RECENTLY PATENTED INVENTIONS.

Engineering.

BALANCED SLIDE VALVE.—Martin A. Green, Altoona, Pa. This valve has a pressure plate with an internal steam space and with portions resting on the valve seat to prevent undue pressure upon the valve, there being a balance ring fitted in the pressure plate and resting against the casing plate, which is disconnected from the pressure plate. The casing plate may be removed to permit access to the balance ring without removing the pressure plate, and the latter is movable laterally over the valve and seat, so it may be properly set without varying the tension of the spring interposed between the balance ring and pressure plate.

SMOKE AND SPARK ARRESTER.—Edson J. Hadlock, Big Spring, Texas. This is an improvement on a former patented invention of the same inventor, providing an apparatus designed to be economically applied to a common locomotive, for arresting and consuming the smoke and sparks. The construction is such that the products of combustion pass to a box on an extension front of the locomotive, where the light smoke is discharged by an escape stack, while the cinders are deposited and the other products of combustion are passed rearward to the fire box through return smoke pipes on each side of the locomotive.

Railway Appliances.

CAR COUPLING.—James M. Elliott, Jr., Gadsden, Ala. Two patents have been granted this inventor for improvements in couplers of the Janney type, in which a knuckle or coupling hook is fulcrumed about a vertical axis in one side of the drawhead, to engage a similar knuckle on the opposite drawhead. One of the patents covers a peculiar construction and arrangement of the rear portion of the knuckle and the drawbar and the means for locking the knuckle in closed position, while the other patent provides a peculiar arrangement of the axial pin, a spiral spring surrounding it and the knuckle. Effective means are thus afforded for positively throwing the knuckle out to its open or uncoupled position in an automatic manner when the cars are separated, to be ready for automatic coupling again without readjustment of the knuckle.

SWITCH SHIFTER.—John Gilstrap and Martin L. Brown, Moscow, Idaho. This invention provides a simple and positive apparatus by which a railway switch may be operated from a moving train, crank shafts parallel with the track being connected with the switch bar, transverse shafts being geared to the crank shafts, while gear wheels on the transverse shafts have oppositely arranged lugs, and weighted levers pivoted on the shafts swing between the lugs, the swinging levers being designed for engagement by sliding bars on the locomotive.

Mechanical.

GRINDING MACHINE TOOL REST.—Darwin L. Brown, Detroit City, Minn. This is a simple and durable rest, arranged for conveniently and accurately grinding tools used by engravers, carvers, watch makers, etc. A bar is adapted to extend across the face of the grinding wheel, at angles to the face of which the bar is formed with shoulders and grooves, the latter being of varying sizes and depth to accommodate the different tool shanks. The tool, pressed with its end against the face of the grinding wheel, has its end ground to a bevel corresponding to the angle formed by the face of the bevel of the groove.

Agricultural.

SEED PLANTER.—Ebenezer R. Knight, St. Johns, Canada. This is a broadcast sower, with a seed box carried by a wheel-supporting frame, there being a valved chute in the center of the box, beneath which revolves a seed delivery drum or cylinder having peripheral grooves or pockets. The implement is of simple and inexpensive construction, for sowing any kind of seed that is to be scattered broadcast, the seed being protected in windy weather when dropping to the ground, and a storage compartment being provided whereby the seed may be carried in bulk to the field without danger of spilling.

Miscellaneous.

ROAD SCRAPER.—John S. Palmer, West Duluth, Minn. The several scraper bars of this machine are hinged to a rod mounted upon the main axle. The scrapers are arranged in a series, their blades parallel with a rigid diagonal brace and supporting beam, and each scraper consists of a bar hinged at its forward end (the bars being of different lengths), while its rear end has a downwardly extending flange to which is bolted the blade. Each blade has an inwardly projecting lipat one end, the lips overlapping, so that the space between the blades is closed to prevent the rearward passage of dirt. By means of a novel arrangement of spring bar and operating lever, the entire weight of the machine may be made to rest upon the blades, or a less weight, as desired.

DERRICK DRUM.—Adams C. French, Rapid City, South Dakota. The drum proper, according to this improvement, has at one end a receiving portion or section, to receive surplus cable, this section adjoining the main windlass portion, on which the strongest pulling is done. A plate separates the sections, and has a slot through which the cable is passed from one section to the other, whereby any desired length of cable may be paid out, and the winding and unwinding effected without frictional wear upon the collected rope. The drum is formed of two concentric sections, one larger than the other, the larger receiving cable from the smaller sections.

STRAP FOR BUNCHING LUMBER.—Edward C. Binet, Clipper Mills, Cal. This improvement provides a metallic band having barbs designed to engage the outside portions of separate pieces of bunched lumber formed into bundles, the barbs being so shaped as to lock fast to the material, and thus form a reliable binding strap. The end barbs are furnished with a peculiarly shaped locking prong adapted to interlock with the bunched material when driven therein, the strap being thus well adapted to hold in closely bound condition planed boards or similar material, to facilitate handling, counting, etc.

DRYING STOVE FOR BRICKS, ETC.—Albert Schaaf, Halle, Germany. Combined with the drying flue of this stove or furnace is a series of depending transverse curtains, while over the curtains extends a strand, short cords from which connect all the curtains for simultaneous operation. The curtains serve to regulate the currents of air and are adjustable, so as not to touch the articles. The furnace is designed to utilize the heat to the fullest extent in drying brick, ceramic articles, etc., conducting the warm dry air in divided currents along every article treated, and into uniform contact with the whole free surface of every object to be dried.

ICE PLOW.—Hamilton Pray, Clove, N. Y. This plow has two principal longitudinal beams so connected that they may be adjusted nearer together or farther apart, according to the width of the ice blocks to be cut, a clip held on the beam carrying a transverse bolt extending through the beam, a cutting blade pivoted on the bolt having an extension adapted to be secured to the beam. The invention is an improvement upon a former patented invention of the same inventor, providing a simple and durable construction designed to prevent breaking of the cutting blades and beams.

FOOT FOR DREDGE ANCHORS.—William Pike and Norman McDairmid, Sault Ste. Marie, Mich. Combined with the anchor post is a foot having swinging leaves, open-topped boxes being secured to the leaves, while a cross bar secured to the rigid portion of the foot extends into the path of the boxes. Cables secured to the leaves extend upward to the top of the post, and a counterbalance is secured to the cables. The anchor foot being made in hinged sections, when the dredge moves off the center the foot partially closes, overcoming the suction, so that it may be easily worked loose and raised.

GRAIN DUMP.—John P. Peterson, Worthington, Minn. This invention provides an inexpensive structure, so built that the pit to receive the grain need not be sunk in the ground, or may be sunk only a little, the parts being so arranged that dust or foreign matter, fluid or solid, will not interfere with the action of the dump timbers in cold weather. The dump timbers are pivoted in openings of a platform, beneath which is a shaft having arms connected with the timbers, an operating lever, and locking arms connected with the arms of the shaft to engage the platform. The vehicle is driven upon the platform, and by rocking the shaft the timbers, including the vehicle, are inclined to facilitate depositing the load.

SANITARY PAIL.—Charles Baron, New York City. This is a very simple and comparatively inexpensive vessel, that may be conveniently used in any household. It has a cover which may be removed from, or held in locking engagement with, the body, and the pail is fitted for use as a commode when desired.

CARPET STRETCHER.—Robert Harrison, Philadelphia, Pa. This device has an arched body terminating at its forward end in a jaw, a second spring-pressed jaw being pivoted upon the body and adapted for engagement with the fixed jaw, while feet have adjustable connection with and act as fulcrums for the body. The device is designed to be easily and quickly manipulated, so that the carpet, with the stretcher, may be carried directly to the baseboard of a room.

STIRRUP.—Robert H. Dacus, Dardanelle, Ark. This is an improvement in wooden stirrups, the suspension bar being centrally held parallel with the sides of the stirrup, and being supported in position by cross bars by which the upper ends of the sides of the stirrup are held spaced apart. The suspension bar and transverse cross bars may be either of wood or metal.

PIANO ATTACHMENT.—Henry A. Hauff, Brooklyn, N. Y. This is a simple apparatus designed to be applied to any piano to cause a beginner to mechanically hold the wrists and hands in proper position for correct playing, the apparatus being adjustable to suit people of any size. It consists of two notched bars held by suitable attaching devices to extend out and up from the ends of the keyboard, these bars supporting a cross rod, the wrists of the player when touching or a little above the cross rod being in the proper position for playing.

COMB.—Elmira H. Harpham, St. Louis, Mich. This is a back comb for ladies' use, combining a comb for holding the back hair neatly and in position when "done up," and an attached neck comb for keeping up neatly the neck hairs or locks; there is also combined therewith a hair dart or pin to pass through the hair and aid to hold the combined comb in place, the whole forming a useful and ornamental article for ladies' head wear.

MUCILAGE HOLDER.—Frank H. Palmer, Brooklyn, N. Y. This is a device designed for pocket use, and is arranged for conveniently gumming at all times papers, envelopes, stamps, etc. It consists of a wooden casing in pencil form in which is fastened a stick of mucilage, one end of which projects at one end of the casing, the latter to be cut down as the mucilage wears off. A cap covers the projecting end, the gum stick being moistened when used.

CORNER BRACKET SHELF.—Joshua D. Legg, Long Eddy, N. Y. Combined with a triangular shelf having a frieze plate securable to its front edge is an adjustable pointed rod located at the angle of the shelf opposite the frieze plate, bent arms pivoted at opposite sides of the shelf having prongs on their outer limbs to project beyond the shelf, with turn buttons for locking the arms in position.

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.

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Notes & Queries

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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.

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(4540) H. C. P. says: 1. A current of electricity passes through the primary wire of an induction coil, is the strength increased by the secondary wire or not? A. The primary current is diminished by the current in the secondary wire. 2. About how many feet of No. 20 insulated magnet wire to the pound? A. About 324. 3. Do the armature and fields of a motor use the same amount of current respectively while running? A. The field magnet requires much less current than the armature.

(4541) C. N. asks (1) whether the Brush machine gives a direct current or alternating current at its terminals. A. The Brush machine delivers the direct current. 2. What is the E. M. F. and C. of this dynamo? I suppose it is a 16 light dynamo giving an E. M. F. of 850 volts and 10 amperes, but I am not sure. Diameter of ring about 20 inches. Number of coils in same, eight. A. We are unable to furnish a reply to this query from the data sent. Better write to the manufacturer of the machine. 3. What transformer would be best for reducing a current of 850 volts to a pressure of 110 volts, and how many amperes would the current have? A. Any form of transformer will answer, provided it is adapted to your current. 4. How many 16 candle power 110 volts lamp would the dynamo run? A. About seventy-five 50-volt lamps. 5. Would one transformer be best and cheapest at the dynamo, or three transformers? A. It is better to have three transformers in parallel. 6. Please explain the action of a transformer, if a dynamo propels a current of 10 amperes at 1,000 volts and the pressure be reduced to 100 volts by a step-down transformer. A. The transformer is simply an inverted induction coil, and the ratio of the primary and secondary currents to each other is as the ratio of number of convolutions of the primary and secondary wires.

(4542) H. W. writes: Last fall I bought myself a pair of long rubber boots for hunting. The blackberries and bushes have worn the rubber on top of foot so thin that the water will come through. Can you tell me of any preparation, or how to make it, to put over this rubber, and which will last as well as the rubber? A. They cannot be satisfactorily repaired. Thin gutta percha leaf might be applied in patches, and made to adhere by a hot iron, or the ordinary shoemaker's cement, might be applied so as to fill the tissue. But you cannot, we fear, get much satisfaction in mending them.

(4543) W. S. asks: 1. I would like a recipe for making red and blue litmus paper. A. Dissolve litmus in water, neutralize with nitric acid until it is barely red, filter if necessary, and by the addition of caustic soda in very dilute solution, and added drop by drop, just restore the blue color. Dip paper in this and dry for blue litmus paper. For red add to the solution dilute nitric acid drop by drop until it is just red and use for red paper. 2. Would an electric motor when run as a dynamo give the same number of volts that it took to run it as a motor? A. No. 3. Can a dry electric battery be charged and run as a storage battery, and is it cheaper than the usual lead battery? A. No.

(4544) E. H. P. asks (1) whether or not a saturated solution of common salt in water will absorb any of the constituents of furnace gas, and therefore whether or not it may be used in collecting such gas. A. No more than plain water. It is not available for collecting gases. 2. Will you also kindly give an accurate method of determining, from the products of combustion, how much air had been supplied to the furnace? A. If all the oxygen evolved in combination in the products of combustion came from the air, then one-ninth the weight of the water, and 32-44 the weight of the carbonic acid gas, and 16-28 the weight of the carbonic oxide gas, give the amount of oxygen, and by multiplying this weight by 100 and dividing by 23 the weight of air is given. The problem is complicated by the presence of oxygen in combination as water or carbonate in the materials introduced into the furnace, and by the retention of some oxygen in combination in the ash; all this has to be allowed for.

(4545) C. H., Jr., asks: 1. Size of objective, length and power of telescope used by Galileo. A. The sizes of the telescopes made by Galileo are not stated. Their magnifying power is stated at 30 for the largest. 2. What is the variation from standard of an aneroid barometer in a year, and how is same corrected? A. The aneroid varies about one-tenth of an inch, when properly corrected by comparison with a mercury barometer. It will keep its adjustment if carefully handled. It has a key screw in the back for adjustment.

(4546) R. T. P. says: I am contemplating laying a cement walk, would like to know the best proportion of cement to sand to make the best walk. There are parties here laying walks 6 of sand to 1 of cement for the first 3 inches; seems to me not cement enough. A. One of cement to 6 of sand may do for the under layer, but the surface should be finished with a layer of 1 of cement to 2 of sand.

(4547) N. B., Australia, asks: 1. If an engine is provided with a fly wheel just large enough to insure a uniform motion of the machinery in a mill, would power be gained or lost by using a larger wheel? A. There is no power gained by the weight of a fly wheel beyond that necessary for regulating the speed. Extra weight is a loss by increasing journal friction. 2. A pair of rolls are used for grinding wheat, one roll running much faster than the other. Will the fast roll suffer more from friction on its grinding surface than the slow one? A. Normally both should wear equally.

(4548) A. E. S. asks what substance it is that, put into water, will cause the dirt to settle to the bottom immediately? A. There is no agent that will do this. A very small amount of alum, a few grains to the gallon, especially if ammonia is added to barely alkaline reaction after it, will clarify water if allowed to stand. A little albumen may be dissolved in it and the water boiled. Gelatine precipitated by tannic acid will have a clearing effect. All these agents require time for settling or filtration.

(4549) G. W. R. asks: We desire to run an alarm from a factory to the fire engine house. The distance is half a mile. We desire to run the alarm by battery. 1. What sized wire will be necessary? A. Use No. 20 wire. 2. Will it be necessary to run two wires, or can the return be made by ground? A. A ground return will be the best. 3. How many cells of Leclanche battery will be necessary? A. Four or five cells. 4. Will it be better to use insulated wire? A. It will be much better unless the wire is carried by insulators like a telegraph line. In such case bare wire can be used.

(4550) W. C. V. asks: Are the gas and oil heating stoves that allow the products of combustion to escape in the room safe to use, from a hygienic point of view? They have them for sale here that are claimed to be sufficient to heat a room fifteen feet square. Would such a stove be likely to be injurious to the health? A. The products of combustion from gas and oil stoves, principally carbonic acid gas, with a small portion of carbonic oxide gas, are well known to be unhealthy and poisonous to animal life. The carbonic oxide is a deadly poison. These stoves are largely sold throughout the United States, with claims for convenience and economy. They can be trusted on these grounds where there is sufficient ventilation to carry off the gases of combustion, as for kitchen use;

but great caution should be used in heating small, close rooms as stated, with closed door and window, when occupied. Bed rooms that are damp may be warmed and then ventilated with safety before going to bed.

(4551) A. R. H. says: Please inform me if you can compress water in a boiler when testing a boiler by cold water. When the boiler is full and I put my gauge on, do I not compress the air that is in the water when I start force pump, instead of the water? When filling boiler I am letting air out of the steam dome, and after the same is full I attach my gauge. Do I not displace air when more water enters the boiler? A. Water is slightly compressible, but not enough for observation in testing a boiler, because the elasticity of the metal in the shell allows it (the shell) to stretch more than the compressibility of the water. The air that may accidentally lodge at the irregularities in the shell, as well as the air mixed with the water, all help to make the gauge show compression. The pipe leading to the gauge is also liable to be filled with air, which also contributes to the apparent elasticity of the contents of the boiler.

(4552) I. G. B. says: It is said that the sun is on the meridian of any place but four times a year at 12 o'clock. That is sun and clock agree only at those times, which are 15th of April, 15th of June, 1st of September, and 25th of December. The question is why those particular days? Whereabout is the earth in its orbit on those days? A. The variation of the sun from mean clock time is a gradually increasing and decreasing amount from its perihelion and aphelion points due to the elliptic form of the earth's orbit, which alone would make but two terms in the yearly variation of time. The effect of the obliquity of the ecliptic so changes this condition that the combined sums and differences make four times in a year at which solar and clock or mean time agree as stated in your query. The sun is in perihelion about the 25th of December, and in aphelion about the 15th of June. As the velocity of the earth in the perihelion half of its orbit is greater than that in the aphelion half, so the curves of time difference are greater in the first and last quarter of the year, as shown in your almanac.

(4553) C. & L. ask: What is the cause of the moon's appearing of a reddish hue sometimes at its rising? To what is ascribed the enlarged form of the moon at times of rising? A. The red appearance of the moon and sun at rising and setting is caused by the unequal absorption by the atmosphere of the colored rays, which are combined in white light, the colored rays having the shortest wave lengths being first absorbed. The violet, indigo, blue, green, when the fading yellow gives the sun and moon the orange hue and occasionally a strongred. It is the vastly increasing distance that the light travels in the atmosphere on the horizon that causes absorption. The sun looks red at noon time through considerable depth of water. The increased diameter is only apparent, an illusion of eye. The measured horizontal diameter is the same as at higher altitudes.

(4554) E. A. McG. asks: 1. What is the buoyant force or negative weight of one cubic foot of hydrogen gas, of coal gas, of a vacuum, in ounces or pounds, taking the density of the air at sea level as a basis? A. There is no such thing as negative weight. In air at the sea level hydrogen has a buoyancy of about 70 pounds to 1,000 feet, and coal gas one-half as much. 2. How much stronger would a vessel containing hydrogen have to be, to resist its expansive force at a height of 10,000 feet, than at sea level, and what is the ratio of expansive force developed as it ascends? A. At the height named hydrogen or any gas inclosed at the sea level would exert a pressure of about 5 pounds to the square inch. The exact ratio can only be expressed by a complicated formula. 3. Is aluminum manufactured in any considerable quantities? If so, where, and what is about its value in the United States per pound? A. Yes; in Pittsburg and in other places. It is worth in quantities about $1.50 per pound.

(4555) T. W. writes: I am desirous of learning what agent I must employ to etch or rather engrave on hard sheet rubber, in the manner that nitro-muriatic acid acts on zinc, *i. e.*, I wish to cover the rubber sheet with a coating of wax, soap or like matter, then scratch the desired lines into the said coating and apply to the lines such a liquid as will eat into rubber in the exposed places. A. Aside from the sand-blast method we know of no way of etching vulcanite or hard India rubber. An impression can be produced by a die or engraving pressed upon it while heated to 212° Fah. If the surface is now smoothed off and exposed to heat, the lines of compression will swell or expand again, and thus give a relief plate. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 252.

(4556) E. N. A. asks how to make Pharaoh's serpents. A. These are little cones of sulphocyanide of mercury which, when lighted, give forth a long, serpent-like, yellowish-brown body. Prepare nitrate of mercury by dissolving mercury dioxide in strong nitric acid as long as it is taken up. Prepare also sulphocyanide of ammonium by mixing 1 volume sulphide of carbon, 4 strong solution of ammonia, and 4 alcohol. This mixture is to be frequently shaken. In the course of about two hours, the bisulphide will have been dissolved, forming a deep red solution. Boil this until the red color disappears and the solution becomes of a light yellow color. This is to be evaporated at about 80° Fah. until it crystallizes. Add little by little the sulphocyanide to the mercury solution. The sulphocyanide of mercury will precipitate, the supernatant liquid may be poured off, and the mass made into cones of about ½ inch in height. The powder of the sulphocyanide is very irritating to the air passages, and the vapor from the burning cones should be avoided as much as possible. To ignite them set them on a plate or the like, and light them at the apex of the cone.—From the "Scientific American Cyclopedia of Receipts, Notes and Queries."

(4557) P. A. F.—For Silvering Brass.—The first essential is that the metal be chemically clean, which is best done by the use of dilute nitric acid, followed by a wash with clean water, and then with dilute aqua ammonia, drying in sawdust. If the metal be then rubbed with chloride of silver dissolved in ammonia and then washed and again dried in sawdust, the result will be fine. It should, however, be immediately lacquered in order to preserve the surface. The chloride of silver is preferable to the nitrate. No battery is used. Or for thin plating dissolve in 10 or 12 drops of water and add nitrate of silver, 2 parts, cyanide of potassium 6 parts. Rub on the object.—Desilvering.—The following is a liquid which will dissolve silver without attacking copper, brass, or German silver, so as to remove the silver from silvered objects, plated ware, etc. It is a mixture of 1 part of nitric acid with 6 parts sulphuric, heated in a water bath to 160° Fah., at which temperature it operates best.

(4558) J. L. C. and F. P. ask how to make oleate of soda referred to oleate of soda, referred to page 162 of the SCIENTIFIC AMERICAN. A. To make the pure acid, 2 ounces of pure soap (almond oil is the best, but Castile will answer) are dissolved in 20 ounces of boiling water. One ounce of sulphuric acid, previously diluted with 2 ounces water and allowed to cool, is added. The fatty acids rise to the surface in an oily layer. The water is siphoned off, and they are washed three times with boiling water. The mass is allowed to cool, and is removed from the surface of the water, where it floats. It is weighed, mixed with ⅓ its weight of litharge, and heated (212°-225° Fah.) until complete combination is effected. This may be known by the cessation of any evolution of bubbles from the mass. The resulting lead plaster is allowed to stand mixed with 10 to 15 times its weight of ether in a tightly corked bottle until completely disintegrated. Then it is filtered, and to the filtrate hydrochloric acid is added as long as any lead is precipitated. The ethereal solution is poured off, and the ether recovered by distillation, leaving pure oleic acid. Two fl. drm. of the acid is added to somewhat less than 1 pint of boiling water, and solution of caustic soda very carefully added, drop by drop, until complete solution of the acid is effected, very carefully avoiding an excess of soda, and after cooling, water is added to make it measure just 1 pint. A standard soap solution is thus obtained. To this add ½ its bulk of the best glycerine. Shake long and well, and the mixture is ready for use.—From the new "Scientific American Cyclopedia of Receipts, Notes and Queries."

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September 27, 1892,

AND EACH BEARING THAT DATE.

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