RECENTLY PATENTED INVENTIONS.

Agricultural.

SULKY PLOW. — George W. Haines, Stockton, Cal. The frame of this machine has a vertically adjustable transverse shaft, with a rocking support, permitting adjustments of the plow beams and plows, without interfering with the free action of the clevis, with other novel features, adapting the plow to a wide range of work in preparing lands to receive crops, for road grading, and other purposes.

BAND CUTTING FORK.—Arthur Rodman, Holder, Ill. This is a fork with a blade or cutter attachment, whereby, in unfastening sheaves of grain, preparatory to shaking, before the straw is passed through the thrashing machine, the man using the fork can cut the bands and handle the straw simultaneously, expediting the work and saving the service of extra help.

CORN HARVESTER AND HUSKER.—Andrew L. Rasmuson, Clermont, Iowa. This invention covers novel features of construction and combinations of parts in a combined corn harvester and husker, by which corn may be gathered, husked, and passed to a discharge opening, where it may be placed in bags or other receptacles.

POTATO DIGGER. — James W. Scott, Uhrichsville, Ohio. This invention covers an improved construction of an apparatus formerly patented by the same inventor, whereby the machine is made more durable and efficient, having detachable spades or cutters to suit different soils, and to assist sandy or loamy soils, clods, weeds, etc., in passing back on the shaker.

SWIVEL PLOW.—Ferdinand J. Blanke, Whitewater, Wis. This plow is light, simple, and durable, and the invention provides means whereby the plows may be reversed expeditiously and conveniently, while the draught and position of the handles will be simultaneously changed to correspond with the plow brought into use.

Mechanical.

BALING PRESS.—David L. Hannay, Grapeville, N. Y. This press has a cam device for adjusting the yielding wall of the baling box by a slight turn of the cam head lever, with other novel features, making a simple, inexpensive, and efficient machine for pressing hay, straw, cotton, etc., into smooth bales, with economy of time and labor.

CHANNELING MACHINE.—William H. Bryant, North Amherst, Ohio. The machine consists essentially of a jointed drill-carrying lever mounted upon an adjustable fulcrum, the two sections of the lever being normally held in the same plane by a spring, while the lever is connected to a crank shaft adapted to impart a rocking motion, the machine being designed especially for quarry use.

MAKING STEREOTYPE PLATES.—Lucius Goss, Upper Montclair, N. J., and Samuel W. Trew, Brooklyn, N. Y. This invention covers a novel construction of machine for trimming, planing, and sawing the plates, and fitting them for the form by a single passage of the plate through the machine, which has a reciprocating bed plate in combination with edge trimming knives, plane, diagonally set saw, and holding bars.

PRINTING CYLINDER.—William Berri, Brooklyn, N. Y. This cylinder is designed especially for use in the printing of warp threads to be used in the weaving of tapestry carpets, where a number of cylinders and supporting carriages are employed, each cylinder and carriage arranged to print a different color upon the yarn, the invention covering a segmental printing block or die with recessed side faces, and with projections extending from its inner circumferential face.

CALIPERS AND DIVIDERS. — Thomas Green, East Davenport, Iowa. This is an improved measuring and drawing instrument specially adapted for mechanics, and to be used as inside and outside calipers, dividers, etc., the instrument having a plate with segmental graduated part and a fixed arm held thereon, with an indicator, and other novel features, whereby the instrument may be readily changed from a divider into an inside or outside calipers.

NEWSPAPER ADDRESSING MACHINE.—Henry Banks, Jr., La Grange, Ga. This is a machine intended for attachment to the folder of a newspaper press, for addressing the newspapers as they are delivered, and is so constructed that when no papers are passing through the machine the addressed strip is not cut, the invention covering various novel features of construction and arrangement of parts.

Railway Appliances.

RAIL CHAIR AND SLEEPER.—Cenemon P. Espinasse, Montauban, France. This is a metallic railway sleeper having on its upper surface a central longitudinal rib, with parallel side ribs and transverse ribs, the central rib being recessed and notched, in combination with a compressible packing block having a serrated upper surface, and a railway chair having a serrated bottom surface bearing on the packing block.

HEAD CHAIR AND CONNECTING ROD.—William J. Hooper, Rincon, New Mexico. This invention provides a railway head chair and switch connecting rod so constructed as to render the parts strong and durable, while the throw rail connection is so made that if any of the parts become worn or broken they may be easily and quickly replaced.

Miscellaneous.

SHOE HORN. — Samuel D. McKenty, Philadelphia, Pa. This horn is made with a handle, and a lower portion capable of clamping the back end of the shoe and conveniently pulling it on to the foot, without soiling the hands of the wearer.

SKATE.—Thomas H. McQuown, Biggsville, Ill. This skate is made with a sole plate and a runner made in two parts, of which the rear part is rigidly secured to the sole plate, and the front part pivotally connected thereto, permitting the skater to skate on his heel or toe, or on both, and readily pass over uneven ice or obstructions.

HOISTING GEARING. — Carl H. W. Reichel, New York City. This invention covers a differential pulley and cord hoisting gearing more particularly adapted for adjusting the picture or color tray of an artist's easel, six pulleys being journaled to fixed and movable parts of a structure, in combination with an endless cord, the device being also applicable to a wide range of work in connection with other mechanisms.

KNIFE CLEANER.—Robert W. Jamieson, Prince Albert, Saskatchewan, N. W. Territory, Canada. It is made with two blocks or plates hinged together to present opposing faces for first cleaning and then polishing knife blades, the blades to be first cleaned while wet and afterward dry polished, the blocks being faced with cleaning fabric and supplied with knife brick powder.

MAKING BASIC LEAD SALTS.—Farnham M. Lyte, Cotford, Oakhill Road, Putney, Surrey County, England. This invention covers a process of fitting sparingly soluble salts of lead for use as white pigments, by first treating basic lead acetate with sulphuric acid to precipitate the extra base, then rendering the precipitate basic by the addition of basic lead acetate, and finally boiling the mixture.

RUNNING GEAR FOR VEHICLES. — Alfred W. Johnson, New Brunswick, N. J. By this invention king bolts are dispensed with, and certain combinations made between the bodies and swiveling axles of wagons, whereby, when cranking the axles, the center portions thereof in direction of their length are brought closer together or moved further apart, the whole space between the wheels being utilized by sliding the body of the vehicle.

Business and Personal.

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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.

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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.

(322) R. J. F. writes: I use a large amount of burlaps to wipe paraffine from tin cans. Will you please inform me in the SCIENTIFIC AMERICAN of a cheap way to save both the paraffine and burlap to use again? A. Wash the burlap in naphtha and distill it after the burlaps are removed, saving the distillate to use again. The paraffine will remain in the retort.

(323) H. E. S. writes: The Amoskeag steam fire engine has always been known as having a submerged flue boiler, the flues carrying off smoke and distributing the heat. I have had a number of arguments upon this boiler, it being claimed that while it was a flue boiler, it was a tubular boiler also. I hold that it is a flue boiler and not a tubular boiler, in the sense that a fire engine boiler is tubular nowadays, for you find by consulting the make of boiler used on all modern engines, such as Clapp & Jones, Ahrens, Lafrance, Silsby, that the water is carried inside the tubes, the heat outside, and the whole boiler interior being the smoke flue. I cannot furnish you cuts to illustrate my position, but perhaps you are familiar with them. The flues in an Amoskeag boiler are certainly tubes before they enter into the construction of the boiler, but after that they carry off the smoke and distribute the heat and furnish the draught for fire, and I hold are no longer tubes, but flues. Am I right in my understanding as to the tubular and flue boiler? A. In the pipe trade, tubes and flues are names used for the same article. The custom with boiler makers is to designate all boilers made with the small welded tubes or flues, whether vertical or horizontal, as tubular boilers, and the boilers with drop tubes, as used in fire engine, as drop tube boilers, although part of the tubes carry off the smoke as in the ordinary vertical tubular boiler of the trade. A flue boiler strictly speaking is applied to that class of boilers having large riveted flues. In the present advanced state of the wrought iron pipe industry, these large flues are now made by welding the same, and are generally called flues.

(324) Lecturer and Draughtsman asks us to explain the principle on which the megascope is constructed, which throws an image on the screen from opaque or surface objects, instead of from transparencies. Also, could the principle be adapted to throwing an image in a dark room from external objects, and what size of disk can be thrown? A. For illustrated description of an electric megascope see SCIENTIFIC AMERICAN SUPPLEMENT, No. 640. It is suitable for illustrating lectures and oral teaching. When adapted for projecting outside objects in a dark room, it becomes a camera, or, in connection with a mirror, on the principle of the solar microscope, may have its optical center changed in the direction of outside objects. The size of the image may be from 4 to 10 feet diameter or more, according to the intensity of the light and size of lenses. They can be procured through the optical trade.

(325) E. C. H. O. asks: Will an optical expert kindly say if a concave mirror can reproduce external objects in a dark box or room like the camera obscura, and would the image obtained be strong enough to affect a sensitized surface? A. About forty-five years ago Prof. John W. Draper and Mr. Wolcott made experiments with concave reflectors for taking daguerreotypes, some of the reflectors having holes at the center for observation and elimination of stray light. Aberration and other difficulties caused them to be laid aside and superseded by the fast improving lenses for photographic work. 2. Also, what instrument is there for giving representations of external objects, so as to sketch them, besides the camera lucida? A. We know of nothing but the camera obscura in its various forms, and nothing is better than a good camera lucida if properly shaded.

(326) C. A. M. says: Please inform me through your columns how to stain Tennessee poplar wood a nice cherry color with a good finish. Also what acid I can use to clean brass by dipping? A. For cherry color, mix equal parts of solution of extract of logwood and solution of saffron in dilute spirit of wine, and add a little solution of tin to tone the stain; dry, and varnish. To clean brass by acid dip, make the brass clean from all grease or varnish by dipping in a hot strong solution of potash and rinse in hot water, then dip in strong nitric acid for a few seconds and then in hot water. If the color is not clear at first, dip again.

(327) Amateur Binder says: I would like a receipt for making a varnish for the leather covers on books. Something to use on roan binding to finish up with. I used an alcohol varnish, and it made the color run. A. Use bookbinder's varnish, which is made by dissolving pale gum sandarac 3 ounces to 1 pint 95 per cent alcohol, dissolve cold and decant. Apply very quickly with a small soft sponge, like wiping the surface lightly. It is the excess in quantity that makes the color run.

(328) B. F. E. asks: 1. What should constitute a solder (such as is used on tin cans, oyster, peach, and other preserves) which would be durable, and at the same time so that the tin soldered with it could be easily pulled apart? A. There is no solder that will pull apart easily that is reliable; 50 parts tin, 25 parts lead, 25 parts bismuth, make an easy flowing solder that is weaker than the ordinary tinman's solder. 2. What is the cost of tin cans? A. We cannot furnish cost of tin cans.

Enquiries to be Answered.

The following enquiries have been sent in by some of our subscribers, and doubtless others of our readers will take pleasure in answering them. The *number* of the enquiry should head the reply.

(329) D. Y. M. asks: What substance will change hard water to soft?

(330) S. T. R. says: I will be pleased to have you inform me or tell me where I can find out the results of the trials that have been made in burning steam by blowing it into boiler furnaces, or in any other way. Is it actually burnt, and if so what are the economic results, and at what temperature does it ignite?

(331) J. F. asks: Can you inform me through your answers to correspondents, the mode of constructing the arch of the West Shore tunnel at West Point and the means used?

(332) W. A. T. says: I want to descend from a balloon by means of a parachute; what kind of goods can I make a hot air balloon and parachute of without using silk, and how large must balloon be to carry 250 pounds, and what is the best way to fill the balloon with hot air?

(333) E. L. asks: Will you kindly inform me how to stop new shoes making so much noise?

(334) W. L. G. asks: 1. Will you please inform me what is the best method for mounting starch granules and, blood corpuscles for microscope objects? 2. A mounting medium that will not dissolve raphides. 3. What is the highest magnifying power of the large Lick telescope?

(335) L. W. S. asks: 1. What is the cause of cyclones? 2. Why did we have no cyclones forty or fifty years ago?

(336) E. W. T. asks: Please give me a formula for making gold lacquer that will stand 250 degrees of heat without cracking off, and that will not come off when applied upon tin if it is run through a machine and bent in any direction.

Replies to Enquiries.

The following replies relate to enquiries recently published in SCIENTIFIC AMERICAN, and to the numbers therein given:

(81) Mixing Chemicals. — In mixing nitrate of potash with sulphur and sulphide of antimony care should be exercised to avoid explosion or deflagration. Powder each ingredient separately in a clean mortar and mix without using the pestle.

(88) Volts required to operate an electric motor one-half the size of one described in SUPPLEMENT, No. 641. Six volts and upward, if the battery is of low resistance.

(89) Wire for Induction Coil.—Use No. 36 on secondary, No. 20 on primary. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 160 and 569. A No. 2 Grenet battery is large enough to work it, though two or three cells would be better.

(92) Silver Plating.—The battery described is large enough. For oxidizing copper and brass. For brass 4 drachms perchloride of iron to 10 oz. tersulphide of arsenic, 1 pint water. For copper, 1 drachm sulphur, 1 oz. pearlash, 1 pint water. Immerse until the color is satisfactory in depth. Quicking articles before plating is not absolutely necessary, but is to be recommended.

(125) Staining Ivory.—Treat with pyrogallic acid to make nitrate of silver stain permanent.

(127) Producing Green and Blue Stains.—The science of staining minerals has received quite extensive development of late, chalcedony and other minerals proving particularly amenable to the treatment. The mineral salts are used; the exact treatment seems hard to ascertain.

(133) Converting Carbonic Oxide (CO) into Carbonic Acid Gas (CO_2).—Pass it through a tube containing oxide of copper heated to a full red heat.

(137) Cost of Induction Coil in SUPPLEMENT, No. 161.—Copper Color of Aniline Green.—The materials for induction coil will cost from $10 to $15. Labor you must estimate for yourself. The copper color you refer to is not due to copper; the aniline contains none; it is a kind of fluorescence.

(138) Strength of Batteries.—Batteries for Various Uses.—Dynamo and Motor.—1. Disque Leclanche, E. M. F. 1·48 volts, resistance one ohm. 2. Do not know what battery you mean. 3. Fuller and Bunsen, E. M. F. 1·8 to 2·0 volts, resistance 1-10 to 1 ohm, according to size. From above you can calculate amperage, dividing E. M. F. by battery resistance, plus outer circuit resistance. The proper voltage of battery depends on the uses. No general rule can be given. Low resistance of battery is the great desideratum. Use gray iron for motor and dynamo castings. No data as to current given by motor used as dynamo.

(142) Converting Chloride of Silver into Nitrate of Silver.—Place in a flask with metallic zinc; treat with dilute sulphuric acid, adding zinc or acid as required until the chloride is completely reduced to the metallic state. Remove any zinc, wash thoroughly, first with dilute sulphuric acid and finally with hot water, and dissolve in nitric acid. Evaporate to dryness and fuse at a low heat. This gives lunar caustic or fused nitrate that can be subsequently dissolved in pure water.

(142) G. O. — Reduction of Silver Chloride.—Melt your chloride of silver with freshly burnt lime 1 part and chloride of silver 4 parts. After which dissolve the result (which will be pure silver) in nitric acid and evaporate to dryness, wash the same several times and evaporate to dryness after each washing. The result will be pure nitrate of silver.—C. H. M.

(142) To Obtain Pure Silver Nitrate from Pure Silver Chloride. — The silver chloride is first reduced to metallic state, which is best done as follows: The precipitate is dried and mixed with nearly an equal portion of a mixture of sodium and potassium carbonates, put into a crucible, a little borax added and fused. After complete fusion, pour the contents of crucible into some suitable receptacle, and when cool the silver globule is easily separated from the mass. The metallic silver is then dissolved in as small a portion as possible of nitric acid heated; diluted with an even amount of distilled water and evaporated to dryness. To the dried mass add distilled water, heat till dissolved, and set aside. Crystals of pure silver nitrate will form.—EDMUND WRIGHT, Jr., Philadelphia, Pa.

(143) Using Motor as Dynamo.—Advise you to make a regular dynamo, such as described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 600.

(144) H. W. C.—Artificial Cold Room.—One freezing mixture without ice consists of equal parts nitrate of ammonia and water; another, of equal parts nitrate of ammonia, carbonate of soda, and water. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 605, 578, 443, 314, 288, 254, 215, for illustrated descriptions of various methods of producing cold.

(145) Running Coffee Mill.—It needs about 1-16 horse power. A ⅛ horse power battery with motor should run it. The belt is large enough.

(146) F. McD. — Ebony Finish on Counter.—We doubt the possibility of your being able to make a satisfactory ebony finish on a Georgia pine counter. The sap pores would take a dye by absorption, but the resin veins would not take a permanent color and would show the resin streak through the varnish.

(147) F. D.—Stamping Powder.—Use pulverized steatite, or French chalk.

(148) W. L. W.—The diaphragm should be placed between the lenses, so as to revolve, with holes of various sizes to suit the requirements of sensitiveness in the plates, as shown in the exterior view of the camera. 2. It is doubtful if a 75 cent reading glass would give you satisfaction as an enlarging lens.

(149) J. I.—Horse Tread Power.—The circular horse power, if well constructed, will have less friction than the common treadmill. The treadmill is, on the other hand, easiest on the horse, as the walk is on a straight line.

(150) J. E. E.—Old Boilers.—There are a few boilers of the cylindrical type that have been in use more than 34 years. We do not recommend the use of a locomotive boiler of great age. The day of reckoning may come too soon.

(151) J. A. W.—Varnish for Canvas Boats.—Use a varnish made by dissolving pure rubber gum in naphtha. Paraffin applied hot to the perfectly dry boat is also excellent.

(152) P. F. B.—Crude Oil for Stoves.—Experiments have been made in the direction of using crude petroleum for household heating and cooking, without satisfactory results. The odor and its volatile constituents seem to be a drawback There is a wide field of invention yet left in this line.

(153) J. A.—Salt in Cement Mortar.—See SCIENTIFIC AMERICAN, January 7, 1888.

(154) W. H. W.—Cleaning Castings, etc.—Immerse the castings in a bath of hot water 10 parts, sulphuric acid 1 part, from one to two hours, and wash in hot water to remove acid, or smear the castings with a stronger solution 1 part sulphuric acid and 4 parts water, after three or four hours wash in hot water. 2. There is no fear of the steel ball valve sticking by magnetism enough to affect its work. Otherwise we know of nothing better than hard bronze for the ball, say 4 oz. tin to 1 pound of copper. 3. Make the moulding trough of 2 inch plank and bind it with iron.

(155) W. W. Y.—Circular Saws.—It is possible to use three saws in cutting large logs. Mills with three circular saws are in use in California and Washington Territory. Band saws are superseding the double circulars to a large extent, as there is less friction and less heat for the amount of work done.

(156) G. A. C.—Acoustics of a Hall.—Your question is too indefinite for special answer. Consult Sallzr's "Treatise on Acoustics."

(157) W. McV.—Boilers and Engine.—The boiler with 3 inch tubes is the best for wood fuel, and otherwise the most durable. The difference in favor of the automatic cut-off over the throttle valve regulation may amount to 10 or 12 per cent.

(169) F. W. M.—Blue Checked Cotton.—The dye probably had not been fixed by a mordant, or the check may not have been properly printed and dressed to fix the printing. If not, this may also be the cause of so much shrinkage.

(170) O. I. F.—How to Cut and Polish Stones; Dynamo.—You will need a thin copper disk about 6 in. diameter made to revolve rapidly on a spindle. With No. 90 to 100 emery and water liberally fed to the wheel, you will be able to slab any specimens of rocks or minerals of ordinary hardness. You will also need a grindstone to flatten the surfaces for polishing. A lap of lead is used with fine emery, and another of wood faced with leather or felt fed with a cream of rouge and water. The laps should run at a speed of 150 and may be 10 or 12 in. diameter, the specimens being held on their face with the hand. For a less expensive arrangement for surfacing only a good grindstone and a piece of sole leather nailed to a board, with the whole manipulation made by hand, will make satisfactory work with amteurs. For a more detailed description of lapidary work, see a work by Byrne, "Artisan, Mechanic and Engineer," $5, which we can mail. 2. It depends on the voltage desired. Use wire to give the same number of turns on the armature, and use two numbers larger on the field.

(171) T. H. F. — Walnut Stain. — Mix equal parts of solution of extract of logwood and solution of saffron, dilute with spirit of wine, add some solution of tin in hydrochloric acid. For a variety of acid, water sulphide and gallate of iron stains, see "Techno-Chemical Receipt Book," $2, which we can mail.

(173) J. A. B.—Hydraulic Pump Gaskets.—Make hydraulic pump gaskets of sole leather only. They should be cupped in a mould made to size of pump. For speeding machinery or other computations, see Mechanics', Millwrights', and Engineers' Pocket Book, by Templeton.

(174) Steam Boiler.—1. Divide the area of heating surface, in square feet, by 16, and the quotient will be the horse power required. 2. Feed pipes should not burst quicker in front of a boiler than behind. They are, however, more liable to burst, or "give out," when exposed to the fire than when not so exposed.—W. J. B.

(179) C. L. S. inquires how to make a porous brick to use as a fire kindler. Take three fifths fire clay, one-fifth coarse ground brick, pea size, and one-fifth sawdust. Bake in a kiln and the sawdust will burn away, leaving a porous brick.—D. Y. M.

(185) Hot Air Furnace.—Your rooms are evidently not properly ventilated. Each room, to heat economically, should have, near the floor, on the side of the room opposite the register, a ventilator, connected with suitable flue for carrying off cold air which settles to the bottom of the room. Make hot air pipes as short as possible, and run them on as sharp an incline as possible. Cold air should be taken direct from outside, and from the windward side of the house, so that if any wind is blowing it will force the warm air into the rooms. Care should be taken to arrange the cold air inlet so that the wind will not blow by it, forming a partial vacuum and causing back draught.—W. J. B.

(185) C. H. S.—Hot Air Furnace.—There may be several causes for the deficiency of your furnace: 1. The doors and windows of the rooms may permit the wind to blow through. If so, the draught will prevent the rising of warm air unless [it is pretty well forced. 2. The pipes may not have rise enough from the furnace to the outlets, and last, but not least, the air box may not be large enough to supply the furnace, or may not be in the right place. The air box must have three-fourths the capacity of the hot air pipes, and should face north or west. The end of the box should be protected from any wind that may draw air from the furnace instead of supplying it (an atomizer will illustrate what I mean), for without a sufficient cold air supply you cannot get warm air. If C. H. S. will send an addressed envelope to A. H. Woodruff, 478 Mulberry Street, Newark, N. J., I will send a diagram of a simple means of automatically preventing the siphoning of the furnace through the air box.—A. H. W.

(189) Magnetized Watch. — Means of putting in order a watch that has been magnetized by a dynamo are described in vol. lv., No. 14, of the SCIENTIFIC AMERICAN, under the heading of "The Demagnetization of Watches." No solution is known which will have the desired effect.—W. J. B.

☞ Books or other publications referred to above can, in most cases, be promptly obtained through the SCIENTIFIC AMERICAN office, Munn & Co., 361 Broadway, New York.

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