

The apparatus will be useful in many connections where work has been erected and it is desired to further operate upon it.

Medical Appliances.

STERILIZER.—H. W. C. THOMAS, Valatie, N. Y. This inventor's improvement relates to apparatus for sterilizing various articles, and more particularly such instruments or tools as are used by surgeons, dentists, and barbers. The principal objects are to provide a convenient apparatus in which a circulation of the sterilizing fluid may be secured by the introduction and the withdrawal of the instruments.

HYPODERMIC SYRINGE.—J. DE LISLE, New York, N. Y. This syringe is more especially designed for making hypodermic injections of antitoxic serum and arranged to maintain its parts during the time the implement is stored or in transit in an absolutely aseptic condition, to prevent contamination of the serum, and to insure free unobstructed flow of the serum through the needle when the syringe is used.

DENTAL SEPARATOR AND TOOTH-HOLDER.—E. D. BARNES, Enfield, N. C. This instrument invented by Dr. Barnes is to be used by dentists for getting space between the natural teeth for facilitating access to cavities between the teeth when filling the same and to give access for polishing or making examinations and which device is also designed to be so held upon the teeth as to prevent the separator-claws from pressing on the gums and which device also serves as a prop between the upper and lower teeth to hold the mouth open.

TRUSS.—F. KING, New York, N. Y. One purpose of this invention is to provide a device that effectually prevents the scrotum escaping backward when the attitude of the wearer is changed, as in athletic exercises, the mounting of a horse, etc. Another is to provide a waist-belt and straps to prevent the apron from slipping upward or downward, and the waistband is provided with an attached broad stiffened pad at the rear, which engages with the small of the back, renders the waist-band comfortable in use, and sustains the muscles at such point.

Prime Movers and Their Accessories.

ROTARY VALVE.—T. G. VAN SANT, Paragould, Ark. This invention relates to a valve mechanism for steam and other elastic fluid engines; and resides particularly in an improved rotary valve, by means of which steam may be admitted to and exhausted from the engine-cylinder. It is especially intended for use with the rotary cut-off forming, the subject of Mr. Van Sant's former patent, of the application on which said patent issued his present application is a division.

CARBURETER FOR HYDROCARBON-ENGINES.—N. LEINAU, Ashbourne, Pa. The most prominent feature in this case resides in a peculiarly-arranged mobile member driven by the air-current through the carbureter and connected with a means for forcing the liquid fuel into the air-passage of the carbureter, where by aid of the mobile member it is thoroughly commingled with the air on its way to the engine or other apparatus in connection with which the carbureter may be used. This member is in form of a fan rotated by the air currents and having connection with a pump placed in the fuel passage and acting to force the liquid fuel through the discharge-nozzle into the air-passage in close association with the fan.

VALVE-GEAR FOR ENGINES.—J. L. WHEELER, San Francisco, Cal. Mr. Wheeler's invention relates to improvements in devices for automatically cutting off the steam supplied to engines, particularly engines employed for heavy work, such as in sawmills. In sawmill work fuel is not a consideration, and in such cases the slide valve of the engine should be set to cut off at the lowest part of the stroke, which will enable it to run all machinery except "circulars" and "band saws," and the cut-off attachment may be adjusted so as to give the valve full travel when the log comes to the saw.

Pertaining to Vehicles.

UNICYCLE.—C. G. CROSSE, Sun Prairie, Wis. In this device the pedal is pressed by the foot, which depresses one side of a bar and pulls down the cranks. This gives corresponding oscillatory motion to two rods which in turn operate two others, one of the latter operating a member which represents the human foot. This simulates the motion of the human leg and foot and exerts a pushing force in a forward direction, thus urging the wheel forward. When one pedal is depressed the other is elevated, thus giving the reverse movements to the parts, and by operating the opposite pedal the same action takes place with respect to the leg on the opposite side.

OIL OR GASOLINE ATTACHMENT FOR GAS-ENGINES.—J. E. GREEN, Belmont, W. Va. One aim of the inventor is to provide an attachment for a gas-engine to allow of running the engine with gas from an oil-well or with gasoline in case the gas-supply gives out, or in case the supply is low and not sufficient to run the engine then oil or gasoline-vapor is supplied through the attachment in any degree

to form an explosive mixture with the gas, the arrangement being such that the necessary changes can be made while the engine is running.

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 the paper.

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

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Advertiser, having ample facilities for manufacturing, desires to meet party who thoroughly understands the manufacture of small dynamos, motors and electric fans, who is already engaged in or desires to enter into manufacturing. Address Dynamos, 794 Broad Street, Newark, N. J.

Inquiry No. 7017.—For manufacturers of cement poles.

WANTED.—Formula of a composition with which to cover the caulked decks of pontoons. It must set hard and tough, so that handling a cargo will not break, crack or indent it, adhesive and elastic so as to stick to wood and yet give to heat and cold, and homogeneous and waterproof so as to keep all liquids out all over.

Shanghai & Hongkew Wharf Company, Limited, Shanghai, China.

Inquiry No. 7018.—For manufacturers of the latest, up-to-date smoking tobacco machinery.

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"A Paper Proposal" is the title of a clever piece of fiction contained in "Mountain and Lake Resorts," a book just issued by the LACKAWANNA RAILROAD, in which some of the most delightful summer resorts in the east are illustrated and described. The story is well worth reading, and the other information may help you in selecting your vacation place.

The book will be mailed on receipt of ten cents in stamps addressed to T. W. LEE, General Passenger Agent, New York City.

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Sheet metal, any kind, cut, formed any shape. Die-making, wire forming, embossing, lettering, stamping, punching. Metal Stamping Co., Niagara Falls, N. Y.

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Inquiry No. 7022.—For manufacturers of luminous paint.

Inquiry No. 7023.—For manufacturers of refrigerating machinery.

Inquiry No. 7024.—For manufacturers of machinery to bend steel plates of $\frac{3}{8}$ inch thickness, and also to cut such plates.

Inquiry No. 7025.—For manufacturers of apparatus for drying blood and egg albumen.



HINTS TO CORRESPONDENTS.

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

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

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

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Minerals sent for examination should be distinctly marked or labeled.

(9671) E. L. M. asks: 1. Does hammering of iron increase or decrease its strength? For example: Suppose a rod of round iron $\frac{1}{2}$ inch in diameter were swelled by hammering to $\frac{3}{4}$ inch in diameter; would it be as strong as originally? Suppose this rod is then turned on a lathe back to the original $\frac{1}{2}$ inch in diameter; would it be as strong as the original rod? A. As a general rule, hammering iron in the right way and at the right temperature, improves its quality and increases its strength. But upsetting a $\frac{1}{2}$ -inch rod until it was $\frac{3}{4}$ of an inch in diameter in the way an ordinary blacksmith would be likely to do it would probably injure the material, and it would be weaker after than it was before the operation was performed. It, however, would be perfectly possible to conduct this operation in such a way that it would be stronger, but it would have to be very carefully and skillfully done. Metal cannot be abused without injury to it. 2. Has there been invented a process for treating tool steel so that if worked at the right temperature it will temper itself on cooling? A. Some of the so-called hardening steels will do what you suggest. Mild steel may be case-hardened in the same way that you would case-harden wrought iron. You may also weld a thin piece of high-carbon steel to the end of your rods.

(9672) E. Z. says: Kindly let me know what the water pressure in an ordinary household faucet is, if you possibly can tell. A. The water pressure at the faucet in an ordinary house varies with the location of the house. A house on a hill or at a distance from the standpipe or pumping station will have less water pressure than one situated lower down or near the standpipe or pumping station. A general average might be taken as somewhere between 25 and 70 pounds per square inch, depending on the city and the location as above noted; but in some instances it will be outside of the limits above mentioned.

(9673) F. H. writes: For a red varnish to be used on electrical articles, allow me to submit the following recipe: Melt together 2 parts of Venetian turpentine (Terebinth Venet.) and 1 part pale shellac (orange shellac will do as well); when temperature reaches 60 deg. C. add 10 parts alcohol. Rub up 3 parts pulverized cinnabar (vermillion) with sufficient alcohol to form a paste, and add to the melted mixture. The operations should be carried on in a water bath, to avoid undue heating. Stir until a smooth liquid is obtained. This should be allowed to cool, continually stirring, and when required should be heated over water bath until it can be applied with a brush. Articles to be coated should be warmed. This paint dries somewhat slowly, but gives beautiful rich permanent color. Needless to say, the necessary precautions as regards fire have to be taken when preparing the paint, as same is inflammable.

(9674) E. R. says: In that sort of mirage termed looming, does not one see the object by direct ray, and not by reflection? Do you not really see an object (ordinarily obstructed from view) just as much as though there was no obstruction intervening? A. The looming of an object is supposed to be produced when the upper air is warmer than the lower air, so that the rays are totally reflected above the eye and come down to the eye. Thus the object is seen above its own real position. Since the light has been reflected, the thing seen is an image as really as in any other case of reflection by a mirror.

(9675) F. M. asks: Please explain to me the method of lining up a simple engine and oblige a reader of your paper. A. The best way to line up a simple engine is to stretch very tight a fine piano wire through the exact center of the cylinder of the engine, and make all measurements from this. Another wire may be stretched at right angles to it, parallel with the shaft. This right angle can be determined by a large machinist's square or by an engineer's transit. The cylinder and guides can be lined up directly from the first wire, and the bearings for the main shaft can be adjusted until they are parallel with the second wire.

(9676) W. K. asks: 1. What action (chemical) does zinc chloride furnish in a dry

cell? Sal-ammoniac? Does manganese furnish any action besides its depolarizing effect? A. The zinc chloride does not exert any chemical action in a dry cell directly; that is, the action of the zinc and ammoniac chloride (sal-ammoniac) is to form zinc chloride. The zinc salts put into a dry cell serve principally to keep the paste porous and moist, since these have a strong affinity for water. Manganese dioxide serves simply as a depolarizer in a dry cell, as it does in a wet cell. 2. Does high initial amperage increase life of a battery, or does it mean that it will be short-lived? A. The amperes of a cell depend upon the external resistance, and there is no propriety in giving amperes, unless it is stated also against what resistance the amperes are flowing. If a large number of amperes are drawn from a cell at first, the cell will be shorter lived than if a low amperage is drawn. A cell will have a certain number of ampere-hours of life. If 100 ampere-hours, the cell will last approximately 100 hours if 1 ampere is the rate of current, but only 10 hours if 10 amperes be drawn. This law is as true of dry as of wet cells. 3. What do you consider best type of wet and dry cells on market to-day for telephone service? A. We have no judgment to give as to the best dry or wet cell. We presume there is no cell which deserves such a distinction. There are many reliable houses offering cells. We presume your local dealers are reliable, and that you are safe in taking their advice. We do not advertise in Notes and Queries. Our advertising columns may be consulted, and we think our advertisers are unusually reliable. We doubt if there is any such thing as a superlatively best thing of any kind. We are not willing to say that there is. 4. In gas and gasoline engines, what affects the life or service of the batteries? A. There is nothing very peculiar in the service a battery performs on a gas engine, except the regularity of its action. It wears out as any other battery does by the work it does, and rather sooner because of the constancy with which it is called upon for current. It is a popular impression that a battery should last indefinitely, but really it is like any other source of power. It can only give back the power which is given to it, and when that is done the battery stops work. No one is ever ready to have the battery stop. Few understand that a battery uses up materials as an engine uses up coal. So much zinc and chemicals, so much electricity. It is a simple matter.

(9677) G. F. says: 1. Is there any sound when there is no ear to hear it? For instance, if a tree were to fall and there were no living thing within hearing, would there be any sound? Please explain fully. A. There may be sound when there is no ear to hear it, and the fall of a tree would produce exactly the same noise, whether or not there be any one near at hand. What we call "sound" consists in reality of pulsations or wave vibrations in the air or whatever medium the sound traverses. If a stone fell into a smooth body of water, it would produce waves on the surface of the water, whether or not there be any person present to see them. In the same way, it would produce waves or pulsations of sound in the air. 2. Give a rule for figuring the drawbar pull of a traction engine. As an example, figure the pull of the following engine: Cylinder, 10 x 10 $\frac{1}{4}$; 225 revolutions, cutting off at two-thirds stroke; pressure, 120 pounds; traction wheels, 64 inches diameter, geared 1 to 17. A. The engine which you describe ought to be able to produce a drawbar pull of from ten to fifteen thousand pounds for each cylinder, provided the driving wheels do not slip. If this force is more than eight or ten per cent of the weight on the driving wheels, they are likely to slip.

(9678) G. L. P. writes: In the June 10 issue of the SCIENTIFIC AMERICAN, in Notes and Queries, No. 9656, H. J. F. asks if a piece of paper 8 by 8 inches square can be cut so as to make 65 square inches. You say: "No, by no conceivable means." Now you will find inclosed a piece of paper 8 by 8 inches, which you are to cut on the lines and put together as lines shown on the smaller piece, and then measure. I think you will find it to be 5 by 13 inches, which equals 65 square inches. I am unable to explain where the square inch comes from, but it is there. A. No, friend, it is not there. We exceedingly regret that any of our correspondents should think us capable of believing that a square of eight inches on a side can be cut into pieces and put together in another way so that its area shall be increased 1 square inch. We are having a deluge of letters on this point, of which we print one, many criticising us more or less severely for saying that this cannot be done. But of course it cannot be done. We repeat it—No, by no conceivable means. It transcends common sense to ask it. Try it with pennies, or kernels of corn, or any convenient similar pieces. Lay out 64 in a square of eight on a side. Then change them to a figure of 5 rows of 13 on a side. There will be a missing kernel or coin. You cannot complete the second figure. It is the same if you cut a piece of paper of the same dimensions; 8 x 8 cannot be anything but 64, and can never be 65. Why not settle one's self first upon simple foundations? Then one will not say, as our confident correspondent does, "But it is there." That begs the question. It is not there, and cannot be there. There is evidently a fallacy here somewhere. Now, this is no new trick.