purer iron passes into the second division, where the same process is repeated, the scoriæ, which are now in fine particles, collecting in the middle, while the liquid metal keeps to the outside. The third canal, also tangential, leads this twice purified iron to the third compartment, from which it runs into the mould, a few particles of dross floating up from the mould and collecting at the top. On cooling, the first division of the "bath tub," or "poche intermédiare," as its inventor calls it, is found to contain the large lumps of cinder, while the second compartment contains a spongy mass of impurity, in the shape of an inverted cone, the base of which occupies the whole area of the compartment, the pure metal having escaped around the sides below. In the third compartment nothing appears but a little ring of particles, the last to rise to the surface out of the mould. The castings made from iron thus purified are extremely sound and solid, and there is no loss of metal, all the pure and liquid iron escaping into the mould. The "bath tub" is easily cleared out, and is relined for a second operation by plastering with fire clay mortar.

Pussy Rides in a Flywheel.

"I have got a kitten at home," said W. L. Slocum, of Manchester, N. H., "which I think has traveled about as rapidly and as far in one day as any other animal in the world. One morning, about a month ago, the kitten strayed into my factory a short time before the machinery was started up. It got playing around the floor and soon took up its position in the big flywheel, where, without being noticed, it nestled down and went to sleep. Soon the machinery was put in motion, the wheel moving so rapidly that the poor kitten could not escape. Indeed, it is probable that puss was soon unconscious from dizziness.

"A little computation shows the distance the cat traveled. The wheel moves at the rate of 250 revolutions a minute, and at every turn pussy went 17 feet. As the wheel was kept in motion 390 minutes without stopping, the kitten must have traveled during that time a little over 300 miles. When the wheel was stopped the kitten was discovered and taken out more dead than alive, but it shortly recovered, and, although it has remained about the factory ever since, it is observed that it always gives the flywheel a wide berth."—St. Louis Globe-Democrat.

Pussy Captures an Eagle.

Charles Wiswell, of Carbonate, Lawrence County, S. D., has a cat that is a king of its kind. Besides being a good mouser, this remarkable feline is death to mountain rats, night hawks, and other small game, not long ago bringing home as the result of its prowess a large jack rabbit. But the most remarkable incident in the cat's history happened a day or two ago.

It was an encounter with a full grown bird of freedom, and pussy was the victor. The cat was sitting on a pile of quartz patiently awaiting the reappearance of a chipmunk, which but a moment before it had chased into a hole, when suddenly the sky above the cat became darkened, and an ominous swish as if from a rapidly moving body fell upon pussy's ear. The cat sprang aside with a motion so rapid that the eye could scarcely follow it, and in the place it had occupied but a moment before stood a full grown bald eagle, its plumage ruffed and thirsting for blood. Pussy had sand and accepted the gage of battle, and in less time than it takes to tell it, the famous "cat and parrot" time was being re-enacted. It was a desperate struggle, and although pussy was pretty badly scratched by the eagle's talons, it, when taking the initiative in the fight, secured a decided advantage, having landed on the eagle's back. For a few moments the air was filled with fur and feathers, and the ground was all torn up, but pussy held on, and in a short time succeeded in biting through the neck of its antagonist. The struggles of the eagle grew weaker and weaker, and soon ceased altogether, and pussy, exhausted by the violent exertions and sore from wounds inflicted by the eagle's talons, rested for a moment, then, as calm as though sitting on a rug before the kitchen hearth, went carefully over the ruffled fur, made its toilet, and, seizing the body of the vanquished antagonist, drew it with much difficulty to the home of its master. Laying it at the master's feet, the cat purred its satisfaction, and in this way boasted of the victory.

The combat was witnessed by a number of people, every one of whom expressed a desire to buy the cat, but Mr. Wiswell says he would not sell it for the best mine in the Black Hills. The eagle measured six feet four inches from the tip of one wing to that of the other.—St. Paul Pioneer Press.

He's Dead at Present.

Julius Cæsar was considered a great man, and so he was. But he had his limitations, and some unknown writer gives a few illustrations: He never rode on a 'bus in his life; he never spoke into a telephone; he never sent a telegram; he never entered a railway train; he never read a newspaper; he never viewed his troops through a field glass; he never read an advertisement; he never used patent medicine; he never cornered the wheat market; he never crossed the Atlantic; he never was in a machine shop; he never went to a roller skate rink; he never controlled a manufacturing company; he never dictated a letter to a typewriter girl; he never invested in railway stock; he never played a game of billiards; he never saw an electric light; he never listened to a phonograph; he never posted a letter; he never had his photograph taken.

RECENTLY PATENTED INVENTIONS.

Engineering.

ROTARY ENGINE.—Oscar E. Morse, Dillon, Montana. This engine has a casing in which are cam races, and within the casing is a rotary cylinder in which the pistons move, links connected to the pistons extending beyond the center of the cylinder, and projections carried by the links having movement in the cam races. The construction is designed to be very simple and economic, having but few wearing parts, and working either forward or backward with equally good results. A dead center is avoided in this engine.

BOILER.—Benjamin F. Conner, Columbia, Pa. This invention provides a boiler consisting of a series of water circulating sections set one on top of the other and forming a passage for the smoke and gases. Surrounding the sections is an exterior shell into which leads the upper end of the smoke passage. The exterior shell is preferably made in sections simil r to the water sections. The spaces between the several water sections are readily cleaned of soot or other accumulations, and the heat generated by the fuel is utilized to the greatest advantage to heat the water in the sections.

Railway Appliances.

CAR FENDER.—Elie B. Graff, Baltimore, Md. This device is adapted to be connected to either end of the car, and has cushions, springs, and a receiving bed, designed to prevent injury to persons caught in the way of a moving car. The bed of the fender is preferably of heavy woven wire or similar material, fastened between side bars of spring steel, and made elastic by means of coil springs. Along the front edge is a hollow cushion, preferably of soft rubber, a similar second cushion being also attached to the rear upturned edge, to prevent violent contact of one falling with the car body.

Electrical.

TELEPHONE.—John Serdinko, San Antonio, Texas. In this instrument, combined with the magnets of the magneto call, the bobbin and the diaphragm fixed in front of the latter, an iron disk is fixed in proximity to the magnets, and a core fixed to the disk extends through the bobbin into close proximity to the diaphragm. The improvement is designed to afford a simple and effective magneto telephone in which the receiving and transmitting instrument will receive its magnetism from the magnets of the magneto call.

Mechanical.

DEVICE FOR TRANSMITTING POWER.—James Evans, Linn Grove, Iowa. This inventor has devised a simple and flexible device, particularly adapted for transmitting power from the pump rod of an ordinary windmill to a washing machine, churn, or other light machine. It is arranged to pass around corners and angles to be connected with a macbine in any position desired. To the pump rod is attached a rope extending over a guide pulley to an oscillating lever, from whose free end extends a transmitting wire, the latter extending over a guide pulley, etc., to convenient connection with the machine to be operated. A coil spring is arranged to take up the slack on the return stroke of the pump rod.

SAW GUMMER OR SHARPENER.—Jerrold E. Oglesby, Ladonia, Texas. This is an improvement in devices for grinding the saws of a cotton gin or linter, the inventor providing a simple apparatus which may be easily applied to a gang of gin saws, and quickly and nicely adjusted to properly fit the teeth, entering between them to any desired distance. The apparatus also has an efficient feed mechanism which moves the saws tooth by tooth as they are ground, while also regulating the pitch of the grinder, the machine doing the work rapidly and nicely to leave the teeth their full original length and openness.

Agricultural.

CHECK ROW PLANTER.—Edward W. Collins, Coalville, Iowa. With the use of this machine a marking compound is dropped upon the ground to check the rows, simultaneously with the dropping of the seed from the boxes. The machine also smooths or levels the ground to receive the marking compound, and a driving mechanism operated from one of the supporting wheels has simultaneous and timed action upon the drop slides of both the marking and seed boxes.

Miscellaneous.

SMELTING TITANIC IRON ORE.—John L. Randall, Brooklyn, N. Y. This inventor has devised a method of and composition of matter for smelting by which this ore may be profitably smelted in an ordinary furnace, and the operation continuously conducted without injury to the walls of the furnace. Employed with the ore is a flux composed of cast iron fragments, puddling furnace slag, feldspar, all used with any suitable fuel in a blast furnace. With the method described a superior cast iron is produced, and the cost of operating the furnace does not exceed that of smelting the ordinary iron ore.

HAME TUG.—Julius C. Clausen, Hensall, Canada. This tug is hinged to a buckle, and has cross bars provided with notches on their inner sides, cross rods being arranged in front of the bars. The trace and its fastening hook has a tongue and out-turned point adapted to engage the cross bars and rods. To adjust the trace it is only necessary to slacken the tension on it, and when adjusted there is always a straight pull on the tug.

HORSE COLLAR.—William T. Fell, London, England. This is an open-topped collar constructed upon a steel spring as a frame which occupies the position of the fore wale and also serves the purpose of the hames. It is designed to facilitate the operation of harnessing and unharnessing of vicious and timid horses, as the collar does not need to be passed over the animal's head. A snap lock engages the ends of the two members of the collar, and a safety catch engages the bolt of the lock to lock it in closed position.

SHOE.—Thomas F. Marshall, Oakland, Cal. A lining for the elastic gores of boots and shoes, that will be both yielding and watertight, has been devised by this inventor, the lining also presenting a substantially smooth surface to the foot. A watertight lining for the gore is connected by a bellows fold with the edges of the boot or shoe lining, the members of the bellows fold lying normally beneath the lining and meeting at an angle to lie substantially flat on each other.

DRYING RAW OR PREPARED GOODS.—August Rubenkamp, Dortmund, Germany. The apparatus designed by this inventor allows of the gradual warming and cooling of the goods treated. It comprises a series of drying chambers, each having lower channels connected with a source of heat and with conduits from which lead valved outlets. The heated air which dries the goods is afterward brought back to the closed furnace to effect combustion of the fuel.

DOOR HANGER.—William F. Johnston, Buffalo, N. Y. The blocks adapted for attachment to the door, according to this improvement, have inclined faces with longitudinal grooves, while adjustable inclined end bars have loops on their upper ends and projections on their lower ends that work in the grooves. A horizontal top bar, on which wheels are centrally carried, is adjustable at its ends in the loops. The construction is such that the door may be readily hung in thorough balance, and easily adjusted to keep it plumb, no matter how it may warp or settle.

ADVERTISING MACHINE.—William T. Shirley, St. Elmo, Tenn. This inventor has devised improvements in mechanical devices for the continuous display of advertising cards, and particularly adapted to exhibit a series of advertisements on a longitudinally moving sheet of canvas or other flexible material. The improvement comprises a novel, power-driven, compact and simple apparatus, which moves the display sheet in one direction until all the advertisements have been exhibited, then reversing the direction of travel of the sheet to display the same advertisements in reversed order.

WAGON BRAKE.—Vardiman T. Sweeney, Springfield, Ky. This is an improvement on a formerly patented invention of the same inventor, designed to simplify the construction and increase the efficiency of the brake, providing also for conveniently applying the brakes to both the forward and rear wheels of the vehicle, either by backing the team or by means of a lever or its equivalent.

SASH FASTENER.—John H. Dickson, New Philadelphia, Ohio. According to this improvement, the socketed side bar of the sash and socketed casement are rubber lined, and a slide bolt adapted to be longitudinally moved therein. The sliding locking bolt has a projecting pusher bar on which a spring acts, while a hinged pendent locking plate, sliding on its bearing, is adapted to be raised and adjusted and dropped into engagement with either side of the pusher bar. Applied to the upper and lower sashes, it affords means to lock either sash partly open or closed.

SASH LOCK.—Charles A. Robert, Portland, Oregon. This is a lock of simple and inexpensive construction, adapted to be located in the jamb of the window to engage with the sash, the lock being manipulated from the front of the window frame. It is so made that two locks may be employed in connection with each sash, one for the upper and the other for the lower, without having either interfere with the other, and without presenting an unsightly appearance.

TRACE.—George S. Duffin, Cheneyville, Ill. This trace is formed in two sections, united at their adjacent ends by jointed coupling, the shanks of which enter and are riveted in the split ends of the trace sections, the inner side of one section having a rearward extension crossing the coupling to take the wear, and the coupling being in rear of and wholly independent of the back strap connections. The construction prevents twisting of the trace, and gives perfect ease and freedom to the animal at all times.

HAY PRESS.—John F. Adams, Aledo, Ill. With this machine hay, grain and similar material may be raked from the field, delivered into the body of the machine and automatically baled and delivered in compact form upon the ground. The construction is such, also, that the rakes may be detached and the baling apparatus connected with the separator of a thrashing machine, so that the straw which issues from the machine may be gathered and baled.

MICROMETER GAGES.—Herman V. Bernhardt, Brooklyn, N. Y. An automatic stop for gauges and similar tools, designed by this inventor, is so arranged as to prevent the operator from exerting an overpressure and causing a consequent spreading of the contacting ends of the micrometer or other tool. The invention consists of an internally toothed head or cap adapted to be engaged by a spring-pressed pawl or pawls mounted to slide laterally on and turning with the micrometer spindle.

INK STAND.—Francis B. Pratt, Canton, Miss. In a base piece circularly recessed at two points in its top, one recess has a funnel-shaped bottom, and a passage extends therefrom to the bottom of the other recess, in which is an interiorly threaded shell, in which screws a hollow plug, there being a set screw adjustable in the top of the plug. The ink stand may be readily filled and kept clean, and the supply of ink in the ink well graduated exactly as needed.

PAINT.—Carl L. C., Max W. H., and August M. H. De Bruycker, Brooklyn, N. Y. This is a new enamel paint designed to leave a good body, so that one coat of it will equal two coats of ordinary paint. It is made of Venice turpentine, linseed oil and litharge, mixed and boiled, to which are added turpentine, benzine, white lead, zinc white and plaster, the whole being ground together.

VALVE FOR OIL CANS.—Charles Wagner, New York City. This is a valve attachment for the spout of a jet oil can which affords a reliable and convenient means for regulating the discharge of any desired quantity of oil from the can, prevents leakage and seals the receptacle against accidental discharge of its con-

tents. The can may be conveniently filled, and the device is of simple construction and not liable to get out of order.

VENDING MACHINE.—James Walton, Phoenicia, N. Y. This is a machine for vending either stamps or paper and envelopes, but it is preferably arranged with duplicate parts, so that both may be delivered by one machine. It is designed to be simple and inexpensive, and with easily working mechanism, which is not liable to get out of order, the delivery of the postage stamps and paper and envelopes being effected by mechanism controlled by dropping a coin in the slot of the machine.

STREET SWEEPER.—August G. Rosenbauer and Richard Brussel, New York City. This sweeper is designed to afford means of sweeping the entire breadth of the roadway, elevating the sweepings as the machine moves along and depositing them in a dirt receptacle, which can be conveniently dumped at any desired point. The movements of the brushes are controlled from the driver's seat in such manner that the brushes may have a light contact with the roadway, or may be made to bear heavily thereon, or lifted entirely clear and their motion stopped.

Designs.

DESIGN FOR TRIMMING.—Josephine Muller, New York City. The principal feature of the invention consists of serpentine opposing side lines, forming a series of curved loops appearing independently formed, one merging into the other, imparting to the trimming a plaited appearance. In the details of the design a central ornament is formed between the marginal lines, having an embossed appearance, and cross ties appear to separate the series of loops.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.
References to former articles or answers should give date of paper and page or number of question.
Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.
Buyers wishing to purchase any article not advertised in our columns will be furnished with address of houses manufacturing or carrying the same.
Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.
Scientific American Supplements referred to may be had at the office. Price 10 cents each.
Books referred to promptly supplied on receipt of price.
Minerals sent for examination should be distinctly marked or labeled.

(6305) J. J. H. asks: 1. How high above the level of its source will an ordinary hydraulic ram raise water? A. The ordinary water rams will force water to 100 feet, and in small quantity under favorable conditions to 200 feet, if the distance is not excessive. See the possibilities and computed conditions for hydraulic rams in SCIENTIFIC AMERICAN SUPPLEMENT, No. 793, 10 cents mailed. 2. Will a sheet of zinc burned in a stove loosen soot in a chimney? A. The burning of zinc is said to loosen soot in the chimney. We apprehend the cause to be in the deposit of zinc oxide on the surface, which prevents the soot from sticking. The burning of zinc should be done after a chimney has been cleaned. 3. Does the temperature of steam increase with the pressure? A. The temperature of steam increases with the pressure. 4. What is taggers iron? A. The brand of iron from which tin plate is rolled.

(6306) H. E. J. B. asks: 1. How is white or cream sealing wax made and what can I use in place of bleached shellac for making bronze or gold sealing wax? How is the wax poured in small strips about ¼ inch in diameter? A. A beautiful variety (aventurin), which can be prepared at comparatively low cost, is obtained by stirring finely powdered mica into the melted ground mass. Gold and silver waxes are obtained by mixing finely powdered leaf metal with the melted ground mass. Ground mass for translucent wax is:

Bleached shellac	3 parts.
Viscid turpentine	3 "
Mastic	6 "
Chalk	2 "

For white sealing wax add zinc white. Bleached shellac must be used. For information in regard to moulding sealing wax we refer you to Brannt's "Varnishes, Lacquers, Printing Inks and Sealing Waxes," $2.50. 2. How can I make gold plating to rub on, also silver plating to rub on places that is buffed off too much? A. Gilding.—Articles of steel, copper, silver, and some other of the baser metals may be gilded by simply immersing them in a weak solution of the chloride of gold. Silvering.—Dissolve 1 ounce crystals of silver nitrate in 12 ounces soft water, then dissolve in the water 2 ounces potassium cyanide. Shake the whole together and let it stand until it becomes clear. Have ready some half ounce vials and fill them half full of Paris white or fine whiting and then fill up the bottles with the liqnid and it is ready for use. The silver coating is not as tenacious to the article as when electrolytically deposited. This is very poisonous and should be handled with great caution—if at all. 3. In making gold chloride from coin after dissolving in nitro-muriatic acid and precipitate with ammonia, will any copper be thrown down with the gold if there had been any in the gold coin or will it remain in the acid? A. Precipitate the copper first by adding sodium bicarbonate until effervescence ceases. The copper will be deposited as a green carbonate of copper. Filter, and add enough nitric acid to turn blue litmus paper red. 4. I have "Experimental Science" and would like to know if I made a dynamo one-quarter size of the hand power dynamo on page 488, would I get a sufficient power to ring an ordinary 2½ inch bell, such as is used with a battery? A. Yes. 5. What will dissolve bichromate of potash and gelatin off glass that has been exposed to sunlight? A. Try weak hydrofluoric acid. 6. How can I put the finishing polish on an opal? A. Use fine emery applied to a lead lap, finish with rottenstone and water. 7. How can iron or steel be blued without heat? A. Solution of potassium ferricyanide and water, one part of the potassium salt in two hundred of water; solution of ferric chloride same proportion. Mix the two solutions and dip.

(6307) M. W. asks: Why is it that dirt taken from an excavation will not fill it when replaced? A. The dirt and sand of all original soils, except wind-driven sand, is solidly packed, having been deposited slowly in water in the early geological ages, by which action the particles were floated into contact, thus occupying the smallest possible volume. When such earth is disturbed the contact is broken, a thin film of air separates the particles and keeps them from falling into the closest relation. This is proved by pouring and ramming dry sand into a keg and then pouring in water to saturation; then by shaking the keg the sand will settle into close contact, showing the difference in volume.

(6308) J. E. H. asks: 1. What is the best kind of glass to be used in making Wimshurst machine? A. Thin crystal plate. 2. What size wire shall I use to wind sewing machine motor for 110 volts? A. For motor described in SUPPLEMENT, No. 641, use No. 3 wire on field and No. 28 on armature. Start it with a resistance in series or you will burn out the armature. 3. A good method to cut the tops off two quart bottles. I would like to make battery jars out of them. A. Notch the glass with a file; rub it back and forth with a red hot pipe stem or poker. When a crack starts, lead it around with the hot poker or pipe stem. It is well to tie a string around the bottle as a guide. Rub off the sharp edges with a whetstone such as used for scythes.

(6309) N. B. P. asks for browning for shotgun barrels. Also how is the best way to remove what is left of the old browning? A. Wet a piece of rag with chloride of antimony, dip it into olive oil, and rub the barrel over. In 48 hours it will be covered with a fine coat of rust Then rub the barrel with a fine steel scratch brush, and wipe with a rag dipped in boiled linseed oil. Remove the old coating with oil and emery paper, then remove the grease with caustic potash and treat as above.

(6310) O. S. asks for the relation of the armature wire resistance to the field winding of a series and a shunt dynamo. A. In a series dynamo the resistance of the field magnets should be two-thirds that of the armature; in a shunt-wound dynamo the product of armature and field resistance should be equal to the square of the external resistance. The armature resistance is equal to one-quarter the resistance of the length of wire used in winding it, unless of course the wire is used in parallel.

(6311) W. D. asks: If a bar of wrought iron 1 inch in diameter and 1 foot long, carrying a coil of insulated wire and moving at a speed of 20 feet per second past a permanent magnet distant 1 foot, this magnet having a cross section of 3 inches and a space between its poles of 1 foot, is it possible by varying the quantity of wire to induce a current having a value of 1 watt? A. A current is not measured in watts, but in amperes. It would be very difficult to produce a one ampere current with one volt potential difference in the circuit under the conditions named.

(6312) H. C. W. asks how many storage cells it would take to run the motor 641 to the best advantage, and can the motor be used as a dynamo to charge the batteries? A. Four cells of storage battery will run the motor. It is not adapted for use as a dynamo.

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November 20, 1894,

AND EACH BEARING THAT DATE.

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