RECENTLY PATENTED INVENTIONS.

Engineering.

GAS ENGINE VALVE GEAR.—Frank S. Mead, Montreal, Canada. For four-period gas and oil engines this invention provides an improved valve gear arranged to positively and directly operate the valve from the engine shaft, dispensing with the usual side shaft, gears, cams, etc. The invention consists principally of a wheel for controlling the movement of the valve, the wheel having an intermittent rotary movement and a reciprocating travel in the direction of the valve stem. The device also forms a mechanical movement which may be used for various other purposes besides a valve gear.

SMOKE AND GAS CONSUMER.—Arthur B. Moore, East Las Vegas, New Mexico. This invention is for a furnace more especially designed for use in locomotives and marine and stationary engines, to insure the complete combustion of the burning fuel. An open pipe frame is arranged in the top of the fire box and along its sides and ends, directly below the crown sheet, the frame being connected with an air supply and each pipe having an inwardly opening longitudinal slit to discharge air upon the burning fuel. The pipes are protected by water jackets in which a free circulation of water is arranged for.

WATER ACCUMULATOR.—Carlo Coda, Civita Vecchia, Italy. To facilitate supplying railway locomotives with water in less time than has heretofore been practicable, this invention provides an apparatus comprising a main reservoir connected with an auxiliary reservoir or water tower which has an airtight cover continued upwardly beyond the level of the main reservoir, a discharge nozzle being connected to the reservoirs The construction obviates danger from freezing, as the water is almost continuously in motion, and the dimensions of the several parts are such that the auxiliary reservoirs are filled in about the time equal to the smallest interval between trains.

MEANS FOR CONVERTING MOTION.—Aaron B. Perine, Topeka, Kansas. This invention is in the nature of an improved engine for transmitting power efficiently and with but little friction. It comprises a circular track on which travel with a gyratory motion one or more upright wheels, each having teeth on its periphery, a driving gear wheel meshing with the teeth of the gyratory wheel, there being means for rotating the gear wheel, and a circular series of ball bearings to resist the outward trend of the gyratory wheel at the upper and lower points of contact.

Railway Appliances.

CAR COUPLING. — James S. Bartley, Whitesville, Ga. In couplings of the gravity pin-and-link type, this invention provides an improved coupling adapted for automatic coupling, and which may also be uncoupled from either the top or side of the car. A spring-cushioned coupling box at the front end of the drawhead is divided into a number of link-receiving compartments through which passes a vertically adjustable coupling pin adapted to hold the link at different heights and angular adjustment for engagement with another coupling on a car that may be higher or lower.

Miscellaneous.

STOOL ADJUSTING DEVICE.—Thomas W. Gilbert, Boston, Mass. To facilitate the adjustment upward or downward of the seat of a stool, and permit the seat to be revolved without raising or lowering it, is the object of this invention, which affords an adjusting mechanism actuated mainly by the foot, but with which the seat may not be raised or lowered while occupied. Combined with the frame is a toothed rod meshing with a gear wheel, toward and from which is movable a locking device.

STORE SERVICE APPARATUS.—William H. Brundage, Hudson, N. Y. To facilitate sending and returning money or change box carriages over wireways in stores, this invention provides improvements whereby the carriage is propelled without the use of previously stored-up power, and is received and held at the receiving end without undue jar to the apparatus. The invention consists principally of a spring-pressed picker stick adapted to engage and move the carriage backward into propelling position, the stick being then suddenly released to send the carriage over the line, the carriage being received by bail-pointed, curved gripping arms to break the force of its movement and securely hold it.

INCANDESCENT BURNER FOR LANTERNS.—James W. Dearing, Brooklyn, N. Y. In this burner threads or filaments of asbestos or similar material, or platinum wire, are supported over a flame, preferably a spirit flame, the filaments being adjustable in a manner to center them upon the lens of a lantern. The filaments are so supported that they will become incandescent from end to end, and means are provided for attaching a fuel reservoir containing oil or spirits to the body of the lantern in such manner that the two parts will be held firmly together, while the parts may be quickly removed or connected, and a perfect draught may be obtained.

WINDOW SASH.—Alfred F. Smith, Las Vegas, N. M. According to this improvement, the window frame has vertical beads forming two vertical slideways, and in each guideway slides a cleat, each cleat having a recess covered by a plate and carrying a spring-pressed and cam shaped bolt, the sashes being rigidly connected with their respective cleats, so that the sashes and cleats slide in unison as the sashes are adjusted in the ordinary manner of operation. The sashes may be readily removed from the frame without withdrawing screws or nails or other permanent fastening devices.

MATCH SAFE.—Walter W. Pennington, Butte, Montana. This is a device of simple construction designed to limit the removal of matches to the taking of one at a time, thus insuring economy in their use. The safe has a vertical magazine portion with glass end walls and a top cover, and a carriage is mounted to slide across the open lower end of the magazine, the carriage having two transverse channels to receive each a match, whereby a match may be carried out of the magazine of the carriage when the latter is moved in either direction.

DAMPER.—George C. and Norman P. Fraser, Carsonville, Mich. The dampers designed by these inventors are arranged in pairs, in such manner that each pair may be independently operated, the dampers being manipulated to promote a rapid draught or to make the products of combustion pursue a tortuous course through the pipe, somewhat checking the draught and more effectively radiating the heat. The dampers each have an area of less width than the flue, a pinion is connected with each damper, and a rack bar extends between and connects the pinions, the rack bar engaging opposite sides of the pinions to turn the dampers oppositely.

DAMPER REGULATOR.—John R. Hanlon, Pennington, N. J. This invention provides simple means whereby water pressure, operating the draught mechanism of a furnace, may be readily controlled. It comprises a valve for a piped circulating system, the valve casing having a perforated diaphragm, a tubular post adjustable relatively to the casing and engaged by a screw-threaded portion of the valve stem, while a plate valve carried on the inner end of the stem is adapted to close the perforations through the diaphragm, a waste tube or pipe communicating with the interior of the tubular post. The arrangement is such that the draught may be controlled from any part of the building with which suitable connections have been made.

BOOK OR MANUSCRIPT HOLDER.—Elbert D. Hall, 57 Washington Street, Chicago, Ill. This invention relates to that class of holders which are supported on a table and mounted to swing at various positions, to suit the convenience of a reader. The book or manuscript rest consists of longitudinal frame plates whose upper edges are inclined forwardly, a cleat being secured to the front ends of the plates, and the rest being supported on a bar pivoted in lugs at the edge of the table in such manner that it may be moved to very convenient positions with reference to one using the table, while by means of side bars the rest may be elongated either over the top of the table or outward therefrom.

HINGE.—Vespasian V. Hedges, Coffeyville, Kansas. To make a more secure joint between the door and the threshold, for the exclusion of water, air, etc., is the object of this invention, which provides a hinge that will ordinarily carry the door to clear the threshold and swing open, but in closing lowers the door into a notch or rabbet in the threshold. It has two leaves and a pivot pin, one of the leaves having longitudinal movement with respect to the other on the pin, and the latter having a head on its lower end engaging the swinging leaf, while a lever and cam attached to the upper end of the pin engages the fixed leaf.

TRUSS PAD.—George V. House, Mount Vernon, N. Y. This invention relates to pads having elastic bulbs to receive a distending medium, and provides novel features of construction facilitating the convenient inflation of the bulb with air or a liquid, and a graduation of the distention to suit the nature of the rupture to be reduced by the bulb, while also providing for an entire or partial removal of the distending medium, as may be required. A further invention of the same inventor covers novel details as to the manner of holding in place the inflatable pad bulb on a measurably yielding but substantial pad holder upon one end of the truss band, thus greatly improving the device in important particulars.

GAME APPARATUS. — Josua Adler, Salem, Oregon. To teach the rudiments of music while affording amusement, without requiring a knowledge of music on the part of the players, this inventor uses cards on each of which is a musical scale, with the usual lines and notes and the treble or bass signature, numerals indicating the notes, and sets of blocks to be placed above or below the cards. The game is played by trying to build the scale in rotation according to the numerals on the cards, the winning scale being called off by giving the name of the scale and the names of the notes.

COATED SILK UNDERWEAR.—A recently registered trade mark (Kotedsilk) covers a new style of goods just introduced by Messrs. Wilmerding & Basset, of New York City, consisting of underwear which has a knitted body portion of cotton and an inner lining of silk, either in the natural state or fleeced. The silk lining renders the garments very soft and they are not liable to irritate the skin of the wearer, while they are designed to be more durable, of lighter weight, and warmer than wool, and also mothproof.

Designs.

JUG.—Henry T. Pope and Benjamin F. Kidder, Fort Payne, Ala. This jug has a horizontally embossed belt, an annular depression or well around its mouth, and two opposite perforated side fins on the outer wall of the depression.

SCRAPING TOOL.—Sarah M. Cushing, Salem, and Ward O. Perkins, Boston, Mass. This is a simple tool with handle portion and concave scraping edge adapted to clean without damaging the surface of pneumatic bicycle tires.

MOULDED TIRE SECTION.—Jacob A. Lewis and William G. Spiegel, New York City. This design is for a segmental hollow tire, each section having at one end a cylindrical projection and at the other end a solid portion in which is a corresponding cylindrical recess, that the sections may thus be fitted together to form a complete tire.

STOVE.—Ernest C. Cole, Council Bluffs, Iowa. This design is for stove ornamentation which shall make the stove attractive in appearance, the design covering details as to the stove top, legs, ash door, draught plate, etc.

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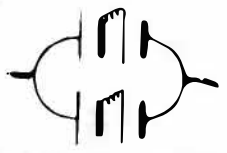
(7260) F. C. P. asks: How long should twenty-four cells of gravity battery be in filling four storage batteries of 50 amperes? What would be the best way to connect the gravity cells? I have them connected in series now, but it seems impossible to keep the blue-stone solution high enough or the specific gravity low enough. A. You cannot charge your storage cells in the way you describe. You are using too much voltage and too few amperes. To charge storage cells requires 2·5 volts per cell. You may proceed in one of two ways: 1. The most rapid way—Connect your 4 storage cells in 2 series of 2 each, thus:



2 series of 2 in multiple.

Similarly connect your 24 gravity cells in 6 series of 4 cells each, and charge with them so arranged. If the blue color does not come high enough, a resistance coil will bring it up when put in the circuit. 2. A slower way—Connect the 4 storage cells in 1 series. Connect the 24 gravity cells in 3 series of 8 cells each. If by "50 amperes" you mean 50 ampere hours, by the first method they should charge in 8 to 10 hours, and by the second twice as long is required.

(7261) T. L. B. writes: In SCIENTIFIC AMERICAN SUPPLEMENT, No. 761, of August 2, 1890, I saw a motor constructed by C. D. Parkhurst. Now, I want to construct that motor from his working drawings, but am not quite clear as to the meaning of some of his terms. Therefore, I write to see if you will answer the following queries through your paper. 1. How much wire on each spool of armature and field magnets, i. e., what weight and length on each spool of each magnet, field and armature, how is a shunt motor connected up, also what size of wire should I use on armature and field, and how connect it up to run motor by a battery? A. Each spool will hold about 40 feet of No. 18 B. and S. gage wire for armature and about 142 feet of No. 24 for field, shunt wound. The wire, No. 18, for six spools of armature weighs about 1½ pounds; for the two field spools, No. 24, nearly ½ pound. To connect it as a shunt motor, follow the instructions on middle column of description, page 12161, beginning "The inside end of one spool and the outside end of the next are fastened to one commutator bar," etc. That is what is meant by a shunt or branch. The electricity has two paths. The sizes of wire are No. 18 for 6 armature spools. No. 24 for 2 field spools. See same page of description for this. The motor is intended to be run by a battery and in no other way. If put on a lighting circuit, you will see it go up in smoke, unless the current passes through a resistance consisting of several hundred feet of wire first. This is dependent on the sort of current in the circuit and no definite instruction can be given without full knowledge. 2. What are the soft iron pole pieces fastened to after having one end fastened to the magnets, armature and fields, i. e., what are they fastened to on the armature shaft, or are they fastened at all? A. They are not fastened to anything. They are magnetized by the current through the coils, and cannot be dispensed with. 3. What is their purpose? It seems they can be done away with. You say the commutator may be made of the usual form, with 6 bars, as in Figs. 12 and 11; a good commutator may also be made as described in a previous article upon small motors, the flanged cylinder being cut up into 6 pieces instead of 2. What previous article do you refer to? Can you give me some definite instructions on the commutator, as to thickness of metal, length of commutator and diameter of same? Should it be made of brass? Also, how thick are the brushes? Can you give me some working drawings or tell me in what SCIENTIFIC AMERICAN SUPPLEMENT I can find the building of commutator? A. You will find a good commutator described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 600, page 9587, third column. In the motor you are building, the commutator bars need not be more than ⅛ inch thick, though they can be more easily fastened if ¼ inch thick. They will not heat with the current they have to carry. They may have any convenient length. They are about 1 inch long in drawing. They should be of copper, though, if more convenient, brass will answer. The brushes are strips of sheet brass or copper, perhaps $\frac{1}{64}$ inch thick, and set so as to press upon the commutator. 4. Will sheet iron, such as is used to cover storehouses with, do to build up the circular iron plate for armature spools? A. The description says (page 12160, middle column, near top) that stovepipe iron may be used. This means any good quality of soft sheet iron. 5. Does the metal plate on the base have to be brass? Can it not be iron or even steel? A. The base plate is to give stiffness to the base, and prevent warping, as the article states. One metal is about as good as another. To start the motor, connect the two binding posts on the same side to each other by a wire, and arrange battery in series. It does not matter to which side the plus pole is joined. For a good form of battery see SCIENTIFIC AMERICAN SUPPLEMENT, No. 792.

(7262) A. E. T. asks: 1. How can I reduce a current of 110 volts to that of about 5 Bunsen cells? A. A resistance of German silver (preferably) or of iron wire will cut down the current for you. Such a construction as is used for the field resistance boxes of dynamos or for running an arc light in a stereopticon would be convenient. 2. A mucilage that will make a powder stick to skin or leather, so that it will not brush off or crack. A. We doubt whether such a mucilage can be made as you ask for. A mucilage which does not easily crack is made as follows:

Glycerine	4½ parts.
Soft soap	4½ "

Dissolve 1½ parts of salicylic acid in 30 parts of alcohol. Shake thoroughly together and add this to a mucilage made of 140 parts of gum arabic dissolved in about 270 parts of water. The "Scientific American Cyclopedia" gives numerous glues and mucilages, some of which may answer your purpose better than the above. 3. Solution that will amalgamate zinc by dipping it. A. A bath for amalgamating zinc is made as follows: Dissolve 1 part of mercury in 3 parts by weight of aqua regia; which is made by mixing 1 part of nitric acid with 3 parts of hydrochloric acid. To this solution add 3 parts more of hydrochloric acid, and the bath is ready for use.

(7263) F. P., Missouri, asks: 1. What are the necessary properties in a limestone suitable for a plastering lime? Also for a lime that would do for cement. A. The best plaster is made with the purest lime made, from the carbonate of lime rock. For the finishing coat, which requires to have a smooth surface, to be white and set quickly, plaster of Paris (calcined gypsum) is mixed with the lime mortar. 2. Is magnesia a necessary property in lime? Is it necessary in cement? A. Magnesia is not only of no value, but is considered a deleterious element in all kinds of mortar. 3. Is a non-magnesian lime, when ground, as good as any otherlime for building purposes? A. Magnesian limestone does not make the best mortar, although much used in the magnesian limestone districts of the United States. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 567, on the deleterious qualities of magnesia in masonry.

(7264) T. M. writes: 1. Please tell me through your paper, in using a 110 volt system, what size wire I should use to bring the current down to about 150 amperes at 60 volts, as I am an amateur in electrical matters, and would like to know. A. If the wire is to be open to the air, No. 1 A. W. G. will carry 150 amperes; if it is to be shut away from the air, No. 00 should be used. Of this wire you will need 5,912 feet. For a drop of 60 volts, measure off $\frac{2}{5}$ of the wire, or 3,225 feet, and use the rest as a resistance box is used. 2. Also please tell what resistance and amperes on a 60 volt system, using a storage battery, so the voltage is about 45 and 150 amperes. If this is not plain enough, please let me know, as I am not up in electrical matters. A. To obtain 45 volts with a storage battery, 23 cells in series are required. The type "G" of the chloride accumulator, 17 plates in a cell, will give 160 amperes for 10 hours.

(7265) B. B. asks: 1. Can you make the field magnet ring for the dynamo described in your paper September 11, 1897? I do not want the holes bored in it—just the plain ring, made according to the directions given. A. This can be done by some machine shop in your part of the country far cheaper than it could be done in New York and sent out. The ring should be of wrought iron. While a cast iron ring will work, it is not so effective. 2. What will it cost to get the toothed armature made? A. The cost of having this toothed armature made will of course vary according to the value of the time of the maker. It should not take over two hours. The cost of the thin iron should come within thirty or forty cents. 3. Can I use a ten segment commutator instead of the rings? A. This machine is not intended for a direct current generator, owing to the number of poles in the field. Therefore, a ten-segment commutator would not be adapted to the purpose. 4. I do not understand much about it, but, from what I have read, I inferred that when ring commutators are used, the dynamos give alternating currents and when segment ones are used we get continuous currents. Is this so? A. Your inference in regard to ring and segment commutators is correct. With plain sliding rings, dynamos give alternating currents, when the fields are separately excited. With segment commutators the alternating current is rectified, producing a continuous current. 5. If the above is true, if I use a segment commutator on the dynamo, will I get a continuous current? A. The conversion of this machine to a direct current dynamo is not advisable.

(7266) J. C. P. writes: My 90° hand feed arc lamp in stereopticon current, 15 amperes at 66 volts, coned carbons, lower one biggest, troubles me by "growing" horns on the lower carbons, short circuiting arc and varying intensity. Why? How avoided? A. The