

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 lip at 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 base board 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.

Business and Personal.

The charge for insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the following week's issue.

Grind Stone Frames—with cabinet base and all improvements for machine shop use. Send for circulars and prices. W. P. Davis, Rochester, N. Y.

"U. S." metal polish. Indianapolis. Samples free. Drop presses a specialty. Am. Tool Works, Clev., O. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. 6 Spindle Turret Drill Presses. A. D. Quint, Hartford, Ct. G. D. Hiscox, 361 Broadway, N. Y., Consulting Engineer. Universal and Centrifugal Grinding Machines. Pedrick & Ayer, Philadelphia, Pa.

For Sale—Patent cycling and boating machine. See illustration on page 225. Address the inventor.

Models and special machinery, lathes, dies, etc. Empire Machine and Tool Co., New Brunswick, N. J.

Jessop's best English tool steel is commended by those who make fine tools.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

Centrifugal Pumps. Capacity, 100 to 40,000 gals. per minute. All sizes in stock. Irvin Van Wie, Syracuse, N. Y.

Portable engines and boilers. Yacht engines and boilers. B. W. Payne & Sons, Elmira, N. Y., and 41 Dey Street, New York.

For pile driving engines. J. S. Mundy, Newark, N. J.

For Sale—A valuable invention, "workbox," dated March 15, 1892, No. 470,728. Address C. Weiss, 55 Waverley St., Brighton, Mass.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps, acid blowers, filter press pumps, etc.

Split Pulleys at Low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Perforated Metals of all kinds and for all purposes, general or special. Address, stating requirements, The Harrington & King Perforating Co., Chicago.

To Let—A suite of desirable offices, adjacent to the Scientific American offices, to let at moderate terms. Apply to Munn & Co., 361 Broadway, New York.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4; Munn & Co., publishers, 361 Broadway, N. Y.

Canning machinery outfits complete, oil burners for soldering, air pumps, can wipers, can testers, labeling machines. Presses and dies. Burt Mfg. Co., Rochester, N. Y.

Competent persons who desire agencies for a new popular book, of ready sale, with handsome profit, may apply to Munn & Co., Scientific American office, 361 Broadway, New York.

Wanted—A first class mechanical and civil engineer, competent to take charge of a large plant and a large number of men. A young man required. Address Ability, box 77, New York.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

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.

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.

INDEX TO NOTES AND QUERIES.	No.
Aneroid barometer.....	4545
Astronomical.....	4545 4552
Brass to silver.....	4557
Cement walk.....	4546
Electrical.....	4540, 4541, 4543 4549
Fly wheels.....	4547
Hard rubber, to etch.....	4555
Hydrogen, buoyant force of.....	4554
Litmus paper.....	4543
Oil stoves.....	4550
Oxide of soda.....	4558
Pharaoh's serpents.....	4556
Water, to cleanse.....	4548

(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 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 alumina 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;