

too small, how should motors in SUPPLEMENT 1195 be wound so as to act as dynamos also? A. The winding of a motor does not need to be changed to make it generate as a dynamo. 5. Is there any special danger on an electric automobile, whether still or moving, in a thunder-storm? A. An electric automobile is not exposed to any more danger in a thunder-storm than any other. We do not recall ever hearing of any person being struck by lightning upon a railway train. 6. In the inclosed sketch, if *U* is a one horse power motor, with 3-inch pinion meshing into 30-inch gearwheel, connected to 18-inch rod, *JH*, and this joined to 6-foot lever, *HF*, working on fulcrum, *G*, five feet from power end, what horse power will be obtained at *A* on the bent axle, *DCABE*, which is connected to lever, *HF*, by 18-inch rod, *AF*? A. With the arrangement you describe you will have at the end of the train of wheels and levers one horse power less whatever has been lost in friction at the several bearings. No one can calculate this. It must be found by experiment, and will depend upon the condition of the machine. A horse power is 33,000 foot-pounds of work done in a minute. It is not affected by the speed of motion nor by the weight lifted. If the speed is great a less weight will be lifted by a horse power; and if the weight is great, the less will be the speed. Your arrangement reduces speed and increases pressure, or weight lifted, but the amount of power remains the same. The 30-inch gear moves one-tenth as fast as the gear which drives it, and the end, *F*, of the lever moves one-fifth as fast as the end, *H*. Hence *F* moves one-fiftieth as fast as the small gear on the motor.

(8260) J. F. C. asks: What is the fraction of power lost in the current produced by a generator which runs a motor, the connecting wires being not longer than 10 yards? That is, what is the relative power of motor and generator? Both are the same size. What size of a booster would be required to have both equal? A. A motor only thirty feet from the dynamo which furnishes the current for running it has little or no drop of potential from that of the dynamo, and needs no booster. The only loss is due to the heating of the coils by the current.

(8261) B. H. G. asks: Please inform me through your Notes and Queries the principle and details of the radiometer? A. The radiometer is a heat instrument. Light has no connection with it. It consists of a glass globe, usually about two inches in diameter, exhausted to a suitable degree. Within is a steel pivot upon which revolves a cross arm carrying four vanes of aluminium, one face of which is blackened by carbon. When heat falls upon the vanes the black faces absorb more than the bright and are hotter. The molecules of air coming in contact with the black faces are heated more than those coming in contact with the bright faces and rebound with more force. The reaction of this rebound causes the vanes to revolve with 4 black faces in the rear. The globe itself has been made to show a tendency to rotate in the opposite direction to the vanes, this being due to the bombardment of the inner surface of the glass by the stream of molecules which rebound from the vanes. Thus the radiometer is a heat engine, transferring heat from the black side of the vanes to the surface of the glass opposite. A satisfactory explanation of the phenomenon is given in Barker's "Physics," price \$3.75 by mail. See also SUPPLEMENTS 13, 37, price ten cents each. 2. Please state also whether energy exists in light, and to what extent. A. Light and heat are now classed together as radiant energy by scientists, and the energy of both is measured by absorbing some material and determining the heating effect it produces. The energy of light as light has not been measured by any mechanical effect which it can produce.

(8262) G. B. W. asks: 1. Does the magnetic field of an inductor dynamo rotate just as if the field coil were fastened to the inductor? A. No; we think the type you name does not. 2. In a slotted armature does the field have to cross an extra wide air gap due to the depth of the slot? A. No; the air gap is smaller in a slotted armature. The lines follow the iron in preference to the air, and do not pass out at the bottom of the slots. 3. Does a conductor cut the lines of force or do the lines of force cut the conductor? That is, do the lines of force break on one side of the conductor and reunite on the other when it is swept through the field on the armature of a dynamo? A. Lines of force are not like threads, to be cut. They are not of material substance, and are not cut in any such sense. The wire passes through the field and is resisted in doing so with a force which has a certain value and effect in generating an electric current which is well expressed by the convention of imaginary lines. The lines are as imaginary as the earth's equator. 4. Is there an arc lamp which does not throw shadows because of the up-and-down rods by the side of the carbon? A. Lamps have been made which do not throw shadows. There need be but a small conductor to carry the current to the lower carbon.

(8263) W. B. asks: In issue of June 1, Notes and Queries, No. 8198, 5,846 deg. F. is given as the latest figure for the melting point of platinum. Is this misprint for 3,846? A. No; the error in the melting point of platinum arose from using a temperature which was in Fahrenheit degrees as if in Centigrade degrees. The melting point of platinum is given variously from 1775 deg. C. to 2200 deg.

C., which would be equivalent to about 3200 deg. to 3992 deg. Fahr.

(8264) S. C. asks: 1. Please let me know the amount of iron wire which is necessary for the core of the armature of the simple motor described on page 500 in "Experimental Science." A. About a pound of wire is required. 2. Would the carbon plates made by the process given on page 705 be all right for the plunge battery on page 401? A. Yes, if well made; but we do not advise an amateur to attempt the manufacture of carbons. He cannot obtain very good results, and they are very cheap in the market. 3. How much bichromate of soda is required for one charging of the same battery? A. To every 6 quarts of water take 3 pounds of sodium bichromate and 1 quart of strong sulphuric acid.

(8265) F. S. L. writes: I would like to know how to make a spark or a spark coil, and in what way it differs from an induction coil. I want to make a spark coil to use to ignite an acetylene gas jet. A. Spark coils are made about ten inches long. The center is a core of iron wire as in an induction coil. It may be  $\frac{1}{8}$  inch in diameter. Insulate the core by wrapping it with paper which may be soaked in paraffine. Fit heads upon the ends of the core to hold the winding and wind four to six layers of about No. 12 B. & S. double cotton-covered wire upon the core. Insulate the layers with paper. This coil is put in series with a battery, and upon breaking the circuit a spark is produced at the break which lights the gas. There is no secondary coil. In this is the difference between a spark and an induction coil.

(8266) J. L. M. asks: What is the most practical and least expensive process to produce, as near as possible, an absolute vacuum in a chamber containing about four cubic feet? Will it require a greater capacity of power to empty a large space than it will a smaller one? A. To exhaust so large a space it will be necessary to use a mechanical air pump. It is not possible to produce an absolute vacuum by any means of exhaustion. It will, however, not require any greater power to empty a large reservoir. It will require more time.

(8267) A. L. N. asks: 1. Are there any known substances, preferably metal, which allow some kind of gas to pass through, about the same as light through glass? If so, which? A. We do not know any such metal or substances. The molecules of any gas are much too large to pass between the molecules of a metal. Red-hot cast iron will allow some gases to escape through it, but not with the ease with which light passes through glass. 2. Are there any known substances, preferably metal, which will change temperature, when immersed in some gas? If so, which? A. Powdered antimony or heated copper foil will burn with the evolution of light if dropped into a jar of chlorine gas.

(8268) E. V. V. writes: I have had some little trouble in convincing a man that ice forms on the bottom of a running stream of water, but having seen the same I know I am right. Would you kindly answer same in your valuable paper? A. Anchor ice is often to be seen fastened to the stones on the bottom of a stream, and also to the timbers around a mill. Very frequently mills are stopped by the anchor ice during a very cold snap.

## INDEX OF INVENTIONS

For which Letters Patent of the United States were issued for the Week Ending

July 2, 1901,

AND EACH BEARING THAT DATE.

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

Adjustable rack, F. Reissmann..... 677,797  
Agricultural implement tooth, H. G. Smith..... 677,478  
Alarm, See Electric alarm.  
Anchor, F. Baldt, Sr..... 677,619  
Anchor, J. N. Young..... 677,839  
Arch, plate-metal, T. F. Rowland..... 677,472  
Armature for dynamo electric machines, C. D. Anderson..... 677,392  
Auger, post hole, J. B. Driskill..... 677,403  
Automobiles, automatic tank pump for, G. B. Stacy..... 677,709  
Bag frame catch, A. P. Fuller..... 677,653  
Barrow, dumping, G. D. Potter..... 677,467  
Battery. See Electric battery.  
Battery zinc element, galvanic, H. J. Brewer..... 677,633  
Beach protector, Van Orden & Coombs..... 677,825  
Bearing, roller, G. E. Bartholomew..... 677,494  
Bearing, thrust, H. Brinkmann..... 677,434  
Bed lounge, G. M. Thumore..... 677,717  
Bedstead attachment, H. C. Lausen..... 677,671  
Bedstead, chair, E. J. Welles..... 677,483  
Bicycle brake and support, J. Schulte, Jr..... 677,804  
Bicycle coaster brake, E. L. Morse..... 677,682  
Bicycle frame, E. Y. White..... 677,830  
Bicycle frame, motor, E. Y. White..... 677,845  
Bicycle handle, J. M. Rauhoff..... 677,373  
Bicycle steering device, G. G. Spencer..... 677,428  
Binder, temporary, J. F. Bourne..... 677,628  
Blowpipe, J. McLaughlin..... 677,660  
Boat, life, B. Glanville..... 677,760  
Boiler leveling device, Grisez & Walch..... 677,508  
Boilers, recording gage of steam pressure on, C. J. Manning..... 677,674  
Book support, portable, W. P. Allred..... 677,731  
Boot or shoe holding jack, W. C. Meyer..... 677,550  
Bottle, non-refillable, E. Hoerichs..... 677,413  
Bottle spout, ink, H. J. Valentine..... 677,719  
Box cap and shot plank holder, combined, T. C. Farrell..... 677,649  
Box fastener, G. F. Knapp..... 677,576  
Box for distributing powdery or pasty substances, P. Kirschen..... 677,667  
Box lid holder, W. Gies, Jr..... 677,506  
Box lid opener or closer, N. P. Hicks..... 677,690  
Prake, G. W. Nistle..... 677,464  
Brick compound, basic fire, S. B. Newberry..... 677,688  
Bridge construction, G. W. Heuer..... 677,571  
Broom, handle extension coupling, S. A. Pulger..... 677,372  
Brush holder, J. J. Wood..... 677,834

Brush, rotary, F. G. Farnham..... 677,502  
Brushing, grinding, or polishing machine, B. Nichols..... 677,589  
Building block, B. Hafner..... 677,351  
Butter, etc., from vessels, device for removing, W. M. Blaney..... 677,732  
Button, cut, G. Breda..... 677,631  
Button, producing tuft, F. H. Neider..... 677,588  
Buttonhole casing, R. H. Piper..... 677,792  
Buttonhole files, apparatus for marking, W. T. Benjamin..... 677,557  
Cake beater, K. H. McRae..... 677,421  
Calendar, pen, and pencil, combined, P. Fraser..... 677,449  
Callipers, C. A. Huestis..... 677,574  
Camera focusing hood, A. D. Davis..... 677,561  
Camera, photographic magazine, A. Mixer..... 677,460  
Cane, producing tuft, F. H. Neider..... 677,588  
Cane topper, O. Palm..... 677,426  
Car construction, W. H. Woodcock..... 677,729  
Car, convertible dump, H. S. Hart..... 677,352  
Car coupling, A. A. Moss..... 677,366  
Car coupling, H. C. Buhop..... 677,435  
Car door, grain, E. V. Williams..... 677,728  
Car door opener, J. H. Hamilton..... 677,611  
Car draft, rigging, railway, J. Rawles..... 677,469  
Car fender, Lind..... 677,523  
Car fender, yielding automatic adjustable, S. W. Alexander..... 677,532  
Car sand box, A. L. Bacon..... 677,554  
Cars, means for supporting and manipulating contact shoes of electrically propelled railway, Hastings & Walkins..... 677,741  
Carbon brush, W. C. Fish..... 677,348  
Carbonating apparatus, P. & O. Maliner..... 677,560  
Card cutting machine, George & Delvoux..... 677,500  
Carpet sweeper fender, S. Greacen..... 677,411  
Carriage wheel, T. Loverin..... 677,525  
Cartridge, H. Maxim..... 677,527  
Cartridge belt or bandoleer, Mills & Orndorff..... 677,528  
Case. See Byeglass case.  
Cash register, J. P. Cheal..... 677,500  
Casting making mould, R. F. Ludlow..... 677,549  
Castings, apparatus for handling, cleaning, and distributing, G. W. Packer..... 677,691  
Ceiling plate for combination light fixtures, F. G. Proculier..... 677,595  
Cement calcining apparatus, Lathbury & Spackman..... 677,457  
Chain belt links, machine for straightening and trimming, J. C. Howe..... 677,744  
Chain, conveyer, J. C. Hoshor..... 677,742  
Chain cutting machine, E. F. Girard..... 677,568  
Chair backs, adjustable support for, J. Luppino (Reissue)..... 11,919  
Chemical apparatus, Robinson & Higgins..... 677,599  
Churn, J. H. McCausland..... 677,684  
Churning machine, B. H. McDaniel..... 677,586  
Cigar wrappers, die for cutting out, E. Plasko..... 677,793  
Cigarette mouthpieces, machine for packing, E. T. Parson..... 677,594  
Circuit breaker, E. M. Hewlett..... 677,353  
Clock, electric self winding, D. W. Thompson..... 677,819  
Closet seat, M. T. Robinson..... 677,799  
Clothes line pole, C. B. St. Clair..... 677,606  
Clutch, H. W. Patrick..... 677,592  
Clutch, H. L. Arnold..... 677,615  
Clutch, friction, E. Huber..... 677,573  
Clutch mechanism, H. F. Knight..... 677,417  
Coating tin, form, like plates, apparatus for, T. Kendrick..... 677,666  
Coffee pot, A. L. Rich..... 677,700  
Cold storage apparatus, indirect air circulating system for, M. Cooper..... 677,536  
Communication wafers, machine for making, J. J. Engster..... 677,648  
Compasses to distant points, mechanism for transmitting the reading of ships, E. F. W. von Manteuffel..... 677,581  
Compressor, W. J. Francke..... 677,503  
Condensing apparatus, P. Nezeraux..... 677,462  
Convertible chair, E. L. Thompson..... 677,382  
Cooling tower, C. H. Wheeler..... 677,750  
Corn husker and fodder shredder, combined, A. Rosenthal..... 677,471  
Corn husker and shredder, Teegarden & Himes..... 677,386  
Corset, L. Dyer..... 677,441  
Cover, for cases, etc., N. Barney..... 677,622  
Cows for milking or the like, leg rope attachment for securing, A. E. Whiting..... 677,831  
Crate, folding, W. P. Murphy..... 677,683  
Crib, folding, H. F. Melstrell..... 677,675  
Crochet needle, J. J. Wickham..... 677,832  
Cross head, H. C. Clay..... 677,338  
Culivator, J. M. Wright..... 677,836  
Cultivator, shares or shovels, standard adapted for, A. G. Perry..... 677,694  
Cutting implement, W. E. Lott..... 677,419  
Dam, N. Gherassimoff..... 677,656  
Dampier, L. Hoepfner..... 677,572  
Dashboard, H. L. Hall..... 677,761  
Dental clamp, J. A. Dunn..... 677,565  
Dental engine, O. H. & A. F. Pieper (Reissue)..... 11,920  
Dental forceps, H. N. Lancaster..... 677,577  
Desk basket attachment, A. S. Busselle..... 677,634  
Desk, card-ledger, G. B. Meloney..... 677,786  
Desk, office, J. B. Rohrer..... 677,802  
Diamond polishing machine, G. Armeny..... 677,613  
Digging machine, trench, J. H. W. Libbe..... 677,522  
Dispensing apparatus, coin controlled, D. Sullivan..... 677,748  
Display rack, W. Northgraves..... 677,790  
Door, grain, P. J. Stone..... 677,379  
Door hanger, W. Loudon..... 677,524  
Door openers, controlling device for electrical, G. A. Le Fevre..... 677,783  
Draft for buffing rigging, R. D. Gallagher, Jr..... 677,654  
Drawers, set of, A. Finkenrath..... 677,734  
Drier, See Malt drier.  
Drier, furnace, W. H. Prinz..... 677,697  
Dust guard, J. E. Akers..... 677,611  
Dye and making same, red azo, Israel & Kothe..... 677,516  
Electric alarm, Wescher & Wollenhaupt..... 677,829  
Electric arc furnace, R. C. Contardo..... 677,439  
Electric battery, portable, M. E. Fuld..... 677,652  
Electric circuit controlling means, R. Varley, Jr..... 677,826  
Electric current controller, C. H. Keizer..... 677,360  
Electric current interrupter, E. W. Caldwell..... 677,498  
Electric currents, interrupting, E. W. Caldwell..... 677,499  
Electric cut out, automatic, F. H. Rogers..... 677,843  
Electric machine casing, dynamo, C. D. Anderson..... 677,533  
Electric machines, regulating of dynamo, H. M. Hobart..... 677,355  
Electric mains connected to storage batteries, apparatus for regulating pressure in, J. S. Highfield..... 677,661  
Electric motor regulator, W. H. Knight (Reissue)..... 11,918  
Electric switch, Cowperthwait & Lindstrom..... 677,340  
Electrical distribution, W. B. Potter..... 677,371  
Electrical distribution system, E. W. Rice, Jr..... 677,375  
Electrical rosette cut out, G. B. Thomas..... 677,479  
Electromagnet, J. D. Ihlder..... 677,359  
Ellipsograph, F. Oldfield..... 677,590  
Engine igniter, gas, C. Allen..... 677,491  
Engines, hydrocarbon spraying device for gasoline, T. B. Jeffrey..... 677,767  
Evaporating pan, I. Kisee..... 677,416  
Excavating and gold saving apparatus, J. C. Des Granges..... 677,844  
Excavating apparatus, R. Dalton..... 677,538  
Exhaust head, A. S. Hyde..... 677,357  
Explosive mixing machine, J. C. Schrader..... 677,803  
Eyeglass case, A. L. Mariner..... 677,785  
Fabrics, formation of colored, P. B. Worthington..... 677,835  
Farm gate, J. E. Moore..... 677,364  
Faucet, Nagastang same, oat stock, J. D. Feed & H. R. Nager..... 677,587  
Fence machine, wire, C. C. Carter..... 677,757  
Fence post, T. W. Brown..... 677,396  
Filter, O. Burbridge..... 677,773  
Filtration and purification system, water, M. L. Davis..... 677,641  
Fire back, adjustable, E. H. Headford..... 677,451  
Fire extinguisher, G. W. Thompson..... 677,715  
Fire extinguisher, automatic, G. Thompson..... 677,716  
Fireplace heater, J. H. Heitland..... 677,542  
Fireproof floor and girder, E. Molloy..... 677,420

Fish hook spring attachment, A. D. Gary..... 677,655  
Fish scaling implement, E. S. Herrington..... 677,543  
Flooring machine, W. O. Vivarttas..... 677,721  
Fluid meter, H. Chrisman..... 677,558  
Flume screen, J. R. Freeman..... 677,567  
Folding machine, G. F. Dunn..... 677,404  
Folding table napkins, etc., machine for, E. Colton..... 677,436  
Formaldehyde generator, F. G. Dieterich..... 677,633  
Foundry clamp, A. M. Thompson..... 677,818  
Frog for use in connection with overhead conductors of electrical tramways or railways, H. G. Nicholson..... 677,463  
Furnace, T. Smith..... 677,812  
Furnaces, stock line recorder for blast, J. E. Johnson, Jr..... 677,665  
Fuse, electric detonator, Smith & Corrie..... 677,477  
Gage, See saw gage.  
Galley lock, Peoples & Walther..... 677,693  
Game, war, J. Lanz..... 677,782  
Gas and air mixer, G. Raap..... 677,699  
Gas burner heating attachment, A. M. Forrester..... 677,650  
Gas furnace, retort, H. Burgmann..... 677,336  
Gas generator, acetylene, Benedict & Graf..... 677,334  
Gas generator, acetylene, H. A. Holmes..... 677,462  
Gas purifier cover, T. S. Clapham..... 677,639  
Glass blowing machine, D. Murray..... 677,530  
Glass cap making machine, F. H. Loveridge..... 677,548  
Glass plates, making wire, Swearer & Toyne..... 677,609  
Golf club, G. W. Mattern..... 677,811  
Grain binder, automatic, J. F. Appleby..... 677,553  
Grain drill, Dodson & Evans..... 677,564  
Grain scouring machine, F. T. Ewan..... 677,630  
Grain separator, A. F. Brase..... 677,647  
Grinding machine, H. Pearce..... 677,593  
Guanidin compound and making same, Israel & Kothe..... 677,514  
Guanidin derivatives and making same, mixed, Israel & Kothe..... 677,515  
Guitar attachment, K. Beck..... 677,395  
Hair crimper, C. L. Walters..... 677,390  
Hands and fingers, device for developing muscles of the, C. Troxler, Jr..... 677,824  
Hank securing means, Wisburn & Buile..... 677,488  
Harrow attachment, disk, H. J. Heider..... 677,658  
Harvester bundle carrying attachment, C. N. Bargquist..... 677,621  
Hatchway cover fastening, H. I. Smith..... 677,604  
Heater, G. E. Riblet..... 677,798  
Heating apparatus, A. M. Hewlett..... 677,764  
Hinge, N. W. McCourt..... 677,665  
Hoe and weeder, combination, T. R. & F. E. Ferris..... 677,405  
Hoof pad, J. A. Buck..... 677,497  
Hopper, animal, J. P. Meals..... 677,583  
Horseshoe pad, A. Buer..... 677,398  
Hot air furnace, C. Messer..... 677,676  
Hub, L. Sturges..... 677,429  
Hub, vehicle, Z. T. Kale..... 677,575  
Hydrant, C. E. Loetzer..... 677,362  
Hydrocarbon burners, preliminary vaporizer for, T. B. Dooley..... 677,402  
Hydrocarbon motor, W. Bruening..... 677,397  
Hydrocarbon vapor burner, Holt & McDaniel..... 677,766  
Index, Throop & Hendricks..... 677,384  
Induction chamber and oil eliminator, J. J. Hoppes..... 677,356  
Insulating conductors, C. E. Woods..... 677,730  
Invalid lifting and handling device, H. E. Sharver..... 677,602  
Ironing machine, A. Sharp..... 677,808  
Jar holder, fruit, S. L. Bray..... 677,733  
Joint coupling, three ball metallic flexible, G. W. Shields..... 677,809  
Journal box, S. & S. J. Reynolds..... 677,374  
Kettle lids, device adapted for operating, C. U. Rhoades..... 677,597  
Knitting machine needle, R. W. Scott..... 677,806  
Knob, door, C. E. Biele..... 677,625  
Ladder, H. Frizell..... 677,651  
Ladder and table, combined step, H. C. Stout..... 677,714  
Lamp, acetylene gas generating, W. P. Cray..... 677,400  
Lamp, electric arc, T. Spencer..... 677,605  
Lamp globe holder, arc, G. E. Stevens..... 677,377  
Lamp, incandescent electric, B. M. Drake..... 677,440  
Lamp, vapor burning, R. O. Applegate..... 677,756  
Lancet, R. Caldwell..... 677,781  
Lasting machine, J. S. Ladd..... 677,432  
Latch, J. Biele..... 677,713  
Latch, B. A. Stevens..... 677,695  
Lath slide rest, J. W. von Pittler..... 677,368  
Leather, manufacturing, J. C. McConnell..... 677,763  
Letter box, A. L. Henry..... 677,600  
Life saving apparatus, acetylene generator for, J. Ruck..... 677,418  
Limekiln, C. J. C. L'Esperance..... 677,578  
Liquids by electrolysis, apparatus for purifying, Lemp & Koedding..... 677,578  
Lithographic or other transfer sheets, machine for coloring or powdering, H. Michaud..... 677,678  
Loading machine, stone and dirt, C. C. Troxell..... 677,823  
Lock, See Galley lock. Sash lock.  
Logging car, J. C. Barron..... 677,556  
Loom filling replenishing mechanism, H. W. Wyman..... 677,838  
Loom pick finder, K. Hyde..... 677,513  
Loom, weft replenishing, E. S. Stimpson..... 677,607  
Mail or other service, transmission system for, G. A. Owen..... 677,424  
Mail service system, G. A. Owen..... 677,425  
Mail, driving, W. H. Prinz..... 677,698  
Malt and drying apparatus, F. H. C. Mey..... 677,787  
Mandolin player, electric, A. I. Mitchell..... 677,584  
Manhole plate, adjustable swinging, M. E. Casey..... 677,637  
Marble, manufacture of artificial, J. Tuckwell..... 677,385  
Match boxing machine, W. R. Swett..... 677,816  
Mattress forcing device, cotton, J. E. Gyle..... 677,780  
Meat or vegetable cutter, M. Cameron..... 677,337  
Melting, smelting, and crucible furnace, W. H. Thornley..... 677,920  
Mercerizing, Gros & Bourcart..... 677,450  
Metallic tie, A. M. Bowman..... 677,754  
Mica splitting machine, De Kaiser & Hadfield..... 677,775  
Mining apparatus, gold, M. Covel..... 677,597  
Mining shaft, safety apparatus for setting cable chaf in, Carstens & Henley..... 677,437  
Mosaic art panels, manufacture of, W. J. Rockwood..... 677,800  
Music stand and music leaf turner, combined, O. C. Zerck..... 677,840  
Musical instrument, automatic, E. de Kleist..... 677,769  
Nut lock, L. J. Mathias..... 677,461  
Nut lock, H. C. Karlson..... 677,546  
Nut lock, T. E. Shortell..... 677,608  
Oar making machine, W. T. Jones..... 677,688  
Oats process, rolled, J. D. & H. R. Nagel..... 677,789  
Offset webs, method of using, J. L. Firm..... 677,736  
Oil, etc., apparatus for distributing or feeding coal, J. G. Branch..... 677,755  
Ore bucket dumper and chute, L. Collier..... 677,560  
Ore roasting furnace, J. Roger..... 677,701  
Ores, apparatus for the treatment of, J. Armstrong..... 677,614  
Ornamenting cardboard, etc., J. W. McCabe..... 677,459  
Package, H. C. Deckert..... 677,642  
Painting machine, H. J. Delaney..... 677,343  
Photographs, duplicating, G. H. Stevens (Reissue)..... 11,917  
Photograph plate, P. V. W. Welsh..... 677,484  
Photographic roll holder, G. Eastman..... 677,445  
Piano, L. W. Noncross..... 677,463  
Piano sounding board, C. Lutz..... 677,579  
Picker checking device, pneumatic, F. B. Comins..... 677,562  
Picker staff checking device, F. B. Comins..... 677,561  
Picker staff controller, F. B. Comins..... 677,563  
Pipe boiler, W. MacFarlane..... 677,788  
Pipe coating apparatus, iron, M. M. Hedges..... 677,570  
Pipe hanger, H. W. Hoerr..... 677,765  
Plating machine, H. S. Brown..... 677,496  
Plating machine feeding device, J. A. Groblich..... 677,540  
Planter, seed, A. L. Alexander..... 677,612  
Pliers, self locking, M. M. Howland..... 677,414  
Plow, vineyard, J. A. Bilz..... 677,495  
Pneumatic despatch tube apparatus, J. T. Cowley..... 677,759  
Pot for cooking purposes, J. Ortnier..... 677,466  
Printing machine, label, S. B. Tilly et al..... 677,821  
Printing press, J. L. Firm..... 677,735, 677,737 to 677,739

(Continued on page 30)



**"Star" Lathes**  
Foot and Power  
Screw Cutting  
Automatic Cross Feed  
FOR FINE, ACCURATE WORK  
Send for Catalogue B.  
SENECA FALLS MFG. CO.  
695 Water Street,  
Seneca Falls, N. Y., U. S. A.

**ENGINE & FOOT MACHINE SHOP OUTFITS**  
**LATHES**  
TOOL SUPPLIES  
SEBASTIAN LATHES CO. CINCINNATI, O.

**FOR LIGHT AND MEDIUM WORK**  
this new 14 inch  
**B. F. BARNES**  
Upright Drill is several laps ahead of any other drill on the track. It will drill from 1/16 of an inch up to 3/4 of an inch and is a strong, well built, durable tool.  
It doesn't cost a whole lot either. Details are yours for the asking.  
B. F. BARNES COMPANY, Rockford, Ill.

**Gas Engine IGNITER**  
Complete with spark coil. \$12.00.  
The Best Thing on the market.  
Latest and most improved model.  
Send for Circular.  
Carlisle & Finch Co., 233 E. Clifton Av., Cincinnati, O.

**New Microscope for Nature Study**  
and for use in the Examination of Ores, Metals, Woods, Fibre, etc.  
**Queen Acme No. 6** 1 in. objective giving power of about 100 diameters, 1 set of 12 prepared slides of insect parts and other interesting specimens, all in case. \$16.00  
Ask your nearest optician for it.  
**QUEEN & CO., INC.**  
Optical and Scientific Instrument Works,  
1010 Chestnut St., Phila., Pa.  
39 Fifth Ave., New York.  
Write for Circular.

**STEAM SHOVELS**  
Both BOOM and CRANE types.  
Also Elevator Bucket Dredges.  
**The Vulcan Iron Works Co.** TOLEDO, O. U. S. A.

**THE MIETZ & WEISS KEROSENE and GAS Engine**  
burns KEROSENE cheaper and safer than gasoline. Automatic, simple, reliable. No electric battery or flameless. Perfect regulation. Belts or directly coupled to dynamo for electric lighting, charging storage batteries, pumping and all power purposes.  
Send for Catalogue.  
A. MIETZ & CO., 198-199 10th St., New York.  
Mark & Co., London, Hansburg, Paris

**TO MINE OWNERS**  
You need a Hoisting Engine.  
You want the best, strongest, safest, most up-to-date engine that is made—the most durable and yet the greatest saver of money. Send for our free catalogue and state the size of engine you want. We build them for mines, quarries and docks. Both electric and geared hoists, 6 to 10 H. P.  
All parts easily interchangeable.  
**WEBER GAS & GASOLINE ENGINE CO., P. O. Box 1114-16, Kansas City, Mo.**

**ARTESIAN**  
Wells, Oil and Gas Wells drilled by contract to any depth from 50 to 300 feet. We also manufacture and furnish everything required to drill and complete same. Portable Horse Power and Mounted Steam Drilling Machines for 100 to 1200 feet. Write us stating exactly what is required and send for illustrated catalogue. Address  
**PIERCE WELL ENGINEERING AND SUPPLY CO.**  
134 LIBERTY STREET, NEW YORK, U. S. A.

**GASOLINE ENGINES**  
If made by Witte are all right. They are simple, safe, durable, and guaranteed for 5 years. Just write for Catalogue A, and see.  
**WITTE IRON WORKS CO.**  
518 West 5th Street,  
Kansas City, Mo.

**THE NEW BRISTOL COUNTER**  
Registers an accurate account of work done on print presses, grain mills, weighing, measuring and other automatic machines. Counts up to 1,000,000 and renews automatically. Simple, accurate, durable. Send for Illustrated Catalogue with Prices.  
**C. J. ROOT, Bristol, Conn., U. S. A.**

**Perfection Air Mattresses**  
(TRADE MARK) (LAND CUSHIONS)  
**FOR CAMP-YACHT-HOME-HOSPITAL**  
NON-ABSORBENT, HYGIENIC, ODORLESS.  
When deflated can be rolled into small package for storage or transportation.  
Send for Illustrated Catalogue with Prices.  
**Mechanical Fabric Co.** PROVIDENCE, R. I.

Printing press, C. B. Funk.....	677,408
Printing press, platen, E. Waite.....	677,389
Pulley, wood split, D. B. Baker.....	677,555
Pulverizing mill, Russell & Hays.....	677,702
Pump, B. Russell.....	677,474
Pump, J. Devanter.....	677,775
Pump, lubricating, L. Friedmann.....	677,617
Pumping apparatus, M. T. & M. C. Chapman.....	677,438
Pumping apparatus, J. E. Kirk.....	677,547
Punch and gage, convex, E. M. Comstock.....	677,339
Punch, convex, G. Schrade.....	677,475
Punching and shearing machine, J. F. Doolittle.....	677,644
Rack. See Adjustable rack.....	
Radiator valve, E. P. Allen.....	677,551
Rail joint, H. H. Scherer.....	677,704
Railway.....	677,456
Railway bed, tank for irrigating vegetable growth on, S. P. L. Erickson.....	677,445
Railway, electric switch, A. L. Hatfield.....	677,778
Railway frog, H. Elliot.....	677,646
Railway rails, device for applying sand to, E. K. de Witt.....	677,833
Railway signaling, detonator for, V. von Neuman.....	677,387
Railway signaling system, wireless electric, L. C. Werner.....	677,828
Railway track cleaner, M. Power.....	677,696
Rake cleaning attachment, W. R. Dawson.....	677,774
Refrigeration system, C. J. Coleman.....	677,845
Refrigerator, W. Thomas.....	677,380
Refrigerator, M. Bensinger.....	677,431
Refrigerator, A. E. Villalobos.....	677,481
Refrigerator, J. S. Wrightman.....	677,837
Regulator, D. H. Haywood.....	677,762
Rein support and lock, A. F. Vorkeller.....	677,722
Relay, R. Herman.....	677,659
Reversing mechanism, H. L. Arnold.....	677,493
Rheostats operated by means of compressed air, apparatus for cutting into and out of circuit liquid, K. von Kande.....	677,454
Rivet feeding apparatus, F. W. Strapp.....	677,711
Roasting furnace, R. Hall.....	677,510
Rotary engine, E. E. Albert.....	677,531
Rotary engine, T. H. Bellas.....	677,752
Rug straightener, G. T. Weeks.....	677,725
Rule, slide, E. Thacher.....	677,817
Ruler, adjustable curved, A. Gagarin.....	677,349
Ruler, parallel, H. Goldmann.....	677,444
Saddle or seat support, Shaw-Mackenzie & Grosley.....	677,705
Sand hand, W. H. Robinson.....	677,598
Sarcophagus, W. A. Crev.....	677,640
Sash, door, or shutter fastening device, O. Williams.....	677,486
Sash lock, automatic, J. A. McCandless.....	677,367
Saw blade handle, J. W. Miller.....	677,879
Saw gage, C. F. Fowler.....	677,406
Saw set, J. T. Hildahl.....	677,354
Scales, price, J. W. Points.....	677,794
Scales, web holding device for wage, A. B. Harmon.....	677,412
Scraper, wheeled earth, W. H. Forker.....	677,448
Sectional table or bench, M. James.....	677,442
Sewing machine, broom, H. S. Vagstad.....	677,591
Sewing machine, buttonhole, E. B. Allen.....	677,391
Sewing machine loop spreader mechanism, L. Onderdonk.....	677,422
Sewing machine, needle feed chain stitch, H. J. Hancock.....	677,740
Sewing machine welt guide, C. H. Allen.....	677,492
Sewing or other machine stop mechanism, F. T. Leitch.....	677,784
Shearing machine, A. I. Jacobs.....	677,518
Shears, Thornley & Baer.....	677,381
Shears, H. L. Hopkins.....	677,662
Sheet metal pipe, spiral jointed, F. W. Staff.....	677,712
Shelf and support therefor, adjustable, D. A. Beckwith.....	677,624
Shingle sawing machine attachment, H. G. Blanchard.....	677,534
Shingling bracket, C. D. Elkins.....	677,645
Shoe fastener, temporary, E. E. Donovan.....	677,519
Sidewalk cover, J. Wagner.....	677,388
Sight feed lubricator, Grimes & Wakefield.....	677,665
Signaling device, Grishow & Osborn.....	677,541
Skirt supporter, M. E. Grove.....	677,509
Skylight and ventilator, combined, Haapam & Akers.....	677,512
Soap hook, F. Morrison.....	677,305
Soap hook, J. W. Booth.....	677,627
Soda water fountain, B. Baron.....	677,751
Soldering device for can capping machines, electric, J. H. Rustat.....	677,335
Sound box, W. B. Outten.....	677,690
Sound increasing device, H. L. Short.....	677,476
Spectacle or eye glass case, W. E. Birmingham.....	677,753
Spinning machine, O. L. Owen.....	677,791
Stamp, drop, E. S. Brett.....	677,433
Stamp, lead pencil initial, H. A. Worthington.....	677,482
Stamp mill feeder, A. C. Pratt.....	677,795
Stand. See music stand.....	
Starch treating apparatus, J. H. Toof.....	677,822
Steam boiler, C. A. Kitts.....	677,779
Steam eliminator, J. Lloyd et al.....	677,458
Steam separator, J. B. Lewis.....	677,521
Stone cutting machine, Eisenlois & Garely.....	677,444
Stone lifter, F. Gathier.....	677,507
Storing and averaging materials in bulk, E. H. Messier.....	677,677
Stove, heating, J. E. James.....	677,664
Stovepipe elbows, etc., manufacture of, T. F. Cravy.....	677,341
Stovepipe holder, V. Ethier.....	677,447
Stovepipe joint, A. St. Armand.....	677,813
Strap connection, Gibbs & Monteth.....	677,505
Stretching, D. H. Mahan.....	677,673
Stringed instrument attachment, A. Pietsch.....	677,427
Stamp extractor, W. H. Wright.....	677,490
Sulfur trioxide, making, Krauss & Wach.....	677,670
Sulfur trioxide, making, Pauli & Krauss.....	677,692
Supporting device, adjustable, Caldwell & Sharpe.....	677,758
Suspensor cast off, A. M. Ziegler.....	677,842
Suspenders, A. M. Ziegler.....	677,841
Switch for multiphase alternating current motors, K. von Kande.....	677,455
Switch operating device, Weathers & Stevenson.....	677,827
Switch throwing device, Baker & Hoffmann.....	677,813
Syringe, M. K. Thomas.....	677,480
Syrup jar, J. W. Sutton.....	677,815
Table, H. J. Brewer.....	677,632
Table, L. Welker, Sr.....	677,726
Tackle block, J. M. Ervin.....	677,446
Target for leveling rods, T. W. Van Hoesen.....	677,720
Telegraph apparatus, J. Barry.....	677,535
Telegraph instrument, protection of multiple, F. W. Jones.....	677,519
Telegraph printing, J. Rogginger.....	677,801
Telegraph switching apparatus, F. W. Jones.....	677,453
Telephone receiver, W. D. Gharky.....	677,409
Telephone switch, automatic, W. D. Watkins.....	677,724
Telephone switchboard, operator's suspension set for, D. Gharky.....	677,410
Telephone toll line coin collector.....	677,331
Thresher belt guide, J. B. Bartholomew.....	677,807
Time and combination lock, combined, E. H. Mix.....	677,363
Tire, bicycle, C. Stone.....	677,378
Tire cushion, W. C. Edwards.....	677,415
Tire inflator, automatic, G. R. Stacy.....	677,708
Tire, pneumatic, U. P. Smith.....	677,810
Tire, rubber, C. W. Stapleton.....	677,814
Tires, air pump for pneumatic, G. B. Stacy.....	677,710
Tobacco pipe, W. B. Barbour.....	677,620
Tobacco stripping machine, F. G. Frankenberg.....	677,407
Tongs, L. Frederick.....	677,616
Tool, E. D. C. Koeth.....	677,770
Tool holder, C. W. Grant.....	677,350
Toy, C. W. Walters.....	677,723
Toy, J. Mauro.....	677,745
Toy bank, S. Schmaus.....	677,601
Trace fastener, L. L. Edwards.....	677,345
Track fastening, Day & Neal.....	677,342
Traction engine, J. B. Bartholomew.....	677,332
Tray stand and napkin receptacle, combined, W. H. Johnson.....	677,545
Trunk, O. Rangpov.....	677,596
Tufting machine button support, J. H. Clores.....	677,559
Turbine, water main, M. Schaberg.....	677,376
Type bar driving connection, A. W. Steiger.....	677,430
Typewriter attachment, W. B. Martin.....	677,582
Typewriting machine, W. J. Barron.....	677,623

(Continued on page 31)

**KEEP UP WITH THE TIMES.**  
**SAVAGE**  
Do not buy a rifle until you have examined into the merits of the which is the  
**TWENTIETH CENTURY ARM.**  
**ABSOLUTELY SAFE.**  
**STRONGEST SHOOTER.**  
Only Hammerless repeating rifle in the world.  
Constructed to shoot 6 different cartridges in one rifle.  
Adapted for grizzly bears and rabbits.  
We guarantee every SAVAGE Rifle. .303 and 30-30 Calibres.  
Write for our handsome new catalogue A.  
BAKER & HAMILTON, San Francisco and Sacramento, Cal.  
Pacific Coast Agents.  
**SAVAGE ARMS CO., UTICA, N. Y., U. S. A.**  
Awarded Grand Gold Medal at Paris, beating all competitors.

**AUTOMOBILE PARTS.**  
IF YOU ARE BUILDING  
AN AUTOMOBILE, WE CAN SUPPLY YOU  
WITH PARTS AND FITTINGS.  
IN OUR SEVEN FACTORIES WE MAKE  
RUNNING GEARS, TOOL STEEL BALLS,  
STEEL RIMS, STEEL STAMPINGS, CHAINS,  
SHEET STEEL AND FORGINGS.  
ALL FOR AUTOMOBILE CONSTRUCTION.  
QUOTATIONS ON APPLICATION.  
**THE AUTOMOBILE & CYCLE PARTS CO.**  
CLEVELAND, OHIO.

**YOUR BICYCLE**  
May need a new crank hanger or higher gear. We can furnish crank hangers complete with cups and cones, to fit any wheel. Write us for full information.  
**The Avery & Jenness Co., 60 S. Canal St., Chicago, Ill.**  
**PALMER** Stationary and Marine Gasoline Engines and Launches, Motor Wagon Engines, Pumping Engines.  
Send for Catalogue.  
**MIANUS, CONN.**

**GERE GASOLINE ENGINES**  
SIMPLEST BOAT ENGINES MADE  
CABIN—OPEN BOATS  
ENGINE CASTINGS BOAT FRAMES  
GEORGE YACHTS, LANSING, MICH.  
NEW CAT FOR 4 STAMPS  
**HIGHEST EFFICIENCY**  
attained in the  
**STOVER GASOLINE ENGINE**  
The best is always cheapest. Write for prices.  
**STOVER ENGINE WORKS, FREEPORT, ILL.**

**The Typewriter Exchange**  
114 Barclay St., NEW YORK  
124 La Salle St., CHICAGO  
38 Bromfield St., BOSTON  
817 Wyandotte St., KANSAS CITY, MO.  
209 North 9th St., ST. LOUIS, MO.  
432 Diamond St., PITTSBURGH, PA.  
3 West Baltimore St., BALTIMORE, MD.  
536 California St., SAN FRANCISCO, CAL.  
We will save you from 10 to 50% on Typewriters of all makes. Send for Catalogue.

**GAS AND GASOLINE ENGINES.**  
Using Natural Gas, Coal Gas, Producer Gas, and Gasoline direct from the tank. 1 to 40 H. P., actual.  
**The Springfield Gas Engine Co.**  
21 W. Washington St., Springfield, O.

**A Marvelous Machine!**  
Watch the wonderful work done by our Apex Nipple and Pipe Mill Machine. Threads nipples of all sizes. So swiftest that it can be reversed and pipe cut off close to grippers. Vise can be opened or closed while machine is in motion. Send for Catalogue.  
**THE MERRELL MFG. CO., 501 Curtiss Street, Toledo, Ohio.**

**FOR VEHICLE AND MARINE PURPOSES.**  
Nothing better or more economical than our four-cylinder motors. Possess every known point of excellence. Durable in every part. Detachable igniters, heavy bearings and shifting spark, water jacketed head, runs any speed from 100 to 1500 per minute. 4 1/2 to 10 H. P. Fully guaranteed. Ground joints throughout.  
**Buffalo Gasoline Motor Co., Buffalo, N. Y., U. S. A.**  
Apply for Catalogue.

**Telephones,**  
for Interior, Short Line, Intercom municipal and Hotel Work. Write us for prices, catalogue, etc., with testimonials and references. Estimates cheerfully furnished. Agents wanted.  
**THE SIMPLEX INTERIOR TELEPHONE CO.,**  
431 Main St., Cincinnati, Ohio.

**What means Schapirograph?\*)**  
SCHAPIROGRAPH is the latest up-to-date multi-copying device, the one, reproducing Black penwritten copies; also from typewriter, without printing ink or stencil. No press, no washing, 1500 reproductions inside of 15 minutes. Price for complete apparatus, cap-size, \$8.00.  
\*) TO PROVE that the Schapirograph is superior to any other duplicator, we are willing to send this outfit at OUR RISK, EXPRESS PREPAID, on 5 DAYS' FREE TRIAL. No obligation whatsoever if returned and found unsatisfactory.  
**THE SCHAPIROGRAPH CO., R 518.**  
Copyright, 1901.

**THE "KHOTAL"**  
is a Portable Practical Blue-Flame Oil Burning GAS STOVE  
Available in city or country, on land or sea, anywhere that a supply of its fuel (kerosene) can be bought or carried; and that means everywhere!  
Handsomely and strongly made of heavy brass and tinned iron; 8 1/2 inches high, 8 3/4 inches top diameter, weighs 4 1/2 lbs., never gets out of order.  
Price, \$3.75  
Other sizes—special finish for yachts—ovens, frames and accessories.  
Send for descriptive pamphlet G.  
Boils one quart of water in three minutes.  
Cooks a six-pound roast to a turn in 60 minutes.  
It is the greatest of modern conveniences for camping, yachting, picnics; a hot-weather comfort in the household kitchen; capable of meeting any cooking requirement.  
**THE HYDROCARBON BURNER CO.**  
197 Fulton Street, New York.

**GEARS, UNION MODELWORKS**  
MODEL SUPPLIES  
1193 So. Clark St. CHICAGO.

**COMPLETE TOOL LIST**  
comprising those in use by every trade or profession, with market prices and discounts of same is  
**Montgomery & Co.'s Tool Catalogue.**  
Best book of reference in the world for tools of all kinds. 510 pages, illustrated, pocket size. By mail for 25c.  
**MONTGOMERY & CO.,**  
105 Fulton St., New York City.

**PROSPECTIVE BOAT BUYERS.**  
By constructing your boat from a set of my Boat Building Materials more than one-half the boat factory's price can be realized. Also economize freight 500 percent. Launches, Sail and Row Boats, Gasoline Engines. Catalog free.  
**FRED MEDART, 3545 DeKalb St., St. Louis, Mo.**

**BY-THE-BYE, WHEN YOU BUY A BICYCLE**  
be sure and buy the best, and that means the  
**BUFFALO KING.**  
either "Racer" or "Special." The "Queen" is for a lady. No better built wheels can be had—every rider satisfied. Thoroughly up to date in improvements. All parts of best materials. Put together by skilled workmen. Prices, \$25 and \$40. Illustrated Catalogue free on application.  
**THE WM. HENGERER CO., Buffalo, N. Y., U. S. A.**

**D. L. HOLDEN**  
REAL ESTATE TRUST BLDG PHILA., PA.  
SOLE MANUFACTURER  
**REGEALD ICE MACHINES**  
SEE FIRST PAGE, SCIENTIFIC AMERICAN, SEPT. 2, 1899

**AUTOMOBILE STEAM BOILERS**  
These Boilers are made of fire box steel, which has a tensile strength of 55,000 pounds. A double butt strap seam is used. The bottom end of shell is flanged to take flat head. This flange also takes care of difference in expansion between shell and copper tubes. Each boiler is tested to 600 pounds C. W. P. Can also furnish boilers with seamless cold drawn shell.  
**FRANK MILNE, - - - EVERETT, MASS.**



Our students succeed because they use  
I. C. S. textbooks.

## Steam Engineering

A course in Steam Engineering enabling students to pass examinations and secure better positions. Includes operation of dynamos and motors.


Teach by mail, Mechanical, Steam, Electrical, Civil and Mining Engineering; Shop and Foundry Practice; Mechanical Drawing; Architecture; Plumbing; Sheet Metal Work; Chemistry; Ornamental Design; Lettering; Bookkeeping; Stenography; Teaching; English Branches; Locomotive Running; Electrotherapeutics.

When writing state subject in which interested.

### taught by mail.

International Correspondence Schools,  
Box 942, Scranton, Pa.

GRAND PRIZE, PARIS, 1900.  
HIGHEST AWARD POSSIBLE



## The Smith Premier Typewriter

### Is a Headlight


THAT MAKES  
CLEAR THE  
PATH TO  
BUSINESS  
SYSTEM AND SATISFACTORY  
CORRESPONDENCE.

SEND FOR CATALOGUE

The Smith Premier  
Typewriter Co.  
SYRACUSE, N. Y., U. S. A.

## Pick a Perfect Pencil

One with a "dependable" point, a uniform grade—one that draws a clear, sharp, well-defined line, and to do this you will have to choose



### Dixon's American Graphite Pencils

the best made lead pencil in any country. Hard, soft or medium. Suitable for all purposes. Architects, draughtsmen, clerks, reporters, etc., find them a boon.

Send 16 cents for samples. Worth double the money.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

## HOLD ON THERE!

Send 3c. for catalog of  
**Monarch Marine Gasoline Engines.**  
\$4 to \$45 H. P. \$300 up.

Grand Rapids Gas  
Engine & Yacht Co.,  
Grand Rapids, Mich.

## THE OBER LATHES

For Turning Axe, Airs, Pick Sledge, Hatchet, Hammer, Auger, File, Knife and Chisel Handles, Whiffletrees, Yokes, Spokes, Porch Spindles, Stair Balusters, Table and Chair Legs and other irregular work.

Patented.

The Ober Mfg. Co., 10 Bell St., Chagrin Falls, O., U.S.A.

## SHEET METAL NOVELTIES

WE ARE PREPARED TO MAKE ARTICLES AND STAMPINGS OF ALL KINDS AND SIZES. TOOLS AND DIES MANUFACTURED ON CONTRACT. FURNISH US BLUE PRINTS OR SAMPLES AND GET ESTIMATES.

STANDARD STAMPING CO.  
DEPT. R. BUFFALO, N. Y.

FLY PAPERS. — FORMULAS FOR  
Sticky Fly Papers are contained in SCIENTIFIC AMERICAN SUPPLEMENT Nos. 1057 and 1324. Each issue contains several recipes. Price 10 cents each, from this office, and from all newsdealers.

## Acetylene Safety

Is tenfold greater than with city gas when our generator is employed. It stops making gas immediately you stop using gas. Fourteen sizes, \$15 to \$100. Write for our literature.

### The Carbide Feed Generator

Is based on the only correct and approved system, that of feeding dry carbide in small quantities to a large volume of water. It is safe, simple, economical, practical and patented.

THE J. B. COLT COMPANY  
21 Barclay Street, Dept. S., New York.  
Philadelphia, Boston, Chicago.  
Criterion Stereopticons. Acetylene Search Lights.

Typewriting machine, C. H. Shepard.	677,706	677,707
Typewriting machine, G. H. Smith.	677,746	677,747
Unhairing machine, J. C. Koth.	677,425	677,426
Unloading apparatus, R. Thew.	677,610	677,611
Unloading apparatus, G. E. Titcomb.	677,718	677,719
Valve, rotary cut off, C. Piguet.	677,370	677,371
Valve, steam, G. Richter.	677,569	677,570
Valve, testing, E. Haffner.	677,473	677,474
Vegetable cutter, R. E. Royal.	677,558	677,559
Vehicle, R. McCluskey.	677,635	677,636
Vehicle brake, Callahan & Short.	677,743	677,744
Vehicle toe rail, S. P. Hotaling.	677,489	677,490
Vehicle top, W. J. Estes.	677,346	677,347
Vehicles, means for connecting differential gearing to driving axles of, E. T. Bird-sall.	677,771	677,772
Ventilator, T. A. Dungan.	677,344	677,345
Vulcanizer, electric, A. J. Conlin.	677,399	677,400
Washboiler, F. M. Bain.	677,394	677,395
Washing machine, C. S. Bradford.	677,629	677,630
Washing machine, E. Campbell.	677,636	677,637
Watch balance staff, D. H. Church.	677,638	677,639
Watch barrel, O. Ohlson.	677,689	677,690
Water bag, S. A. Woods.	677,489	677,490
Water cooling tower, J. E. Swendeman.	677,749	677,750
Water module or delivery regulator, C. E. Livensy.	677,361	677,362
Water, purifying, C. H. Koyl.	677,698	677,699
Water softening and purifying apparatus, C. H. Koyl.	677,699	677,700
Waxlike bodies by the action of oxidizing agents, producing, E. Schlemm.	677,703	677,704
Weather strip for doors, automatic, W. E. Morgan.	677,681	677,682
Weighing machine, J. Manes.	677,526	677,527
Well packing device, tubular, C. F. Preslar.	677,468	677,469
Wheel, See carriage wheel.		
Wheel equalizing mechanism, vehicle, T. B. Dooley.	677,401	677,402
Wheel securing device, T. A. Keogh.	677,520	677,521
Whistle, electric, S. A. Brown.	677,772	677,773
Windmill, A. A. E. Sterzing.	677,747	677,748
Windmill, A. T. Scott.	677,805	677,806
Window, pivoted, E. Humblot.	677,541	677,542
Wire reeling machine, C. L. Winget.	677,487	677,488
Wire weaving loom shuttle, W. I. Whitehurst.	677,727	677,728
Wrench, J. J. A. Miller.	677,529	677,530
Yoke fastening, neck, T. M. McVay.	677,369	677,370

### DESIGNS.

Badge, L. Sickles.	34,702	34,703
Badge or similar article, W. L. Panikoff.	34,701	34,702
Beam, metal, N. H. Davis.	34,721	34,722
Boat or ship, C. T. Maguire.	34,733	34,734
Bottle, H. C. Heinz.	34,712	34,713
Broiler, K. M. Harrington.	34,725	34,726
Brooch or pendant frame, J. H. Theuerath.	34,703	34,704
Cane or umbrella ring, D. Rose.	34,705	34,706
Cheese mold, N. Simon.	34,726	34,727
Clothes pin, O. H. Greene.	34,713	34,714
Cream separator, P. C. Smith.	34,727	34,728
Cup, A. C. Bosselman.	34,710	34,711
Fabric, woven, W. T. Smith.	34,734	34,735
Fence wire, barbed, D. C. Smith.	34,715	34,716
Governor cylinder, L. O. Goodwin.	34,718	34,719
Last hinge member, J. T. Brown.	34,731	34,732
Nasal cup, W. J. Evans.	34,708	34,709
Plate, G. R. West.	34,711	34,712
Rail bond, A. H. England.	34,716	34,717
Rug, A. Petzold.	34,740	34,741
Saddletree, R. G. Davis.	34,722	34,723
Scale frame or box blank, W. N. Pelouze.	34,706	34,707
Sewing machine frame, R. G. Woodward.	34,730	34,731
Sewing machine needle lever, R. G. Woodward.	34,728	34,729
Shade fixture, window, C. F. Bassett.	34,714	34,715
Shaving cup, J. V. Reed.	34,709	34,710
Stove, G. Thompson.	34,724	34,725
Stove leg, gas, H. P. Stimpson.	34,723	34,724
Thill coupling plate, Kell & Garthe.	34,719	34,720
Tiling, A. Plant.	34,742	34,743
Tombstone or monument, E. C. Hodges.	34,743	34,744
Valve, governor, L. O. Goodwin.	34,717	34,718
Wagon stake, G. Lant.	34,720	34,721
Weighing machine case, coin controlled, B. H. Cook.	34,707	34,708

### TRADE MARKS.

Anesthetic, liquid, H. J. Bell.	36,672	36,673
Apparel, certain named wearing, L. Baer.	36,664	36,665
Apparel, certain named wearing, B. Lowenstein & Bros.	36,665	36,666
Beer, ale, and porter,lager, Hudson County Consumers Brewing Co.	36,675	36,676
Butter, D. E. Wood Butter Co.	36,679	36,680
Buttons, vegetable ivory trousers, Newell Bros. Manufacturing Co.	36,663	36,664
Candles, H. H. Bergmann.	36,685	36,686
Canned goods, Stomo-Ordnur-Wells Co.	36,681	36,682
Chain links, detachable, King & Hamilton Co.	36,682	36,683
Coaster brakes, H. C. England.	36,688	36,689
Coffee compound, J. Camrick.	36,677	36,678
Coffee, Java and Mocha, Winslow, Rand & Watson.	36,676	36,677
Cooperage, certain named, J. H. Hamlin & Son.	36,687	36,688
Fabrics, certain named, G. Willis.	36,666	36,667
Fire kindlers, certain named, T. D. Bausher.	36,686	36,687
Food products, certain named, Mattie Mitchell Co.	36,680	36,681
Foods, compressed, American Compressed Food Co.	36,683	36,684
Furniture, rustic, Old Hickory Chair Co.	36,689	36,690
Medicines, proprietary, L. L. Browning.	36,669	36,670
Medicines, proprietary, Liquid Ozone Co.	36,670	36,671
Optical apparatus and devices, L. B. Holborn.	36,661	36,662
Remedies, cough, J. S. Dorsey.	36,671	36,672
Salt, H. H. Bros.	36,673	36,674
Sugar, "A," American Sugar Refining Co.	36,678	36,679
Toilet preparations and soaps, certain named, G. C. Stevens.	36,668	36,669
Tonic, Clifford Chemical Co.	36,674	36,675

### LABELS.

"E. B. F. Hayth's Great Egyptian Salve, for salves, E. B. F. Hayth.	8,506	8,507
"Empress Kitchen Set," for kitchen cutlery, Bridgeton Knife Co.	8,511	8,512
"Eucalypto," for a toilet preparation, C. W. Lettingwell, Jr.	8,504	8,505
"Gold Band Shoe Polish," for shoe polish, P. McLaughlin.	8,509	8,510
"Hood's Foot Friend," for a powder, Hood Chemical Co.	8,505	8,506
"Kentucky Belle," for whiskey, W. P. Strader.	8,501	8,502
"Life Saving Cholera Cure," for a medicine, L. V. Fischer.	8,507	8,508
"Lithia Salt," for mult extracts, A. Schuber.	8,502	8,503
"Primos," for meats, A. von Cotzhausen.	8,510	8,511
"Shakespeare Rye," for whiskey, L. Blum.	8,500	8,501
"Stryx Tonic," for a hair tonic, W. D. S. Co.	8,503	8,504
"The Keystone," for cigars, J. M. Downs.	8,499	8,500
"The Penny Cobbler," for a leather dressing, G. M. Port.	8,508	8,509
"White House Kitchen Set," for kitchen cutlery, Bridgeton Knife Co.	8,512	8,513

### PRINTS.

"Blowin His Bazzoo," for harvesting machinery, McCormick Harvesting Machine Co.	367	368
"Chanut Gaunterie Parisienne," for gloves, J. M. Chanut & Co.	365	366
"La France Shoe," for shoes, Williams, Clark & Co.	364	365
"Miller," for paper hangers' trestles, H. M. Lay.	368	369
"The Singer Seam," for sewing machines, Singer Manufacturing Co.	366	367

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents. In ordering please state the name and number of the patent desired, and remit to Munn & Co., 361 Broadway, New York.

Canadian patents may now be obtained by inventors for any of the inventions named in the foregoing list. For terms and further particulars address Munn & Co., 361 Broadway, New York.

## PERFORATED METALS

FOR ALL USES. MADE AS REQUIRED.

HARRINGTON & KING PERFORATING CO., CHICAGO.

## CREST MFG. CO.

CAMBRIDGEPORT, MASS.

### 3 to 5 H. P. MOTORS

CREST Sparking Plug

Coils Batteries Carburetors

### IF YOU SHOOT A RIFLE

Pistol or Shotgun, you'll make a Bull's Eye by sending three 2c. stamps for the Ideal Hand-book "A," 126 pages FREE. The latest Encyclopedia of Arms, Powder, Shot and Bullets. Mention SCIENTIFIC AMERICAN. Address CO., NEW HAVEN, CONN., U. S. A.

## DICKERMAN'S

### DURABLE DESKS

Don't buy until you get our catalogue—100 pages of money saving values.

AMERICAN STORE STOOL CO., 33 Howard St., New York

## PUNCTURE PROOF TIRES

GLASS, NAILS, TACKS, ETC. WILL NOT LET THE AIR OUT

THEY SAVE YOU TIME, MONEY, TROUBLE, DELAY

but to quickly advertise them we will send one pair only at \$4.75, C. O. D., and you can thoroughly examine them before you advance a cent. WE PAY EXPRESS ONLY when cash accompanies order. Send order at once, giving size, and we will forward a pair of the best and most durable tires ever made. CATALOGUE FREE. CHICAGO ILL. COR. RANDOLPH & FIFTH AVE.

Mention SCIENTIFIC AMERICAN.

### STANDARD WIRING

for Electric Light and Power, as adopted by the Fire Underwriters of the United States; by H. C. CUSHING, JR., A. I. E. E., Electrical Engineer and Inspector; in use by over 30,000 Electrical Engineers, Central Station Managers and Wiremen. Because it is the only book on Wiring and Construction kept strictly up to date. Flexible Leather Cover, pocket size, \$1. Sent postpaid upon receipt of price, by H. C. CUSHING, JR., 39 Cortlandt Street, New York City.

## NICKEL

### Electro-Plating

Apparatus and Material.

Hanson & Van Winkle Co., Newark, N. J. 136 Liberty St., N. Y. 30 & 32 S. Canal St., Chicago.

## LYON & HEALY'S

### Own Make BRASS BAND

INSTRUMENTS. Indorsed by the great Jules Levy as the best in the world. Big Catalogue, 400 illustrations, FREE. Positively the lowest prices on Band Instruments, Uniforms and Supplies of all kinds. Also contains Music and Instructions for New Bands. Lyon & Healy, Manufacturers, 48 Adams St., Chicago. (Lyon & Healy is the largest music house in the world—Editor.)

## LEROY RACER

Is in every way a strictly up-to-date mount. It is one of the handsomest bicycles on the market and a pleasure to own one. We manufacture bicycles in every state of completion or complete from \$25 to \$35 and guaranteed for one year. Get our catalogue. Address Bicycle Dept., John R. Keim, Buffalo, N. Y.

## PATENTS

50 YEARS' EXPERIENCE

TRADE MARKS DESIGNS COPYRIGHTS & C.

Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. Handbook on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

## Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co., 361 Broadway, New York  
Branch Office, 625 F St., Washington, D. C.

## THIS GRINDER

Has no pumps, no valves. No piping required to supply it with water. Always ready for use. Simplest in construction, most efficient in operation.

Send for Catalogue.

W. F. & JOHN BARNES CO., 1999 RUBY ST., ROCKFORD, ILL.

## ELECTRICAL ENGINEERING TAUGHT BY MAIL.

Write for our Free Illustrated Book. "CAN I BECOME AN ELECTRICAL ENGINEER?"

We teach Electrical Engineering, Electric Lighting, Electric Railways, Mechanical Engineering, Steam Engineering, Mechanical Drawing, at your home by mail. Institute indorsed by Thos. A. Edison and others.

ELECTRICAL ENGINEER INSTITUTE, Dept. A, 240-242 W. 33rd St., New York.

## WILLIAMS' SHAVING SOAP

### These Faces Show

the difference between Williams' Shaving Soap and other kinds. The lather of most soaps is thin and watery and as soon as it is applied to the face begins to evaporate. It appears full of little pin holes (see face No. 1); the skin becomes hard and dry, the face burns and itches; it's torture to shave with such soap.

The lather of Williams' soap is always thick, moist and creamy (see face No. 2); it softens the beard, makes the skin soft, pliable and velvety, and renders shaving easy and agreeable.

Williams' soap is the only kind that

No. 1. No. 2.

"Won't Dry on the Face."

Only firm in the world making a specialty of Shaving Soaps. SOLD EVERYWHERE.

THE J. B. WILLIAMS CO., Glastonbury, Conn. LONDON. PARIS. DRESDEN. SYDNEY.

"A great deal in a little space."  
—The Press.

## "The Four-Crack Series."

This is the title of a series of books of travel and education issued by the Passenger Department of the

NEW YORK CENTRAL & HUDSON RIVER R. R.

These small books are filled with information regarding the best modes of travel and the education that can best be obtained by travel.

They relate specifically to the great resorts of America—trips to the islands of the sea and around the world.

They also contain numerous illustrations and now and accurate maps of the country described.

A copy of the 40-page Illustrated Catalogue of the "Four-Crack Series" will be sent free, post-paid, upon receipt of postage stamp by George H. Daniels, General Passenger Agent, New York Central & Hudson River Railroad, Grand Central Station, New York.

## NEW DOMESTIC SEWING MACHINES

are equal to two of any other, because they make both chain and lock stitch.

GENERAL OFFICES, 16 Exchange Place, New York.

## 1/2 H. P. GAS ENGINE CASTINGS

Materials and Blue Prints. Write for Catalogue 9.

PARSELL & WEED, 129-131 W. 31st Street, New York.

## ICE MACHINES, Corliss Engines, Brewers' MFG. CO., 895 Clinton Street, Milwaukee, Wis.

## STEEL TYPEWRITER TYPE

TYPEWHEELS, MODELS & EXPERIMENTAL WORK, SMALL MACHINERY NOVELTIES & ETC. NEW YORK STENCIL WORKS 100 NASSAU ST. N.Y.

## MODELS & EXPERIMENTAL WORK.

Inventions developed. Special Machinery.

E. V. BAILLARD, Fox Bldg., Franklin Square, New York.

## SHORTHAND BY MAIL.

Pioneer home course Catalogue and First Lesson Free.

Potts Shorthand College, Box 33, Williamsport, Pa.

## AGENTS.

You can't find a better proposition. Honest business, large profits, advancement. Write, give us a chance to convince you. Lewis & Company, 406 North Third Street, St. Louis, Mo.

## AGENTS

On salary or commission; \$12 daily or \$100 per month and expenses, selling our claim file to merchants and physicians. Sayers & Company, D 60, 408 Olive Street, St. Louis, Mo.

## D'AMOUR & LITLEDAL MACHINE CO.

130 WORTH ST., NEW YORK.  
PATTERN AND MODEL MAKERS.

## STATLER'S HOTEL

The Largest in the World. Send for map of city and Exposition grounds, also folder telling how to secure guaranteed accommodations.

F. C. STATLER, Prop., Statler's Hotel, at Exposition, Buffalo, N. Y. Statler's Restaurant, Fillicott Sq.