

ring has sliding motion upon the shaft, and is connected with a long tapered cone that slides upon the shaft, which cone operates a chain of gearing for moving a hand or pointer over the dial.

STEAM HYDRAULIC INTENSIFIER.—T. E. HOLMES, 63 Sheldon road, Nether Edge, Sheffield, England. The design of the invention is to obviate defects without in any way interfering with the ordinary mode of working a press. It provides (for the purpose of effecting the automatic cut-off of the steam-supply) mechanism in the nature of a "hunting-gear," which on one hand, is connected to the main controlling-valve and its actuating-lever and, on the other, is adapted to be controlled automatically by the main steam-piston, said lever being controlled directly by hand or steam or other power relay, which in turn is manually controlled through medium of hunting-gear.

LIQUID-WEIGHING MACHINE.—C. J. HEDEMANN, Honolulu, Hawaii. This invention relates to improvements in machines for weighing liquids, such as cane-juice or other material capable of running or discharging from a supply-pipe; and the inventor's object is to increase the accuracy of the weighing and the efficiency of the machine. The present invention resides in means or additional features to the machine shown and described in a former patent granted to Mr. Hedemann.

CORE-CUTTER FOR CEMENT-BLOCK MACHINES.—J. W. STUART, Paris, Ill. This improved machine is used for forming building-blocks of cement or other plastic material, and especially for cutting out or coring the blocks when being molded, whereby they are produced with a central hole or passage of any desired shape, thus economizing material, reducing the weight of blocks, and adapting them when duly laid in a wall to form continuous vertical air-passages.

TUCK-GUIDE FOR SEWING-MACHINES.—S. FRIEDMAN, New York, N. Y. The invention has reference to such sewing-machine attachments as tuckers, and has for its principal objects the provision of a device by which work of different widths may be operated upon with a minimum amount of attention and in which the relation of the elements to one another may be changed to meet varying conditions.

Prime Movers and Their Accessories.

INTERNAL-COMBUSTION ENGINE.—C. M. STEELE, Statesville, N. C. The object in this case is to eliminate or neutralize shock resulting from the explosion of the charge and its effect upon the engine and to provide means for more effectually air-cooling the parts. The piston and cylinder are mounted respectively upon separate parallel crank-shafts, so that the explosion of the charge causes the cylinder to yield in one direction and the piston in the other, the cylinder turning one crank-shaft and the piston the other, both shafts being connected by toothed wheels running in opposite directions.

GOVERNOR MECHANISM.—H. T. BALLARD, Youngstown, Ohio. In the present patent the invention has reference particularly to a governor mechanism for Corliss engines; and the object of the inventor is the provision of an efficient mechanism applied to the fly-wheel or shaft of the engine by which to regulate the valve mechanism.

STARTING MECHANISM FOR GAS-ENGINES.—V. B. MILLER, Philadelphia, Pa. The invention relates to starting mechanism for explosion-engines. In starting engines of this class in the usual manner by means of a crank it frequently happens that the crank will be given a violent jerk or "back-kick." The object of the invention is to produce a mechanism of simple construction which will enable explosion-engines to be started without danger to one turning the crank. It is especially applicable in connection with gas-engines of the type usually found on automobiles.

ELECTRICAL IGNITER FOR INTERNAL-COMBUSTION ENGINES.—W. H. WALTER, New York, N. Y. The aim of this inventor is to provide a simple and efficient construction of igniters of that class which employ stationary terminals or electrodes and which may be advantageously used on internal-combustion engines in which oil is liable to be pumped up from the crank-pit past the packing-ring and into the combustion-chambers. The object is to provide an improved igniter which insures the passage of an electric spark or sparks under any and all conditions of service and in which the deposit of carbonaceous matter on the terminals (one or both) is overcome.

ROTARY ENGINE.—R. C. MCLEAN, Cleveland, Ohio. The object of the inventor is to provide an engine which is simple in construction and which will operate efficiently with little waste. Further, to provide such an engine with an improved arrangement for the exhaust-ports. Its use is by no means confined to steam, and it may be operated by any other gas, such as compressed air. Indeed, it could be operated by water.

Railways and Their Accessories.

NUT-LOCK.—M. OMALIA, Scranton, Pa. Mr. Omalia employs a main washer or ring-plate to be placed over the bolt employed and flatly against the surface of a portion of the structure to be bolted, and in conjunction therewith employs a supplementary washer or ring-plate also adapted to be placed over the bolt used. Said washer is also so adapted to a part of

the structure to be bolted as to be incapable of turning about the bolt in either direction, while the two said washers are so adapted to each other as to effectually resist any tendency to reverse turning of the nut on the bolt.

CAR-FENDER.—J. LANDAU, JR., New York, N. Y. The object of the present invention is to provide a fender arranged to safely land and retain any object struck by the fender-basket, to permit of conveniently folding the fender when not in use, and to allow quick and convenient transfer of the basket from one end of the car to the other. It relates to fenders such as shown and described in the Letters Patent of the United States formerly granted to this inventor.

NUT-LOCK.—H. SEEGER, Morley, Iowa. The nut-lock is designed especially for railway-work, but useful in various other connections. It comprises the arrangement with a bolt and a shouldered nut of a washer or collar adapted to surround the bolt inside of the nut and carrying a peculiar dog coacting with the shoulder or shoulders of the nut securely to lock the same.

RAILROAD-TIE.—C. E. SHANNON, Marble City, Indian Ter. The aim of this inventor is to produce a tie which will have the strength and durability of a metal tie, combined with the resiliency and advantages of a wooden tie. It can be laid upon the usual road-bed where wooden ties are used, and does not require a specially-prepared road-bed of asphalt or concrete, such as is often required with metal ties. When the wooden blocks wear out, they may be readily removed without removing the body of the tie, and new ones may be easily inserted.

CROSS-TIE AND MEANS FOR HOLDING TRACK-RAILS THEREON.—E. A. GILLCHRIST, McKeesport, Pa. The purpose in this improvement is to provide novel details of construction for a railroad cross-tie of the class formed of concrete or a similar composition of matter and for means embodied therewith, that enable the convenient, stable, and secure clamping connection of track-rails that are mounted upon the tie and permit speedy release of the rails and removal from the tie.

Pertaining to Recreation.

AMUSEMENT APPARATUS.—O. ROBERTS, Winfield, Kan. Mr. Roberts employs a frame associated with which is an ascending section of trackway, said section merging at the upper end thereof into another which is descending then ascending, but in a different plane from that of the first mentioned section, the second mentioned then merging into a corresponding section terminating in an under or return section between which and a receiving-section used there is a gap over which the vehicle and occupants are carried along a trajectory, there being also a second gap between lower terminal of the receiving section and upper terminal of a final section of trackway, over which final section the vehicle reaches the ground from whence it started.

TARGET.—T. J. MCNELLY, New York, N. Y. Principal objects of the invention are to provide a target with an indicating device and a movable bull's-eye which when hit by a bullet will release the indicating device, so as to show that the eye has been hit; also, to provide a bell which will be rung at the same time and to provide the target with a series of removable sheets each representing a target and each designed to be removed from the main target after each person's shooting has ended in order that a record may be kept by each one of his own score.

Pertaining to Vehicles.

LOG-CARRIER.—W. E. SINCLAIR, Mobile, Ala. This improvement is in that class of carriers in which the draft animals attached to a tongue and wheeled axle are utilized for lifting and handling logs, the tongue being adapted to slide in suitable guides and connected with a pivoted lifting-lever which in turn operates chains and grapples attached to the log. The chief objects are to reduce the draft heretofore required for raising the logs by the lift-lever and chains and also to enable operation of loading and unloading to be more quickly effected.

VEHICLE-WHEEL.—M. G. BABIO, New York, N. Y. Mr. Babio's invention refers to an improvement in wheels, and particularly to an improvement in the construction of the wheel for which he formerly made and filed an application for patent, and the purpose is to avoid friction between the flanges of the primary hub and the sides of the secondary hub, so as to adapt the above-named construction to light and high-grade vehicles, which adaptation will give more comfort to occupants than attained in those now in use.

Designs.

DESIGN FOR A TOILET-POWDER RECEPTACLE.—W. A. BRADLEY, New York, N. Y. Mr. Bradley has invented a new, original and ornamental design for a toilet-powder receptacle of very neat and graceful proportions. The width of the receptacle is double the thickness, the height double the width, the body is nicely rounded. The screw-threaded neck and perforated top are attractively designed.

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 the invention, and date of this paper.

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 desiring 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. 7930.—For manufacturers of machinery for making a dry condensed milk by spraying same upon a revolving cylinder which is heated by steam.

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

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I sell patents. To buy, or having one to sell, write Chas. A. Scott, 719 Mutual Life Building, Buffalo, N. Y.

Inquiry No. 7932.—For manufacturers of rubber cloth specialties.

Automatic wire end butter dish machinery; or plans, if preferred. B. A. Grasperger, Richmond, Va.

Inquiry No. 7933.—Wanted, address of firm making preparation called "Ascage."

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

Inquiry No. 7934.—For manufacturers of machinery for the manufacture of powder.

Every business firm and manufacturer should get our prices on lithography—can save you money. Stilwell, 709 Pine St., St. Louis.

Inquiry No. 7935.—For manufacturers of machine and mold for making concrete drain tiles, also for powdered sand and stone screens.

FOR SALE.—At a reasonable price one German patent No. 159,139. Improved spatula and cork extractor. Address E. B. Jelks, Quitman, Ga.

Inquiry No. 7936.—For firm who can supply the tobacco-cutting machine, roasting and preparing cigarettes.

FOR SALE.—Self-swinging gate, great improvement. Sell or lease on royalty. Patented November 21, 1905. Claude Siebring, George, Iowa.

Inquiry No. 7937.—For the manufacturers, dealers or jobbers in novelties and office or store equipment.

Metal Novelty Works Co., manufacturers of all kinds of light Metal Goods, Dies and Metal Stampings our Specialty. 43-47 S. Canal Street, Chicago.

Inquiry No. 7938.—For manufacturers of raw hide pins, 1/2 inch to 3-16 inch diameter by 12 inches long.

WANTED.—Practical storage battery man to join me in making small storage batteries. Must have some capital. I have building and power. Capital, Box 773, New York.

Inquiry No. 7939.—For manufacturers of ceiling fans run by steam and gasoline power.

I have office, facilities and capital, and want good, legitimate office proposition; could represent manufacturers desiring to market their product in the South. F. T. Crump, No. 215 Mutual Building, Richmond, Va.

Inquiry No. 7940.—For manufacturers of gasoline engines.

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

Inquiry No. 7941.—For manufacturers of nut-shelling machinery.

WANTED.—Experienced foreman for erecting department "Four Cylinder Motors" with well-established automobile company. Must have had similar experience with good company. Address Foreman, Box 773, New York.

Inquiry No. 7942.—For the manufacturers of stone mills and handle and spoke machinery.

Inquiry No. 7943.—For manufacturers of brass balls and rods suitable for static machines.

Inquiry No. 7944.—For manufacturer that makes small dove-tail or lock-cornered odorless wood boxes.

Inquiry No. 7945.—For manufacturers of saw machines for squaring small timber from one inch up.

Inquiry No. 7946.—For manufacturers of a waterproof material, not costing more than 40 cents per yard, being one yard or more wide, pliable, light weight and guaranteed to be absolutely waterproof for two years.



HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

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Minerals sent for examination should be distinctly marked or labeled.

(9899) F. Q. B. calls attention to a misstatement in one portion of a note upon projectiles, which we gladly amplify and correct. The theoretical path of a projectile in a vacuum would be a parabola, and in textbooks of physics the subject is ordinarily treated from the theoretical standpoint only. The results of the resistance and motion of the air are such as to render the theoretical result of little practical value in gunnery. In a case cited by Wood, a ball was shot with a velocity of 1,000 feet per second and at a range which should have carried it by the law of projectiles to a

distance of 31,250 feet. Its actual range was 5,000 feet. A projectile rises highest when shot vertically upward, or at an angle of 90 deg. with the horizontal. For other angles its rise varies as the square of the sine of the angle of elevation. As the sine of 30 deg. is 1/2, it follows that a bullet shot at this angle would rise 1/4 as high as if shot vertically; if shot at 45 deg. elevation, it would rise 1/2 as high as at 90 deg. elevation. The greatest range is found at 45 deg., and for equal angles above and below 45 deg. the range is the same.

(9900) H. M. K. asks: What is the chemical composition of wood, bituminous and anthracite coal, and natural and artificial gas? Is the composition of natural gas the same in the various gas-producing rocks and fields? How and in what proportion should natural gas and air be combined in order to create the most heat? Please explain this combination, and also the formation of the new compounds (and elements, if any) giving also the proportionate amounts. Is it possible for the air mixer to allow too much air to mix with the gas? How and in what way in the process of burning is heat made? Most stoves are made so that the gas and air mix before combustion, but in some stoves they do not. Is it possible to get the same amount of heat from 1,000 feet of gas in each case? Does the draft of the stove or the pressure of the gas burnt affect in any way the proper mixture of the gas and air by the mixer? What is the color of the flame in perfect combustion, and why should the color be different in imperfect combustion? What are the evil effects produced by burning gas without a flue connection? A. We may state that the chemical composition of anthracite coal is as follows: Carbon, 86; volatile hydrocarbons, 4; ash and moisture, 10. The composition of bituminous coal varies very greatly, but as a general average we would give the following: Fixed carbon, 65 to 45; volatile hydrocarbons, 25 to 45; ash and moisture, about 10. Wood kiln dry: Carbon, 50; hydrogen, 6; oxygen, 41 1/2; nitrogen, 1; ash, 1 1/2. Natural gas: Marsh gas, 93; hydrogen, 18/10; nitrogen, 3 2/10; other gases, 2. Coal gas: Marsh gas, 40; hydrogen, 46; carbon monoxide, 6; small quantities of other gases, 8. The chemical composition of all of these varies in different localities, but the above figures may be regarded as giving an approximate average. Natural gas and artificial gas both burn with the best results when they are both mixed with air in just the right proportion to give perfect combustion. The best mixture of air and coal gas is one part of gas to about five to seven parts of air measured by volume. The proportion with natural gas is about the same. It is possible for the air mixture in a burner to admit too much air. In the combustion of gas or solid fuel the hydrogen combines with the oxygen of the air to form H₂O, and carbon in the fuel combines with the oxygen of the air to form CO₂. This union of hydrogen or carbon with the oxygen of the air is what produces the heat. It is better to mix the gas and air before combustion, but it is possible to get perfect combustion if this is not done. It is also possible to get perfect combustion regardless of the pressure of the gas or draft on the stove, and so long as the combustion is perfect the same amount of heat is produced. Where the gas and air are mixed before combustion the flame is apt to be nearly colorless, and when they are not so mixed the flame is apt to have considerable color, especially if there is much carbon present in the gas. Where there is no flue connection, the products of combustion escape into the room and vitiate the air.

(9901) H. A. W. says: I would be pleased to have you inform me of the process of coloring incandescent electric light globes, and the necessary ingredients used in producing the following colors, i. e., ruby, green and blue. A. Aniline dyes are used for coloring the bulbs of incandescent lamps. These may be dissolved in amyl acetate or in photographer's collodion. The bulbs should be cleaned thoroughly and dried, coated with the white of egg and dried. The dye will then adhere firmly to the glass. The details of the process may be found in the Notes and Queries of the SCIENTIFIC AMERICAN, No. 10, vol. 74; and in SCIENTIFIC AMERICAN SUPPLEMENT, No. 948, price 10 cents each.

(9902) J. M. C. asks: In all articles I ever read I have gotten the idea that a dynamo of a given current (say 10 amperes) could be run at any voltage, say 14, 25, 52, 75, or 110, and give out 10 amperes, provided lamps in circuit called for that amount. In fact, my idea has been that I could use eight 14-volt, eight 25's, eight 52's, ten 75's, or sixteen 110's, voltage varying with speed, but amperes still the same if lamps call for it. You see I figure eight amperes in circuit (about) in all the voltages, leaving 2 amperes for variation of excitation. Am I right or wrong, yes or no? A. The voltage of a dynamo depends upon the speed of the armature, which determines the number of lines cut per second. The amperes depend upon the resistance of the circuit, internal and external. If you have a resistance which allows 10 amperes to pass without overheating, you can within the limits of safety vary the speed and so the voltage, and the same 10 amperes will flow. But it is not possible to have such a range of voltage as you mention. To change from 14 to 110 volts requires eight times the speed of the armature. No armature could stand the centrifugal force of such a speed. The proposition as you make it is not practicable.