

RECENTLY PATENTED INVENTIONS.

Engineering.

STEAM CONDENSER AND AERATOR.—Edward Rowe, Indiana, Pa. This is an apparatus designed to quickly condense the steam from an engine and relieve it of back pressure, prevent water from the engine running back into the exhaust pipe, and aerate the water of condensation to make it better for use in the boilers. It comprises a shell with air inlets into which extend nozzles from a steam distributor, drawing in air to mingle with the steam in the shell, the nozzles being connected with a compressed air supply.

BLAST FURNACE RELIEF DEVICE.—James Andrews, Allegheny, Pa. This improvement is designed to afford instant relief in case of a sudden explosion of gases in the top of the stack. The bell is made with doors hinged at their lower ends in its sides, the doors normally forming part of the sides of the bell and being adapted to swing open on pressure from within. The doors are sufficiently heavy to withstand the ordinary pressure of from seven to twelve pounds within the furnace.

Railway Appliances.

CAR REPLACER.—Robert B. Hawkins, Clarendon, Texas. This replacer may be made principally of old rails, and is very simple and of great strength, providing efficient means for guiding the wheels of a derailed car to the track, even from a considerable distance. In arranging the device an ordinary center-bearing rail is so disposed that its base and head are vertical and its web horizontal, a clip with a hooked end projecting laterally from the replacer rail to engage the head of the track rail, while the opposite end of the clip is formed to bear against a tie.

CAR FENDER ATTACHMENT.—Robert Muir, Brooklyn, N. Y. Attached to the fender frame, according to this improvement, are a number of spaced and bowed springs, the free or central portion of the springs being all located in the same plane, so that they will come in contact with each other when striking an obstruction. Should the springs strike a prostrate body or movable obstruction, they are designed to gently push the body or obstruction from the track, in a manner not likely to injure a person.

RAIL JOINT.—William D. Jones, Homestead, Pa. For detachably securing together the ends of railway track rails, this inventor provides a novel and simple joint, easy to apply, effective in service, and readily removable for making repairs. The fish plates and rails are transversely apertured, the plates having sloped and grooved faces, while clamps passed through the aligned apertures in the rails and plates have diverging limbs adapted for engagement by spring latch pieces on the fish plates.

CAR BRAKE.—Ferdinand Gabler, Topeka, Kansas. This is an improvement on a former patented invention of the same inventor, toggle arms at each side of the car being connected to adjacent brake shoes and jointed to each other in the middle, there being a spiral spring between and connected to the brake shoes of each pair, two transverse stems being also connected to the middle joints of the toggles, while an equalizing device is connected to the inner ends of the stems and to the brake-applying mechanism.

Electrical.

BATTERY.—Walter S. Doe, Brooklyn, N. Y. In a suitable jar is a porous cup with bottle-shaped top portion, the cup being sealed in the jar and containing the carbon element and a depolarizing fluid, the zinc element being made as a ring surrounding the porous cup. A rod connected with the carbon extends through and is sealed in a top opening, a like opening forming a passage for the conducting rod of the zinc element. The arrangement obviates the escape of dangerous gas, and facilitates utilizing the power of the battery to its fullest extent.

ELECTRIC TYPEWRITER.—John L. Garber, Sidney, Ohio. This invention provides electrically operated means for moving the typewriter carriage, and for moving the platen or roller of the machine. Arranged adjacent to the typewriter are solenoid magnets with spring-pressed plunger armatures connected by a cross piece in which slides vertically a spring-pressed arm having a tooth to engage a notched bar secured to the carriage, a magnet-operated lever effecting the vertical movement of the toothed arm, and a circuit closer being arranged in the circuits of the lever magnets and the solenoid magnets. The improvement may be used with all kinds of typewriters having a sliding carriage.

Mechanical.

LIFTING JACK.—Malcolm Anderson, New York City. This is a jack of simple and strong construction arranged to readily transfer the load from the screw spindle head to an auxiliary support and to shift the load laterally with the support. An eccentric is mounted to revolve and be raised and lowered with the load-lifting spindle, a support held on the eccentric being adapted to be shifted laterally thereby, while a nut screwing on the spindle raises and lowers the eccentric.

COMBING MACHINE.—Anthony Gunerman, Hoboken, N. J., and George Schacht, Jersey City, N. J. This is a compactly foldable, portable machine of simple and inexpensive construction, for combing, without breakage or injury, hair, moss, fiber, wool, etc., ample air being supplied during the work of combing and the escape of dust being facilitated. Provision is also made for easily and thoroughly cleaning the combing teeth.

MACHINE FOR TAPPING MAINS.—John Hearne, New York City, and Elmer E. Cisco, Brooklyn, N. Y. This is a portable machine adapted to be easily fastened upon a pipe, and of such construction that a hole may be drilled, reamed and tapped in the pipe and a cock introduced without loss of fluid and without danger of asphyxiation. The tool may also be removed from the pipe and another tool introduced without the escape of fluid.

Miscellaneous.

TYPEWRITER RIBBON HOLDER.—Edwin L. Foster, Independence, Kansas. For readily clamping the typewriter ribbon to the spool, facilitating its quick attachment and easy removal, this invention provides a clamp having arms riveted or pinned near one end to the spool leads and flared outwardly, a crossbar uniting with the arms at a point between their ends, the cross bar being curved transversely, corresponding to the curvature of the spool body.

LETTER FILE, ETC.—Richard Bennett, Neihart, Montana. This is a simple, inexpensive device, neat in appearance and well adapted to hold blanks, bills, letters, etc. Covers secured to a back are provided with eyelets at opposite ends, index sheets being held between the covers, and elastic cords extending through the eyelets across the space between the covers to engage the index sheets, hooks on the covers engaging loops at the ends of the cords.

CALIPERING INSTRUMENT.—George W. Mings, Holy Cross, Col. This instrument has two pivotally connected members provided with sets of adjustable pins for measuring small and large articles, one of the members being provided with a frame with forked arms in which segmental dials are adapted to be inserted and clamped, a pointer with a reading wire or hair extending on the dials, while a magnifying glass is held on the pointer over the wire or hair. The implement is adapted to automatically indicate the size of the article gaged in standard and other measurements.

BANK SAFETY VAULT.—Thomas Barnes, Rawlins, Wyoming. This invention provides for the erection of a burglar and fire proof vault on a skeleton frame elevated from the ground or floor of a building to expose the lower side of the vault, a gallery sustained by the supports completely encompassing the vault, while mirrors are arranged to reflect all sides of the vault in a manner to be visible from the street.

LOCK.—Andrew Alfors, Hanna, Wyoming. In this lock the body section has hinged connection with the face plate, which is provided with a keeper adapted for engagement by a rotating key-actuated bolt carried by the body section, a retarding device offering resistance to the bolt. The lock is especially adapted for trunks, boxes, etc., and is simply and inexpensively made.

CONTROLLING HATCHWAY DOORS.—Frederick F. Jackson, Chicago, Ill. For automatically controlling the closing of hatchway and other doors, this inventor provides a system of wiring to be used in connection with thermostats, the wiring being connected with a lock mechanism by which a door or doors will be closed by the action of heat on thermostats. A retarding mechanism is also provided by which the doors may be prevented from closing for a certain time, other operating mechanism being set going, and an alarm sounded if desired.

FIRE ESCAPE.—John Evans, Denver, Col. This is a portable device, adapted to be readily carried in a trunk for use by travelers and other persons, and comprises a light and strong frame in which are journaled rollers by means of which a regulated pressure may be placed upon a hanging rope, affording means to let a person down from a building, a strap or other giraffe encircling the person of the user. By graduating the straight strain one can lower himself to the ground as slowly or as speedily as desired.

VEHICLE AXLE.—Henry M. Powell, Florence, Ga. This invention comprises a sand box adapted to fit over the end of the hub and provided with portions for connection with the body of the axle and for detachable connection with the spindle. The improvement affords a novel construction for taking up lost motion and wear of the hub upon the spindle, and when a wheel or spindle, or both, become badly worn, the spindle may be removed and replaced by a larger spindle.

PUMP OPERATING MECHANISM.—William A. Anderson, Alpha, Mo. For operating pumps by a windmill rod or by hand this invention provides a simple, light and inexpensive mechanism carried by an open frame adapted for easy attachment to the upper end of a pump stock at the platform of the well. The mechanism is designed to have a minimum of friction and give the greatest amount of working efficiency with the least outlay of power.

WASHING MACHINE.—Loren B. Walters and Kinsey Caldwell, Georgetown, Texas. Among other improvements, this machine presents a novel construction of casing and gear framing, together with improvements in the clothes receptacle and the devices for securing a circulation of water and steam through the clothes. The clothing may be placed in the machine with cold water and the latter gradually brought up to the boiling point.

ASH SIFTER.—Agnes E. Bennett, Toronto, Canada. This sifter comprises a cylindrical screen journaled in a suitable casing and adapted to be turned in sifting by a crank, the cinders being retained within the casing during the operation and the dust being received in a drawer at the bottom, from which it may be conveniently removed. After the sifting the cinders are discharged through a chute to a receptacle.

CIGAR BOX.—William F. Fuchs, Galena, Ill. This box has a false bottom adapted to be raised and lowered and held in adjusted position, ribbons or tapes being employed to thus manipulate the false bottom. Springs are also used on the false bottom to prevent the cigars becoming loosened during transportation, and the lifting tapes may be employed to hold bundles of cigars in position. With this improvement cigars may be packed on the bottom from the top of the box and the bottom adjusted downward as the successive rows are placed in position.

WINDOW CURTAIN AND PILLOW SHAM SUPPORTER.—Edward W. Farnham, Chicago, Ill. This improvement is designed to obviate the use of clumsy poles and brackets, substituting therefor a practically invisible support, which may be easily put up and removed and packed in a small space. With this improvement, also, rings and pins are not required to support the curtains or shams, which are held by means of clutch

brackets and an adjustable wire line arranged in a novel manner.

RAISING AND DRAWING OFF LIQUIDS.—Alphonse Bonnoront, Paris, France. The apparatus devised by this inventor employs in its operation the water pressure from a tank or other suitable source, and comprises neither a flap valve nor piston. A vessel communicating with the liquid to be raised is cut off from the atmosphere, and water under pressure is introduced to compress the air in the vessel and also in a closed cask communicating with the liquid reservoir, thereby forcing the liquid through its discharge tube. The improvement may be employed in the place of beer pumps, etc.

FOLDING GAMBREL.—Peter N. Swanson, Galva, Ill. This is a novel folding device for the suspension of a carcass of dressed beef, etc., in such manner as to facilitate work thereon in preparing the dressed meat for consumption. It comprises a hanger bar to be suspended from a support, there being on the bar two outwardly movable arms supported by adjustable flexible connections and having adjustable hooks.

BUTTON.—Daniel B. Seward, Easthampton, Mass. This invention provides a combination button with a solid center of vegetable ivory, bone, etc., affording a proper support for, and engagement of, the cloth covering, together with a clamping ring or shell therefor, enabling the button to be cheaply produced and the cloth covering neatly and securely applied. The button, instead of being sewed on by the ordinary tufts, is secured by means of apertures extending through its solid center.

DUST PAN AND VENTILATOR.—Francis M. Rector, Eddyville, Iowa. This device comprises a casing adapted to be set in the floor or wall of a building, and having a grated top, a box in the casing being provided with a slatted bottom, which may be opened and closed. The device may be employed to facilitate the ventilation of a room or as a dust pan to receive its sweepings.

Designs.

ERASER.—Oliver C. and Charles W. Hackett, Akron, Ohio. This design is for an instrument which is nearly oval in cross section at about its center and tapers toward both ends, presenting an elongated flattened ovate form, the head having one side roughened and the other smooth.

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NEW BOOKS AND PUBLICATIONS.

TRIBUNE ALMANAC AND POLITICAL REGISTER FOR 1896. Henry E. Rhoades, editor. New York: The Tribune Association, 1896. Pp. 305. 16mo. Price 25 cents.

The Tribune Almanac was founded in 1838 as "The Whig Almanac." It is one of the oldest and now ranks among the highest of all American annuals for its accuracy and completeness.

THE DAILY NEWS ALMANAC AND POLITICAL REGISTER FOR 1896. Compiled by George E. Plumbe. Chicago: Chicago Daily News Company, 1896. Pp. 452. 16mo. Price 25 cents.

This almanac is very much like the preceding, and it is even more largely devoted to political affairs.

REPORT OF THE COMMISSIONER OF EDUCATION FOR THE YEAR 1892-1893. Vol. I. Containing parts 1 and 2. Washington, D. C.: Government Printing Office, 1895. Pp. 1224. 8vo.

This work contains a vast amount of useful information. In addition to the statistical summaries there are chapters on public education in Belgium, France, England, India, Canada, Germany, Uruguay, as well as chapters on the recent developments in the teaching of geography in Central Europe.

The bound volume for the year 1895 of Garden and Forest, a New York Journal of Horticulture,

Landscape and Forestry, affords a large amount of exceptionally high class reading on the subjects to which this publication is devoted, and timely topics germane thereto. To the scientific gardener, and especially to all interested in the preservation of trees and the general promotion of their growth by wise and practical means, this weekly is an invaluable assistant, and the 500 large pages comprised in the volume present much matter well worth preservation and perusal.



HINTS TO CORRESPONDENTS.

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

(6729) A. V. H. says: Kindly inform me the relative value of the following materials: cinders, coal ashes, coal, sawdust, mineral wool, as a nonconductor when used as filling or insulation in ice house walls which are eight inches thick. A. The following table gives the results of a series of experiments by Mr. C. E. Emery, for the New York Steam Company:

Material.	Non-conductivity. Per cent.
Hair felt.....	100
Mineral wool No. 2.....	83.2
Mineral wool No. 2 and tar.....	71
Sawdust.....	68
Mineral wool No. 1.....	67.6
Charcoal.....	63.2
Pinewood, across grain.....	55.3
Loam.....	55
Gasworks lime, slaked.....	48
Asbestos.....	36.3
Coal ashes.....	34.5
Fuel coke.....	27.7
Air space, 2 inches deep.....	13.6

(6730) C. W. M. asks: 1. What should be the dimensions and the size of the wires for a transformer to use a current of twenty-five amperes at 120 volts and furnish a current at one volt, and how many amperes would such a transformer furnish? A. The size of the transformer depends on the frequency of the alternations. For the primary you must use No. 9 wire. The primary must have 120 turns for one of the secondary. The secondary will give nearly 25x120=3000 amperes on short circuit. 2. Is there any difference between a gas engine and a petroleum engine other than the addition of the vaporizer? A. Little or none; proportions may slightly vary. 3. Could a gas engine be used as a petroleum engine by adding the vaporizer? A. Yes. 4. How is this vaporizer made? Have you ever described its construction and operation in the SCIENTIFIC AMERICAN or in the SUPPLEMENT? A. For details of gas and oil engines we refer you to our SUPPLEMENT, Nos. 535, 618, 715, 716, 963, 993, and 1024, price 10 cents each. 5. According to the best practice, what is the characteristic difference between the construction of a motor and a dynamo? A. There need be none. A cast iron field is used in dynamos to make them self-charging. For motors a soft iron field is better.

(6731) E. H. S. asks: Suppose Hiero's crown was an alloy of silver and gold, and weighed 22 ounces in air and 20½ ounces in H₂O. What was the proportion of each metal? A. Apply the following formula: Let

- a = weight of alloy in air.
- b = weight of alloy in water.
- c = specific gravity of gold.
- d = specific gravity of the other metal.
- x = weight of gold in the alloy.

Then a-x = weight of other metal in the alloy.

$$\frac{x}{c} = \text{weight of water displaced by the gold.}$$

$$\frac{a-x}{d} = \text{weight of water displaced by the other metal.}$$

$$a-b = \text{weight of water displaced by the whole.}$$

$$\frac{x}{c} + \frac{a-x}{d} = a-b,$$

$$\text{or } x = \frac{dca-dcb-ac}{d-c}$$

The specific gravity of gold may be taken as 19.3; of silver, as 10.4.

(6732) G. H. writes: Several times have I seen in Notes and Queries questions asked. What change must I make in simple motor of SUPPLEMENT, No. 641, to convert it into a dynamo, if I use cast iron fields? I think I have seen on two occasions where you advised not to change motor in question to dynamo, as it is not adapted for that purpose, but on no occasion have I ever seen the question asked: Why is it not adapted for dynamo? And of course naturally no answer. I must admit I am in the same predicament. I have also built the simple motor with laminated field and had perfect success. Then I changed to cast iron fields, made a new armature with 14 coils, No. 22 wire, to a resistance of 1½ ohms with same wire on field to the amount of resistance as a series machine, but got no results at all, not even enough to ring a bell properly. I would like to know, and per-

haps many more besides me, why it is not adapted for a dynamo. Is it on account of the Gramme ring armature, or is it because of not enough coils on armature? Of course, one reason is, as you have answered before, use finer wire on field and armature. A. The field core is too slender and long; for a dynamo a massive field is far preferable. There may be much trouble anticipated in making it self-charging. We advise you to try separate excitation of the field with a battery. Possibly you may get it started, and by connecting the field into the circuit first and then disconnecting the battery, it may keep on working. 2. What is the difference in constructing a high or a low speed dynamo and motor? A. In a motor or dynamo a strong field or an armature with many turns gives relatively slow speed and vice versa. 3. How many ohms resistance will bring current of eight light dynamo as described in SUPPLEMENT, No. 600, down to zero? A. An infinite resistance.

(6733) Customer asks: 1. Will you kindly define the term "an ampere hour," as applied to electricity used by a customer for incandescent lighting? A. An ampere expresses the rate of flow of current; an ampere hour means a current flowing for one hour at the rate of one ampere. The company is assumed to maintain a definite voltage. As you pay for electric energy, this maintenance of voltage supplies the factor requisite. 2. If I make an agreement with a company for incandescent light "at a price or sum not exceeding one-half cent per ampere hour by meter," what can I demand from the company—how much electric lighting for my half cent? A. You do not state the voltage. At 110 volts, one ampere hour should mean two 16 candle power lamps for one hour. If at 55 volts, then it should mean one-half the quantity. 3. If the agreement does not specify the voltage or candle power to be supplied, what strength of light in my house could I reasonably demand from the company? A. The answer to No. 2 expresses it. The voltage is always ascertainable. There is no secret about it. A very slight drop in voltage cuts down your light enormously without reducing the bills in anything like the same proportion.

(6734) F. R. B. asks the rule for finding gearing for cutting threads on a screw cutting lathe. A. Read from the lathe index the number of threads per inch cut by equal gears and multiply it by any number that will give for a product a gear on the index; put this gear upon the stud, then multiply the number of threads per inch to be cut by the same number and put the resulting gear upon the screw. Example.—To cut 11 1/2 threads per inch. We find on the index that 48 into 48 cuts 6 threads per inch, then

6x4=24, gear on stud, and 11 1/2x4=46, gear on screw.

Any multiplier may be used so long as the products include gears that belong with the lathe. For instance, instead of 4 as a multiple, we may use 6.

Thus, 9x6=54, gear upon stud, and 11 1/2x6=69, gear upon screw.

(6735) J. L. D. asks (1) for formulae for finding the area of an ellipsoid or spheroid. A. If prolate, area=888 r^2 R^2 + r^2, in which R represents the major and r the minor axis. If oblate, interchange R and r and apply the same formula. This may be used as a working formula. If a table of natural sines or logarithmic functions is at hand, use for more accurate work the following:

S = 2 pi b^2 + (2 pi a b / e) sin^-1 e

in which a = semi-transverse axis b = semi-conjugate axis e = sqrt(a^2 - b^2) / a

This is for the prolate spheroid; for oblate interchange a and b. 2. Also for the volume of same. A. Multiply square of revolving axis by the fixed axis and this product by 0.5236. These formulae are not directly deducible from the equations named in your letter.

(6736) T. G. asks: 1. Will electro-plating with nickel or with silver affect the properties of a permanent magnet? A. No, except as the polishing or scratch brushing would impair the magnetism. 2. If not, will it be best to plate the steel before it is magnetized or after it has been magnetized? A. Plate iron or steel, after being heavily plated with nickel or silver, be used in contact with wines and alcoholic liquors in general, without being affected by and without having any influence on the above liquids? A. Silver would be less affected than nickel; we should not advise reliance to be placed on the latter.

(6737) R. W. S. asks: 1. What is the electromotive force and the current of the common gravity battery? A. Allow 1 volt and 4 ohms resistance. The resistance is subject to wide variations according to strength of solutions used. 2. Can you give me recipe for a good depolarizing fluid for a carbon battery? A. Water.....100 parts. Sodium bichromate.....16 " Sulphuric acid.....37 "

All by weight. Use the bichromate in powder. Be careful to inhale none of it in powdering, as it is very dangerous.

(6738) R. A. C. writes: I am going to make a storage battery; the jar will be 4 inches high, 2 3/4 inches wide, and 1 1/2 inches thick, and will be divided into four cells; each cell will contain two lead plates 4 inches long and 1 1/4 inches wide. Will you please tell me how long the battery will light a three candle power lamp? A. For each square inch of positive plate immersed in a single couple allow 0.03 ampere, and for each cell allow 2 volts, and ten hours running. The lamp will need 55 to 70 volts and 1 to 1.50 amperes.

(6739) J. C. H. says: Can you give me formula in your Notes and Queries for cleaning smoky and dirty wall paper and leaving it as bright as new? A. To clean wall paper, rye flour and wheat flour are mixed together into dough, which is then partially cooked or baked and the crust removed. Common salt, powdered or pulverized naphthaline, corn meal, and burnt umber are then added in the following proportions: 1 pound rye flour, 1 pound wheat flour, 1 ounce common salt, 1/2 ounce solid naphthaline properly pulverized, 1 ounce

corn meal, 1/2 ounce burnt umber. The composition is formed into a mass about the proper size to be grasped in the hand, and for plain wall paper, painted walls, etc., the composition should be drawn in one direction over the surface to be cleaned.

(6740) G. E. H. writes: I have a chloride of silver cell made by rolling a piece of commercial sheet zinc in the form of a cylinder 4 inches long and 3/4 inch in internal diameter, and soldering a circular piece of zinc in one end and the cylinder down the side where the edges of the zinc meet, so as to make a watertight cell, into which is placed, after amalgamating the zinc, a cylinder of chloride of silver 3 inches long and 3/8 inch in diameter. The silver chloride is cast on a silver wire and is suspended in the cell in such a manner as to prevent it from touching the zinc and causing short circuiting. The space in the cell is filled with a weak solution of ammoniac and water and the end sealed with pitch. 1. Is the solder used in this cell liable to cause local action to any great extent? A. No. 2. Is 1 ampere too much current to take from this cell for a period of 5 minutes each day, and how long should the cell last at this rate of discharge? A. Yes. If you can get as much as that out of it, it will soon polarize it. Arrange a number of cells in parallel. 3. What weight of silver is required to make a cylinder of chloride of silver 3 inches long and 3/8 inch in diameter? A. About 300 grains.

(6741) W. M. H. asks: 1. How would acetylene answer as a substitute for the oxyhydrogen light in the magic lantern? A. It answers very well where high power is not required. It gives a very white light, but not as powerful as the oxyhydrogen. 2. If practicable, would it be better to generate the gas from the solid article as wanted or would it be more economical and satisfactory to use a cylinder of the liquid gas such as is described in the SCIENTIFIC AMERICAN October 19, 1895 (see Notes on Atlanta Exposition). A. Generate the gas from the solid article. An apparatus is described in the SCIENTIFIC AMERICAN of January 4, 1896. A very simple one is given in the SCIENTIFIC AMERICAN of March 30, 1895. 3. If the article is used in the liquid state, what is the best way of regulating the amount of gas consumed? A. Use a stopcock of first class construction, and regulate by hand. 4. Is it safe to ship it in either form on board ocean vessels, and what effect would passage through the tropics have upon it? A. Calcium carbide is perfectly safe if packed in airtight and watertight cases. The liquefied acetylene is not altogether safe under all conditions.

(6742) H. K. W. asks: 1. Where can I obtain a dynamo for one 8 candle lamp? A. Consult our advertising columns. Any dealer in electrical goods will supply it. 2. What power will be necessary to run such a dynamo? A. It is safe to allow 1/2 horse power. 3. Where (in what book) can I get information necessary to make as small a dynamo as indicated above? A. The SCIENTIFIC AMERICAN SUPPLEMENTS treat of this subject in great detail—giving many dynamos of various sizes. We refer you to them.

TO INVENTORS.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

February 18, 1896,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions such as 'Adding and printing machine, combined, G. W. Dudley', 'Alarm, See Burglar alarm', 'Apparatus for separating and saving gold, T. G. Barlow-Massicks', etc.

Main table listing inventions such as 'Breaking rig, H. Kenner', 'Breast strap, J. R. Henry', 'Bridge approach gate, Brooke & Trotter', 'Bridges, etc., tubular frame for, R. Mannebaum', etc.