ble the strains on the apparatus. The inven tor improves speed regulation of rotating parts by providing devices for throttling the motive fluid supply.

Railways and Their Accessories.

CAR-SEAT .- F. BENNETT and S. A. WALK-ER, New York, N. Y. In this patent the invention refers especially to a car-seat of that class in which the back is made to shift from one position to another, so as to reverse the seat, and in which the seat proper is made to change its inclination in correspondence to the change in the position of the back. It resides in a certain novel manner of mounting the back or the back and seat to attain these results and in a peculiar arrangement of the foot-rest with respect to the mounting devices.

RAIL-JOINT .- C. J. SHEA, Freeport, N. Y. Mr. Shea's invention is an improvement in that class of rail-joints in which bolts, nuts, and fish-plates are dispensed with, the meeting ends of the rails being provided with interlocking tongues or projections. He has devised a construction and arrangement of parts whereby rail ends are so engaged as to be more firmly supported vertically and also held in more rigid alinement laterally.

RAILROAD-SWITCH .- L. LAKE, Fontanet, Ind. This invention is designed to dispense with frogs as ordinarily used. It provides a special construction of switch which leaves the main track smooth and unbroken when the main line is open and in which the switch-rail is raised slightly above the main track and has an adjustable crossover-section which in one position leaves the main rails open and continuous and in another position laps over one of the main rails and carries the wheels of the cars over the main rail onto the siding or diverging track.

RAIL-JOINT.—J. W. ENRIGHT and E. J. Enright, New Orleans, La. In this instance the improvement has reference to railway construction, and concerns itself especially with rail-joints. The object of the invention is to produce a rail-joint of simple form which will part of the person drawing the device forward. operate without necessitating the use of $\ensuremath{\triangleright} \text{olts}$ and nuts to hold the abutting ends of two rails firmly together.

RAILWAY-RAIL JOINT.-II. C. BREWSTER, C. A. DUTHERAGE, and W. L. GLIDDEN, Shreveport, La. In this patent the invention is an improved means for connecting and supporting the meeting ends of railway-rails. It is more particularly an improvement in forms of truss connections and braces in which slidable wedges breakage is reduced to a minimum. are employed to enable the parts to be readily tightened in order to preserve a rigid or unyielding support for the rails.

LOCOMOTIVE FIRE-BOX .- J. NILSSON, Fremont, Neb. The object of this invention is tongue will be yieldingly resisted, so that the to so construct the fire-box and connected parts sudden starting up of the draft-animal will of a locomotive as to enable the contents to be dumped at will from the cab. To this end as to relieve the animal and vehicle from he employs in connection with the dumping sudden strains of all kinds; also to provide ash-pan an operating device for the grate and similar means for causing the same kind of a ash-pan, such device passing into the locomoresistance when the animal backs or the vetive-cab, so as to be readily operated by the hicle is pushed toward it. engine-driver or his assistant.

CAR-COUPLING.—S. E. JACKMAN, New Ind. the object is the provision of a coupler arranged to safely couple adjacent cars to allow the cars to readily travel over sharp curves and steep inclines of the track without danger of the cars becoming uncoupled or jumping

Pertaining to Recreation.

ADJUSTABLE LEG FOR BILLIARD-TA BLES .- C. D. SEYMOUR, Rensselaer, N. Y. The purpose in this improvement is to provide simple and readily-operated means for raising and lowering the legs of billiard-tables or like articles of furniture for the purpose of leveling the bed or top of the article, it being possible to expeditiously and conveniently bring about such adjustment with little exertion.

TOY PISTOL -L. H. HINAMAN. Port Jervis. N. Y. In operation the handle is drawn backward, pulling the plunger to the rear against the resistance of the rubber band, and the recess in the curved arm engaging the pivot-bolt retains the hammer in elevated position and the plunger at the rear of the barrel. The projectile being dropped in the open end of the barrel and the cap placed in the cap-seat, a pull on the trigger will elevate curved arm and release hammer and explode cap. The plunger is drawn forcibly forward projecting a marble with considerable force.

VELOCIPEDE.-F. M. THOMPSON, East Liv erpool, Ohio. The object of the present invention is to provide for excluding the connections between the front and rear legs from view and for supporting the front of the sulky in placed at regular intervals around this beautisuch manner as to relieve the strain of such support from the imitation figure of the horse and to provide for a spring connection between the upper and lower leg-sections and for an adjustable seat for the sulky. It relates especially to that class of such devices which is represented in a former patent granted to Mr. Thompson.

GAME APPARATUS.—H. E. HENWOOD, New York, N. Y. Mr. Henwood's invention pertains to game apparatus, and more particularly to those in which various chance combinations in cards, dice, or the like may be the invention, and date of this paper.

secured by means of appropriate operating and controlling mechanism. His principal objects are to provide a convenient and effective apparatus of this character for agreeable diversion.

Pertaining to Vehicles.

VEHICLE FOR EXHIBITING GOODS.-LEFEVRE, Berlin, Germany. The interior space of this vehicle is divided by means of partitions in such a way that spaces or compartments are formed which are visible from outside. These compartments are intended to be utilized as show-windows and to be dressed with exhibits. The vehicle may also serve for transportation of goods and other purposes The arrangement can be provided in vehicles of all sorts, even hand-vehicles, and is in no way confined to vehicles drawn by animals or operated by mechanical power.

DEVICE FOR PREVENTING ACCIDENTS. MATHEWS, Coalmont, Ind. The principal objects in this invention are to provide means for readily and quickly detaching draftanimals from a vehicle and for simultaneously applying a brake to stop the vehicle if it is going at a high rate of speed, and at the same time to provide means for effectually guiding the vehicle after the horse is detached.

VEHICLE-WHEEL.-M. G. BABIO, New York, N. Y. In this instance the invention relates to an improvement in vehicle-wheels, particularly wheels for automobiles and like vehicles; and the purpose of the construction is the provision of a wheel in which dishing track where it crosses the rails of the main strain is avoided and in which all necessary eccentric vibrations may take place at the center of the hub-section of the wheel when the wheel is in action.

VEHICLE -J. J. FURCHTRAR Joetta, Ill. The aim of the inventor is to provide a vehicle arranged to permit easy traveling, especially over rough surfaces, and capable of being used as a sled, skate, and the like. The device is very simple and durable in construction and allows the carrying of heavy loads with comparatively little power or exertion on the

AUTOMATIC WAGON - BRAKE.-E. F. VEATCH, Palco, Kan. This improvement in operation is entirely automatic. The brake may be easily applied to an ordinary wagon and may be used with or without a bed, be ing equally efficient in both cases. It is simple in construction, and is not liable to get out of order. Since considerable strain is brought to bear upon no part, the danger of

THILL-COUPLING. — C. VIVES-NAVARRO. Ponce, Porto Rico. The principal objects of the invention are to provide means whereby the exertion of the pull upon the thills or not cause a sudden jolt of the vehicle and so

VEHICLE-BRAKE.—D. GRUBB. Pike County. Mr. Grubb's invention is an improve-York, N. Y. This improvement relates to cars; ment particularly in that class of brakes in traveling on inclined or switchback railways, which the brake is automatically set by the such as are used in places of amusement, and holding back of the team in descending an The means for use in setting brakes by hand is an important feature, as when desired the handle-lever may be fitted at its socketed end on an upwardly-projecting arm, the handle-lever being secured in any desired adjustment by a rack. This handle-lever may also be utilized to lock the brakes free of the wheels.

Designs.

DESIGN FOR A SANDWICH-SIGN.—J. J. MEYER, New York, N. Y. This ornamental sign comprises a design representing a sausage partly covered by a roll or cheese sandwich placed on a flat broad surface. The top end $% \left(1\right) =\left(1\right) +\left(1\right)$ of the frankfurter is pierced with three oblong holes. The sign carrier looks through the upper apertures and the whole is supported by shoulder hangers and waist band.

DESIGN FOR AN ASH-TRAY,—A WALSH, New York, N. Y. This new, original. and ornamental design represents an ash-tray of circular form. Upward continuation of the well-rounded sides at the front constitute a partial hood, the rest and greater part remaining open. The tray shows considerable depth, its bottom is flat, and a very graceful downward-curved handle is riveted at the back end of the tray.

DESIGN FOR A BRACELET.—C. S. HURD. Newark, N. J. In this case the design is for a bracelet exteriorly ornamented with leaves and flowers on a mottled background. Six slightly prominent scroll-worked shields are

DESIGN FOR A FINGER-RING.--J. L. Herzog, New York, N. Y. In this ornamental and unique design the top of the ring is set to hold two dog heads, one on each side of the setting. The heads are in alinement, back to back, and slightly separated by a deep depres sion in the setting. The paws on which the heads rest hang over the curve of the ring.

Note.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desir-ing the information. In every case it is necessary to give the number of the inquiry. MUNN & CO.

Marine Iron Works. Chicago. Catalogue free

Inquiry No. 7703.—For parties who can manufacture heavy ditching machinery, and to undertake the manufacture of a tested and novel machine.

For bridge erecting engines. J. S. Mundy, Newark, N. J Inquiry No. 7704.—Wanted, addresses of manufacturers of candle-making machinery.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 7705.—Wanted, manufacturers of hydraulic presses.

Drying Machinery and Presses. Biles, Louisville, Ky. Inquiry No. '7706.—Wanted, makers of cross-arm pins for telephone and telegraph use.

Handle & Spoke Mchy. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

Inquiry No. 7767.—For makers of brick and holow concrete block machinery.

WANTED.-Purchaser for Monazite, Molybdenite and Wolfram. Apply Monasite, Box 773, New York.

Inquiry No. 7708.-For makers of shoe cobbler FOR SALE CHEAP.-Steam power shop nearly new, in

leepy, isolated village. H. Sage, Waterbury, Conn.

Inquiry No. 7709.—For makers and installers of ice plants.

I sell patents. To buy, or having one to sell, write Chas. A. Scott, 719 Mutual Life Building, Buffalo, N. Y. Inquiry No. 7710.—For makers of hand power and horse power machinery for sawing wood.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Machine Company, Foot of East 138th Street, New York.

Inquiry No. 7711.—For makers of milking apparatus.

WANTED. - Ideas regarding patentable device for water well paste or mucilage bottle. Address Adhesive, P. O. Box 773, New York.

Inquiry No. 7712.-Wanted, a feather renovator. I have for sale the U.S. and all foreign rights of new patent Improvements in Water Tube Types of Boilers. Great economizer. J. M. Colman, Everett, Wash.

Inquiry No. 7713.—For makers of soundboards (reedboards) for organs.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery tools and wood fibre products. Quadriga Manufacturing Company, 18 South Canal St., Chicago.

Inquiry No. 7714.—For makers of plan and ball-earing casters and malleable iron wheels and axles or

FOR SALE .- Patent for absolutely non-refiliable bottle. Simple in construction, perfect in operation. Will cost only a trifle more than regular whisky bottles. Apply to James Clausen, 2525 Rauschenbach Ave., St. Louis, Mo. Patented Dec. 12, 1905, No. 806,917.

Inquiry No. 7715.—Wanted, makers of Venetian iron work and accessories.

PATENTS.-Wanted, the service of a patent expert and experienced specification writer. No one need apply who has not had a thorough education along techpriorities, and who has not had experience in patent practice. Munn & Co., 361 Broadway, New York.

Inquiry No. 7716.—For manufacturers of pumps or ditchers that can be run by 6½ h. p. engine.

NOTICE.

To the Inventor Members of the American Manufacturing Co., 113 Adams St., Chicago., Ill. As I have information that would be of interest to inventor members of the American Manufacturing Co., I would like to enter into communication with said inventor members, not holding office, with the sole object of placing them in charge of information which will materially protect their interests. Inclose stamp when writing. Fred L. Wakefield, Chester, Vermont, an ex-stockholder.

Inquiry No. 7717.—For manufacturers of glazing glass for glazing leather.

WANTED.-High-class machinists and tool makers. wages. No labor troubles.

Driggs-Seabury Ordnance Corporation, Sharon, Pa. Inquiry No. 7718.—For manufacturers of steam read-baking machinery.

Inquiry No. 7719.—For manufacturers of brick-making machinery.

Inquiry No. 7720.-For manufacturers of machin-ery for making excelsior. Inquiry No. 7721.—For manufacturers of knitting machinery.

Inquiry No. 7722.—Wanted, address of party willing to manufacture and place on market, on a roy alty basis, a new flying toy.

Inquiry No. 7723. For manufacturers of mills or extruments for pulverizing lime or marble into impalp-Inquiry No. 7724.—For manufacturers of extremely fine sieves for impalpable powder.

Inquiry No. 7725 .- For manufacturers of instruments for amusing people.

Inquiry No. 7726.—Wanted, address of party manufacturing telephone receiver cushions.

Inquiry No. 7727.—For manufacturers of confetti making machines.

Inquiry No. 7728.—For manufacturers of shaving machines for men.

Inquiry No. 7729.—For manufacturers of watchman's detector. Inquiry No. 7730.—Wanted, address of parties nanufacturing matches.

Inquiry No. 7731.—For manufacturers of solid rubber balls, from 1 to 3 inches in diameter.

Inquiry No. 7732.—For manufacturers of land conveying apparatus for conveying different boxes, barrels, etc., up and down and horizontally.

Inquiry No. 7733.—For manufacturers of hand-driven printing presses with accessories. Inquiry No. 7734.—Wanted, address of parties dealing in Smith & Stokes automatic paper box machines.

Inquiry No. 7735.—For manufacturers of merry-o-rounds.

Inquiry No. 7736.—For manufacturers of small toy engines castings in brass and iron. Inquiry No. 7737.—For manufacturers of small acorn-shaped watch protectors.

Notes and Queries.

HINTS TO CORRESPONDENTS.

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.

accresses 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 JO cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(9870) H. J. B. asks: 1. I wish to learn why, in building the A. C. dynamo described in Supplement 1558, the fields are wound on brass tubes. When in a medical coil we wish to cut out the magnetism of the core we slip a brass tube over the core, which takes up the lines of force and keeps them $\,$ bound down within the tube. If the brass tube has such an effect in one place, why not in the other? A. Your idea that brass can stop magnetic lines of force is erroneous. There is no known insulator for magnetism. Iron and steel furnish an easier path for magnetic lines than any other substance. Hence Other substances, such as brass, allow lines of force to pass with about the same difficulty as does air. Hence brass may be used as a spool for the field coils of a dynamo with no harm, especially when, as in this case, a strong spool is required. In the case of the medical coil, to which you refer, the action of the brass tube is not to screen or cut off magnetic lines of force at all. The interrupted current in the primary coil acts upon the brass or copper, or any other metal, in the tube which is slipped over the primary coil to produce in the tube currents of electricity, which are in the opposite direction to the primary current, and which for that reason cut down the magnetizing power of the primary upon the secondary. With the tube over the primary there is less current in the secondary; when the brass tube is drawn out the secondary current increases. but not because magnetic lines of force are cut off by brass. Eddy currents, opposing the primary, are produced when the tube is pushed over the primary, and cut down when the tube is withdrawn. There is not one effect in one place and an opposite effect from the same cause in another. The action in the two places $% \left(1\right) =\left\{ 1\right\} =$ is entirely different. If a continuous current flowed in the primary of a medical coil without interruption, there would be no eddy currents in the brass tube and no induced currents in the secondary. This is the way the current flows in the field magnets of the dynamo. The interruption of the primary current in the medical coil causes the eddy currents in the brass tube and the currents in the secondary coil. 2. If the armature should be wound with much finer wire, what would the effect be? A. A finer wire on the armature of the small alternator would cut down the amperes but leave the volts the same, if the same $\operatorname{num} \mathfrak{b} \operatorname{\acute{e}r}$ of turns were put on; if more turns were put on the volts would be increased, and the amperes reduced more than in the first case. 3. Wherein does this alternating current differ from that generated by the glass plate machine or the induction coil? The dynamo described in Supplement 1558 is said to give the same effect as the current from an ordinary medical coil, but the wire is much coarser. Does the field winding on the dynamo represent the primary of the coil? A. An alternating current is one in which the electromotive force rises from zero to its highest value, then falls through zero to a value as far below zero as it was previously above zero, rising again to zero. This series of changes constitutes a cycle. Cycles are repeated from 30 to 130 times a second in the various forms of alternating current. Neither the plate electric machine nor the induction coil as ordinarily employed acts in any such manner. Both of these have their electromotive force raised till a spark jumps across between the poles. The same action takes place repeatedly. The current is pulsating and not alternating. An alternating current will, however, produce spasmodic contractions of the muscles, just as a coil does. The field winding does not represent the primary of a coil. It furnishes a steady flux of lines of force through an armature. The armature revolving through this flux produces an electromotive force which is the cause of a current over the external circuit, doing its required work there. (9871) A. B. D. asks: Please tell

in the Notes and Queries column of the SCIEN-TIFIC AMERICAN, or otherwise, how to ascertain the candle-power of an arc lamp. Also how to make a small searchlight. A. It is not easy to measure the candle-power of an arc lamp, since it gives a varying amount of light in different directions. The mean spherical candlepower is the rated candle-power. This is the

mean of all measurements above and below the horizontal, and is the true average candle power. It is the most difficult to obtain. The 'nominal candle-power" is the one oftenest spoken of commercially. It is a value arbitar ily taken to correspond to a certain consumption of energy in the arc. Thus an arc taking 450 watts is called a 2,000-candle-power lamp, and 300 watts are assumed to give 1,200 can These numbers are perhaps near the maximum candle-power of an open arc lamp. A small searchlight may be simply an arc light so arranged that it can be swung to throw its light strongly in different directions by attaching to it a parabolic reflector. Such a one as is used on a locomotive headlight would be good for the purpose. Supplement No. 1276 contains a description of a portable projector which may be useful in making a searchlight. We send it for ten cents.

(9872) F. K. W. asks: Will you please write to me telling me the dimensions for a or bell, or both, at the approach of street car smoke box for making rings? I wish to use it simply for experimenting. What substance should be put over the end to be knocked? What size hole? A. A box for making smoke rings may be of almost any size. One which we have used with success in our lectures for a good many years is about 18 inches long and 8 inches square, with a hole about 4 inches in diameter in one end. A sheet of pure rubber it is claimed a person when telephoning ca is fastened over the other end with cleats. The advantage of a box of some size is that it thing about a device for seeing a person t contains a large volume of air with which to whom one is talking by the telephone and who form rings.

(9873) P. writes: Regarding Answer seen such a device. tial point in the question, namely, the ability of a moving body to overcome resistance to its motion. The two balls of equal size present equal surfaces to the air and experience equal resistance from the air so long as their velocities are the same. But there seems to be a failure to see that the resistance of the air is a constant resistance which the ball must overcome in the same manner that a moving car must overcome the friction of the brake applied to its wheels. The falling ball must displace air, and the displacement of the air is a variable resistance dependent upon the velocity of the moving body. The ability of the falling ball to displace air depends upon the weight of the falling ball, since it is momentum which pushes the air aside, and this varies both with the weight and the velocity of the ball. The lighter ball cannot push air out of its path as easily as the heavier ball. It will soon find itself left behind in the race, and the heavier ball will reach the ground first, since the retardation increases as the time of fall increases. It may be accepted as good authority to quote Wood's "Elementary Mechanics," page 33, sec. 71: "The attraction of the earth being the same on each particle of a body, a light body would fall as rapidly as a heavy one if there were no resistance to their movements; and this is confirmed by experiment, by letting bodies fall in a vacuum. The resistance of the air varies with the sur face against which it acts, but in falling bodies the ability to overcome this resistance varies as the weight of the body; hence, heavy bodies fall faster than light ones in the air. But the velocity of heavy bodies, such as iron, stone, brass, etc., falling from 100 to 200 feet, do not differ much from each other." bodies fell as J. F. reasons they should, rain drops would hit our devoted heads with the velocity of shot falling from the same height, often a mile, and would, as shot would, give us a smart blow, to say no more.

(9874) P. C. D. asks: Will you please explain the cause of the light line around dark objects seen against the bright sky, also around shadows cast by an are light? It occurs occasionally in photographs, especially those taken at sunset. A. The bright border sometimes seen around a dark object against a bright surface is due to the sharp contrast of the object and its background, which also causes found in books on elementary dynamics are the dark object to seem smaller than it actu-contained in it, and all principles are treated object in a photograph seems to be due to The author has devoted a considerable portion another cause. It appears that the gelatine of his work to the subject of balancing, and film is thicker in one part than in another this subject will be found discussed in a after it is dried. The place where the film interesting and easily-understood manner becurves from the thick to the thin part acts all who read the work. as a lens to diffuse the light and make a narrow band where the print is thinner and so brighter than elsewhere.

(9875) C. A. R. asks: 1. It is a known fact that weakening the field of an motor decreases its speed, and yet it would stop if the field current was opened. Now, at what point does weakening the field cease to decrease its speed? Make as clear as possible. A. If the armature current for a motor is supplied at a constant voltage, strengthening the field has the effect of decreasing the speed, and weakening the field increases the speed of the motor, for equal power. This is due to the counter electromotive force generated by the armature of the motor by its rotation. It makes no difference whether an armature is driven by electricity or by some other power, an E. M. F. is generated by it in the opposite direction to that of the same machine as a The current flowing in a motor is weaker the faster the motor runs. This is well explained by Thompson in his "Elementary Lessons," under motors. We send the book for \$1.50. 2. Many people think it is a strange wonder that electricity is used to such an extent and yet no one knows what it is. I sometimes tell them that its "being" is not

much more wonderful to scientists than the of heat, light, gravitation, and many other things. To what extent do I answer right A. While it must be admitted that all is n yet known regarding the nature of electricit it is certain that much more is known that was known even a few years ago. Such a boo as Whewell's "Recent Advances," or Thomp son's "Electricity and Matter," will give fair presentation of the subject. We furnis the first-named book for \$2, and the secon for \$1.25. 3. How is the speed of gasoling engines regulated and governed when aut matic? A. The speed of a gasoline engine regulated in one of several ways-by throttlin the supply of gas mixture, by stopping th feed of gasoline for several revolutions, be manipulation of the exhaust valve, or, wit electric ignition, by cutting off the spark. Thes changes may be operated by a ball governor of any other device. 4. I have been studying o a device to give warning signal by either light on crossings. Each (in) line would have separate device of its own at a certain place to indicate when the car is coming. Is an such thing in use anywhere; if not, why not A. Any novel device you may invent for signa ing the approach of a car to a crossing can i patented, and might be sold to railway people 5. What can you say for the device by whic see the one talked to? A. We cannot say any is at the other end of a line. We have never

NEW BOOKS, ETC.

A TREATISE ON CONCRETE, PLAIN AND RE INFORCED. By Frederick W. Taylor M.E., and Sanford E. Thompson S.B. New York: John Wiley & Sons 8vo.; pp. 585. 176 figures 1905. Price, \$5.

The present treatise, which is a most con plete one, is designed for practising engineer and constructors, and also for a text and ref erence book on concrete for engineering stu dents. The entire subject of concrete and th process of concreting is described, including classification and use of cementing standar and special tests for cement, strength an composition of cement, mortars, reinforce concrete, mixing concrete, depositing concret effect of sea water on concrete and water fire and rust protection, sidewalks and base ment floors, building construction, foundation and piers, dams and retaining walls, arches tunnels and conduits, reservoirs and tanks an cement manufacture are all adequately treated There is little question that this book will b of very great value at the present time, whe there is such an interest in the subject of the utilization of concrete.

GRAPHIC METHODS OF ENGINE DESIGN. BY Arthur H. Barker, B.A., B.Sc. London: Technical Publishing Company Ltd., 1905. 12mo.; pp. 210. 90 dia grams. Price, \$1.50.

The author had a two-fold object in view in writing this book, which is now in its second edition. In the first place, he attempted to describe and explain clearly a series of eas and practical constructions for use in th drawing office by young mechanics aspiring to positions in such offices, and having little ide of the sort of mathematical knowledge re quired in designing engines on correct principles. The author's second object is to show the intimate relations necessarily existing be tween the science of engineering and exac principles of what is called "theoretical" me chanics. The mechanism of the steam engine forms a very complete series of illustrations of these principles, and the book is intended to make clear their application to practica Examples of almost every principle The light line seen around a dark numerically, besides being also fully described

INDEX OF INVENTIONS

For which Letters Patent of the

United States were Issued

for the Week Ending January 9, 1906.

AND EACH BEARING THAT DATE

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

ı	Accounting appliance, credit, P. A. Mc-	
ı	Caskey	809,723
ı	Acid. etc., making boric, H. Blumenberg,	
ı	Jr	809,550
ı	Acids, making dialkyl-barbituric, M. Engel-	,
ı	mann	809,362
ı	Adhesive and making same, F. H. Patch	809.739
ı	Adjustable bracket, S. Kahn	809,448
ı	Air brake, ancher emergency, C. Z. Sanders	809,632
ı	Air heating system, F. S. Lamsen	809,306
ı	Ammunition hoisting mechanism, Meigs &	
ı	Steut	809,455
	Amusement apparatus. E. S. Timmens	809,589
	Ancher, earth, E. C. & H. Helden	
	Ancher post, R. Wiltse	809,879
	Anthracene compound and making same,	
ı	Bally & Welff809,893,	809.894
ļ	Antiseptic compounds, making solidified, D.	
	Genese	809,795

1110	American	
han that	Antitoxin for fatigue and making the same, W. Weichardt. Asymmetric cell. M. Buttner Auger bit. J. Strön. Automobile body, A. K. & F. S. Welch. Automobile frame, A. R. & F. S. Welch. Alse box, rallway car, H. Stuting Axle truss, C. M. Haeske Bag fastener, E. G. Staude Rallag press, J. W. Reynolds. Ralling press, J. Unfried. Barrel head, removable, A. Jaeger. Barrel head, removable, A. Jaeger. Barrel head, removable, A. Jaeger. Basket, clothes pir, S. W. Hurlburt. Batteries, machine for filling dry, P. P. Nungesser	
ny other er right?	W. Weichardt Asymmetric cell, M. Buttner Anger bit J. Stein	809.347 809,770 809,856
ll is not	Automobile body, A. R. & F. S. Welch Automobile dust allayer, W. H. Parker	809,655 809,738
wn that	Automobile frame, A. R. & F. S. Welch Automobile race course, Thomas & Lynch Axle box. railway car. H. Stuting	809,656 809,588 809,404
h a book Thomp-	Axle truss, C. M. Haeske Bag fastener, E. G. Staude	809,297 8 09,756
give a	C. M. Cagle	809,283 8 0 9,844
e second	Baling press, J. Unfried	809,867 809,918 809,380
gasonne en anto-	Basement and the like ventilator, P. H. Jackson	809,617 809,568
engine is hrottling	Basket, clothes pir, S. W. Hurlburt Batteries, machine for filling dry, P. P.	809,568
ping the ions, by	Battery plate, storage, D. P. Perry Bearing, vertical shaft, E. W. Broomall	809,526 809,742 809,280
or, with	Bed and cabinet, folding, N. Lui	809,710 809,447
k, These ernor or	Bedstead attachment, W. A. Wright Bell push, pull, etc., L. S. Wilks	809,657 809,352 809,595 809,329
dying on her light,	Basket, clethes pii, S. W. Hurlburt. Batterles, machine for filling dry, P. P. Nungesser Battery plate, sterage, D. P. Perry. Bearing, vertical shaft, E. W. Broomall. Bed and cabinet, felding, N. Lui. Bed carner fastening, B. H. Jones. Bed, sefa, G. N. Wersel. Bed, sefa, G. N. Wersel. Bedstead attachment, W. A. Wright. Bell push, pull, etc., L. S. Wilks. Belt shifter, Seybeth & Baumann. Billiard and seel tables, cigar helder for, E. E. Hanks. Binder, F. A. Cleveland, 809, 420, 809, 493 to Binder attachment, A. Williams. Binder, loese leaf, E. G. Dumas. Bismuth disallcylate and making same, E. R. Seifert. Bleaching fibers, J. Wakefield. Blind slat fastener, window, M. J. Coogan. Rlock molding machine, H. P. Gates. Bebbin helder, T. J. Mureck. Bolster, A. E. Ostrander. Bett clipper, J. Pulvitt. Book suppert, J. Maccallum. Bookbinder's gage, A. Von Auw. Bettle clesure, J. C. Conds.	809,329 809,441
reet cars have a	Binder, F. A. Cleveland. 809,426, 809,493 to Birder attachment, A. Williams.	809,496 809,877
in place	Binder, loose leaf, E. G. Dumas	809,557 809,5 8 7
Is any why not?	B. R. Seifert. Bleaching fibers, J. Wakefield.	809,583 809,869
r signal- g can b e	Blind slat fastener, window, M. J. Coogan. Block molding machine, H. P. Gates Robbin holder, T. J. Murdock.	809,779 8 0 9,367 809,624
y people. y which	Bolster, A. E. Ostrander. Bolt clipper, J. Pulvitt.	$809,736 \\ 809,843$
ning can	Book Support, J. Maccallum. Bookbinder's gage, A. Von Auw. Bottle closure, J. C. Condo.	809,315 809,411 809,427
say any- erson to	Bettle corking machine, Schlosser & Fisher Bettle filling machine, F. B. Thatcher	809,850 809,407
an d who ve never	Bettle washing machine, Leew & Miller Bettles, non-refillable, device for rendering,	809,514
	Book support, J. Maccallum. Bottle closure, J. C. Condo. Bottle cocking machine. Schlosser & Fisher Bottle filling machine. F. B. Thatcher. Bottle, non-refillable, bolan & Shoemaker. Bottles, non-refillable, device for rendering, P. Juppet Bottling machine, E. L. Miller. Box corner trimming machine, J. T. Leckenby	809,811 809,621 809,715
	Box corner trimming machine, J. T. Leck-	
ND RE-	Brake shee, W. H. Namack.	809,619 809,627 809,658
Taylor,	Breech block, lever-actuated wedge, M. Hernsdorf Bridge safety gate draw T. B. Londing	800,801 809,817
& Sons,	Brace snot, H. L. Leversactuated wedge, M. Hernsdorf Briege safety gate. draw, J. B. Lardinois. Bridge safety gate. draw, J. B. Lardinois. Bridge safety gate. draw, J. B. Lardinois. Bridge, J. M. Stekee. Brooder, J. M. Stekee. Brooder, N. Saltenstall. Brooder, pig, H. B. Vail. Buckle, F. T. Whitted. Buggy top curtain holder, Noble & McHenry Burlal casket, M. S. Leech. Butter cutting device, H. Schnackenberg. Butten guard. collar, F. H. Norris. Butten guard. collar, F. H. Norris. Butten guard. collar, F. H. Norris. Buttenhele, H. Walden. Calciunter, S. S. Fry. Calculator, S. F. Fry. Calculator, S. S. Fry. Calculator, F. G. Johnson. Camera lenses, screen for photographic, H. S. Miller. Can opener, J. W. Bavis. Can safety device, ell, B. Buccleri. Candies, dipping frame for ceating, P. Paneulias Cane mill feed box, J. P. Geiden.	809,364 809,639
figures.	Brooder, N. Saltenstall	809,631 809,543 809, 87 4
ost com-	Buggy top curtain holder, Noble & McHenry Burial casket, M. S. Leech.	809,457 809,573
and ref-	Butter cutting device, H. Schnackenberg Button E. Zeckhauser Butten guard, collar E. H. Nerris	809,532 809,883 809,730
and the	Buttenhele, H. Walden	809,652 809,387
ncluding standard	tion of, E. F. Price, et al	809,842 809,294
gth and inforced	Calculator, F. G. Johnson	809,446 809,830
concrete, water.	Can opener, H. B. Ray Can opener, J. W. Davis.	809,527 809,673
nd base- ndations	Can safety device, ell, B. Buccieri	809,281 809,737
arches,	Cane mill feed box, J. P. Golden	809,440 809,512
nks and treated.	Car door lock, W. F. Wendt. Car, dump, T. R. McKnight.	809,872 809,522 809,829 809,347
will be ne, when	Can safety device, ell, B. Buccleri. Candies, elipping frame for coating, P. Paneullas Cane mill feed box, J. P. Golden. Canisters, etc., machine for cutting and pressing, R. von for Linde. Car door lock, W. F. Wendt. Car, dump. T. R. McKnight. Car frame, W. R. McKnight. Car frame, W. R. McKeen, Jr. Car frames, post and car line for rallway, W. F. Klesel, Jr. Car, hopper bottom, J. S. Stevensen. Car, peorle bottom, J. S. Stevensen. Car, peorle bottom, J. S. Stevensen. Car, peorle bottom, J. S. Stevensen. Car, neiter, F. W. Lanchester. Car, rallway, L. A. Hoerr. Car, rallway, L. A. Hoerr. Car, reller side bearing, rallway, E. S. Woods Car wheel, sectional, G. W. Richards. Cars, steel underframe for rallway, W. F. Kiesel, Jr. Carbonating apparatus, automatic attachment for, H. W. Van der Vaart. Carpet stretcher, S. J. Wever. Carrier, See Electric carrier. Cement brick press, H. B. Mnrelock. Chain links, forming helices for, I. D. Weaver Chain links, manufacture of helices for,	809,347
t of the	W. F. Kiesel, Jr	809,920 809,638 809,635
N. By	Car, meter, F. W. Lanchester	809,509 809,597 809, 6 13
mpany,	Car reller side bearing, railway, E. S. Weeds	809,599
90 di a-	Car reel, metal, J. C. (amphel) Car wheel, sectional, G. W. Richards Cars, steel underframe for railway, W. F.	809, 9 07 809,398
in view in its	Kiesel, Jr. Carbonating apparatus, automatic attachment for H. W. Van der Vaart	809,921 809,649
tempted of easy	Carpet stretcher, S. J. Wever	809,545
in the iring to	Chain links, forming helices for, I. D. Weaver	809,834 809,412
tle idea	Chain links, ferming helices fer, I. D. Weaver Chain links, manufacture of helices fer, I. D. Weaver	809,413 809,469
dge re- ct prin-	Chimney holder, A. R. Cooper. Chuck, drill. C. Gordon.	809,413 809,469 809,780 809,296 809,889
to show ting b e-	Churn, Ayers & Siean	809,758
d exact	Crawford Cigar machine, W. S. Luckett Cigars, cigarettes, cigar fillers, etc., ma- chine for the manufacture of, M. Van Gulpen Clamp J. Writeley	809,782 809,3 8 4
engine trations	chine for the manufacture of, M. Van	809,410
inten d ed j oractical	Ulamp, J. wrigley Clevis, interlecking N. M. Lien Clinemeter, B. Kern, Jr.	809,882 809,511 809,699
	Gulpen Clamp. J. Wrigley Clevis, interlecking. N. M. Lien. Clinemeter, B. Kern. Jr. Clutch mechanism, M. G. de Simone. Coal cutting machine feed. F. Eckersley. Coatings upon metals. electrolytic production of lustrous metallic. A. Classen.	809,331
ics are treated	Coal cutting machine feed. F. Eckersley. Coatings upon metallic, A. Classen. Cock. basin, P. Mueller Cofin drep handle, G. A. Schehr. Coke even cover, A. H. Walstrem. Collar, herse, G. W. Hahn. Collar, herse, C. L. Allen. Combination gaze. F. Gumpp. Composition of matter, B. C. Senten. Computing device, G. M. Brewn. Concentrator, frue, L. R. Tullech. Concentrator, frue, L. R. Tullech. Concentrator, frue, L. R. Tullech. Condenser, J. F. Grace. Confectioner's sizing and cutting machine. G. F. Dickson. Control system. F. E. Case. Confectioner's sizing and cutting machine. G. F. Dickson. Control system. F. E. Case. Conveyer, J. W. Mackin Conveyer, A. Tomkins Conveyer, G. Lucas. Copying press. F. E. Jagenherg. Cord clamp. E. Nelson. Crane. W. B. Brekine. Crane lecking mechanism. J. R. Whittemere. Crane mechanism, J. R. Whittemere. Crate. W. H. Richmond.	809,492 809,720
escribed. \ portion	Coffin drop handle, G. A. Schehr	809,467 809,344 809,298
ng, and a very	Collar, horse, C. L. Allen. Combination gage. F. Gumpp.	809,886 809,562
ner by	Composition of matter, B. C. Senton Computing device, G. M. Brown Concentrator, frue, L. R. Tulloch	809,472 809,605 809,648
i	Concrete block machine, Blake & Kenrich Condenser, J. F. Grace	809,901 809,679
ONS	Confectioner's sizing and cutting machine. G. F. Dickson	800,498
the	Conveyer, J. W. Mackin	809,908 809,316 809,763
,	Conveyer, G. Lucas	809,827 809,558
	Copying press. F. E. Jagenherg. Cord clamp. E. Nelson.	809,375 809,726
	Crane lecking device, J. R. Whittemere	809,674 809,483
DATE	Crane mechanism, J. R. Whittemore Crane mechanism, J. R. Whittemore Crate, W. H. Richmond Crate for transporting poultry, F. M.	809,482 809,481 809,326
patents.	Gault	809,559 809,854
	Gault Crate, shipping, F. Sochurek, Sr. Cream separater, J. W. Hinklev Cream separater, centrifugal, E. W. Broom-	809,442
809,723		809,355 809,735 809,335
. 809,550 . 809,362	Cultivator, single rew. H. S. Swansen Culvert, read. Isham & Miller Current machine, electric alternating, K. A.	809,336 809,304
809.739 809,448	Lindstrom	809,706
s 809,632 . 809,306 k	Current meter, alternating, M. Deri Current meters, starting compensator for al-	ลบ9.835 809.787
809,455 809,589 809,374	Allister Current meter, alternating, M. Deri. Current meters, starting compensator for alternating, E. F. Gehrkens Curtain stretcher. F. M. Haynes. Cut-off, automatic, E. G. & J. R. Rese. Cut-off, Transformer, J. P. Hetherington.	809,677 809,684 809,749
. 809.374 . 809,879	Cutter See Cigar cutter	,
809.894 809,795	Dairy products, suction apparatus for, C. M. Taylor. Jr. Dental tool, A. W. Feltmann	809,861 809,365

7 0 6	Desk table, H. Jehnson. Dial lock, L. A. Druehl Diamond, E. G. H. Schenck. Dispensing device, G. L. Belcher. Display case, sample, A. Jelliffe	. 809,376 . 809,55 . 809,53 . 809,41
5 8 6	Display case, sample, A. Jelliffe Display device for millinery articles, H. Sil berman	809,760
8 4 7 6	Display device for millinery articles, H. Silberman Display hanger, G. D. Dial Display mirror, W. V. D. Kelley. Dividers, self-centering, C. Amendt. Door hanger, M. Cossey. Door leck, C. F. Fringer. Dough dividing and scaling machine, Hehn	. 809,359 . 809,698 . 809,887
34	Door lock, C. F. Fringer. Dough dividing and scaling machine, Hohn bach & Leitel	. 809,781 . 809,610 . 809,443
$_{0}^{7}$	Dough dividing and scaling machine, Hohn hach & Leitel Draft appliance, A. McNeil. Drawing models and the like, adjustable holder for, G. J. Barrschmidt. Dredger sleeve, W. F. Bowers. Dredges, excavaters, and the like, dipper for, W. Ferris Dress or skirt gage, I. M. Rouse. Duplicating apparatus, A. B. Dick, 809, 287 Dust collector, J. S. Thurman. Dve and making same, violet, Bally & Isle: Easel, G. L. R. Dahlberg. Electric carrier, overhead, H. M. Harding. Electric carriers, means for controlling over	. 809,318 . 809,433 . 809,903
7 8	Dredger sleeve, W. F. Bowers. Dredges, excavators, and the like, dipper for, W. Ferris	. 809,903 . 809,436
6 2 0	Dress or skirt gage, I. M. Rouse Duplicating apparatus, A. B. Dick.809,287 Dust collector, J. S. Thurman Dress or skirt gage, I. M. Rouse Duplicating apparatus, A. B. Dick.809,287	. 809,464 , 809,288 . 809,408
* 7 7	Easel, G. L. R. Dahlberg Electric carrier, overhead, H. M. Harding. Electric carriers, means for controlling over	r 809,892 . 809,785 . 809,799
2 5 9	head, H. M. Harding. Electric cell, K. Tsukamete Electric lighting arrangement for theaters	. 809,798 809,647
1 6 7	and similar buildings, emergency, F. Brand. Electric meter, W. J. Lleyd Electric switch, retary, J. Dugdill. Electrical conductor, flexible, G. E. Schmid	. 809,904 . 809,825
7	Electrical conductor, flexible, G. E. Schmid- mer Electrically operated portable drill, A. Ped	
3 9	ersen Electroplating apparatus, A. W. L'Homme-	. 809,394 -
7 4 6	Electrestatic influence machine, E. Thomser Elevator cage, automatic dumping, W. J. Newman Elevator gate, G. D. Thompsen.	809,456
3 5 1 7	l Elevator safety device. J. R. Conley	. 809.285
0 7 9	Elevator safety device, F. S. Payne. Engine bed, F. W. Salmon. Engine sparker and governor combined, gas, Graham & Fox Engines, automatic speed regulator for in-	809,560
1	Graham & Fex Engines, automatic speed regulator for internal combustion, J. G. Callan. Engines, high tension current distributer for internal combustion, L. J. Le Pontois. Envelops, manufacture of bottle, Henke &	809,771 809,453
5	Envelops, manufacture of bottle, Henke & Schulte Excavating machine, A. F. Huber. Explesion engine, G. Petzel. Explesive engine, cam movement, P. K.	809, 2 99 809,689 809,841
7	Explosive engine, cam movement, P. K. Stern Explosive engine, double acting, Kyle &	000,000
1	Hicks Eyeglass guard, C. Goodwin Eyeglasses and spectacles, J. Kovacs Fan and score card, combined, W. Steel. Fan, oscillating electric, H. S. Brown	809,451 809,368 809,702
1	Fan and score card, combined, W. Steel. Fan, escillating electric, H. S. Brewn Fare receipt register, conductor's cash, W. W. Kay	809,535 809,356
3 4 7	Fare register, W. W. Kay	809,377 809,378 809,351 809,895
3	Faucet, J. O. Beazley. Fence, J. H. Brown Fence fabric, wire, T. Litwiller, reissue. Fence lock, wire, G. W. Beyerle. Fence post, Liske & Seymour. Fortilizer distributer C. Labrean	809,906 12,434 809,549
?		
2	File and binder for newspapers, etc., combined, J. Wilson Filter, E. W. Roberts. Fire escape, J. C. Covert. Fire pet and grate, S. Knapp. Fire resisting cabinet, W. V. Dick. Fireproof conductors, making, A. M. Lougee. Fireproof wire, A. M. Lougee. Fishing tackle, B. Waldberg. Flexible coupling, Woolldridge & Ward Floor waxing, polishing, and cleaning machine, F. B. Reichenbach Flush, A. J. Barr. Fodder leader and houler, M. Plackard.	809,484 $809,463$ $809,670$ $809,701$
7 :	Fire resisting cabinet, W. V. Dick Fireproof conductors, making, A. M. Lougee Fireproof wire, A. M. Lougee	809,497 809,312 809,311
Ĺ	Fishing tackle, B. Waldberg	809,343 809,880
2	chine, F. B. Reichenbach Flush, A. J. Barr. Fodder leader and hauler, M. Plackard. Fuel, apparatus for the complete combustion	809,580 809,603 809,323
2	of solid, A. Pfeifer	
9	Furnace charging apparatus, blast, G. C. Shackelford Fuse, impact, L. Abendroth Fuse plug, H. T. Palste Fuse plug, electric multiple, Hepke & Diener Game apparatus, A. Friedenthal. Game board, N. T. Hale. Game board, N. T. Hale. Game board, I. Slivernal!	809,754 809,885 809,837 809,301
9	Game apparatus, A. Friedenthal	809,301 809,293 809,606 809,502
,	Game board, I. Silvernail	809,292
3	Game apparatus, A. Fredenthal, Game board, N. T. Hale. Game board, N. T. Hale. Gas engine, W. T. Fex. Gas engine, compound, J. W. Eisenhuth. Gas fixture, P. J. Nevins Gas plant, acetylene, W. J. Stinsen. Gas preducer, J. R. George. Gas preducer, E. Sandner Gas preducers, fluid sealing device for, G. M. S. Tait	809,791 809,727 809,473 809,295
 (Gas producer, E. Sandner Gas producers, fluid sealing device for, G. M. S. Tait Gas producers, governor for suction, E. Sandre	809,849 809,339
	Gas purifier, E. C. Woodworth	809,848 809,659 809,383
	Constructed by C. Tolortt	809,372 809,406 809,915
	Gearing, C. R. Gabriel. Gearing, transmission, M. C. Talcott. Glass futnace, S. O. Richardson, Jr. Glass manufacturing window, L. Appert. Glass plate grinding tool, F. Franz.	809,540 $809,925$ $809,418$
	Glassware, machine for the manufacture of, C. E. Blue	809,499 809,90 2
	Gold separator, E. J. Sterling	809,321 809,586 809,772
: !	Governor in thywheels, automatic friction, T. L. Cummings. Grain conveyer, J. B. Schuman. Grain elevator, pertable, Hof & Ladwig Chydrox france C. Widensey	809,784 809,470
	Grindstene frame, G. Wideman. Gun, A. H. Stew. Gun barrels or the cradles of portable guns in the traveling position, device for se- curing the, Lauber & Thiele	809,470 809,373 809,349 809,640
	Gun elevating and signting attachment, Dau-	809,819
	ber & Stock Gun, recoil, O. Lauber Gun, salute, W. D. Ryan	809,818 809,821 809,75 2
	ber & Steck Gun recoil, O. Lauber Gun, salute, W. D. Ryan. Guns, means for securing shields to portable, O. Lauber Hair, apparatus for promoting the growth of, N. W. Dible Hammer, power, M. T. Weston Hand, artificial, A. Grogan Harness lining and pad and the like, E. M. Aulten	809,820 809,360
	Hammer, power, M. T. Westen Hand, artificial, A. Grogan Harness lining and pad and the like, E. M.	809,348 809,797
	Aulten Harness pad, W. L. Kellerman Harness snap and slide, J. Reichert Harness snap and slide, combined, J. Reichert	809,276 809,449 809,745
	Hanner D D Miller	809,924 809,716
	Harrester, bean, C. Rueble. Harvester, beet, C. L. Jelly. Ituy leader. S. M. Wixcel. Heading machine, E. C. Meyer. Headstone and grave marker, A. H. Howard	809,751 809,694 809,598 809,520
	Heater, J. L. Klemme	
	Heddle making machine. Charpentier & Ri-	809,668
	chelle Horse blanket pin, M. L. Jacoby. Horseshoe, Campbell & Reagan Horseshoe, J. Howard Hose coupling S. M. Rhoods.	809,691 809,553 809,688 809,746
	Horseshee, J. Heward Hose coupling, S. M. Rheads Hose coupling, Toele & McDennell. Hot water bag and syringe, combined, M. Van Tassel-Beck.	809,746 809,759 809,650
	Hub, wheel Brabant & Beaufore	809,666
	Hygiometer, automatic indicating and regulating, S. W. Cramer	809,663 809,741 809,314 809,871
	Inhaler, J. Barnes	809,66 2 809,891
	F. W. Hedgeland	809,565 809,864
۱	Internal combustion engine, H. C. Holloway Iron or steel, manufacturing, E. Fleischer	809,614. 809,291