

SCIENCE AND INVENTION.

Work of the World's Busy Brains in Discovering, Inventing and Creating.

FOREIGN PATENTS.

Rule 29 of the Patent Office reads: Rule 29.—The receipt of Letters Patent from a foreign Government will not prevent the inventor from obtaining a patent in the United States, unless the application on which the foreign patent was granted was filed more than 12 months prior to the filing of the application in this country, in which case no patent shall be granted in this country.

WORK OF THE PATENT OFFICE.

For the week ending Sept. 19 the Patent Office issued 508 patents, nine designs, 125 trade-marks, one label and one reissue, making a total of 644. Of these 458 patents and designs went to citizens of the United States, and 126 to those of foreign countries.

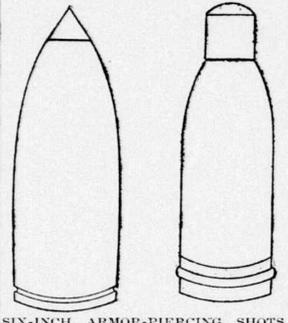
THE PRODUCER GAS ENGINE.

Continual and Rapid Improvement of the Engine of the Future.

Undoubtedly the producer gas engine—that is the engine which gets its power directly from the gas generated by the coal in its own furnace—will be the engine of the future, and supersede all other forms of heat engines—that is the gas engine, the gasoline and the steam engine. The leading engine builders in Europe are turning their attention strongly in this direction and producing some very compact and effective types of engines. One of these

CAPPED SHELLS.

Why They Pierce Armor—Various Theories. The astonishing effect produced by placing a cap upon an armor-piercing shell is one of the marvels of the ordinance of the present day, and has



SIX-INCH ARMOR-PIERCING SHOTS, CAPPED AND UNCAPPED.

brought on many theories to account for it. The cap is made of soft steel, filled with graphite, and is of various shapes. For a 4.7-inch shell it weighs about 3.3 pounds. It is sometimes sol-

Rope Climber.

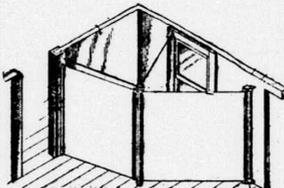
This device will be best understood from the illustration. When the rope is grasped by the hands and the feet raised, the jaws of the climber open, allowing it to slip up the rope freely. The moment the feet are pressed down



the jaws close, gripping the rope and affording a secure support to the operator. A very long rope may be climbed in this way, as the climber can stop for rest as long and often as desired; or having reached the elevation sought can use the hands for other work while standing in the climber.

Partition Device.

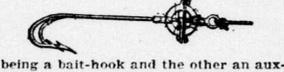
Willard C. James, Los Angeles, Cal., has received a patent for a partition device for rooms comprising a perpen-



dicular roller with a winding device thereon and a second roller to draw or release a curtain to divide a room as wished.

Fishing Gear.

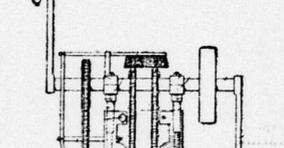
Otto Miller, Providence, R. I., has patented a fishing gear having a pair of independently movable hooks, one



being a bait-hook and the other an auxiliary hook with means for securing the hooks together and for swinging or turning the auxiliary hook on its axis after it is released by a pull upon the bait-hook.

Square Auger.

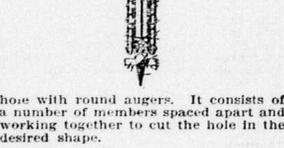
Fred Bryan, Mainesburg, Pa., has patented a device for boring a square



hole with round augers. It consists of a number of members spaced apart and working together to cut the hole in the desired shape.

Water Key for Wind Instruments.

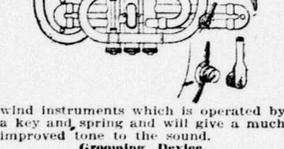
William F. Boast, Colby, Kan., has patented a water key for horns and like



vehicles consisting of a rubber boot having continuously open air ducts leading transversely across the tire.

Steam Wall-Paper Remover.

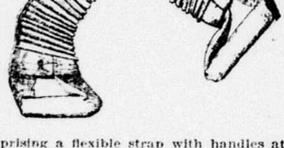
Steam generated in a boiler by means of a gasolene burner is applied to the wall by a hood in the hands of the workman. The hood is connected to the boiler by rubber tubing. When



wind instruments which is operated by a key and spring and will give a much improved tone to the sound.

Grooming Device.

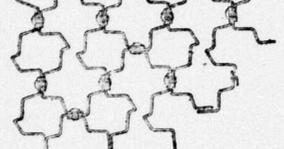
Francis K. Mosely, Owensboro, Ky., has patented a grooming device com-



prising a flexible strap with handles at the ends and a fluted rubbing member secured to the strap.

Metallic Mat.

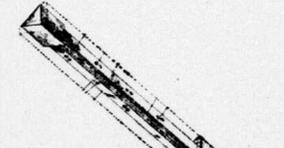
Bernard Londkowski, Milwaukee, Wis., has patented a metallic mat com-



prising a number of links joined pivotally at three points only. Each link has one short and one long attaching end.

Fence Post.

Elijah B. Gaylord and Martin Conroy, Lamoni, Iowa, have patented a



fence post of concrete having a pointed end and a block embedded in the top by which it is driven into the ground.

Pressed Metal Pump.

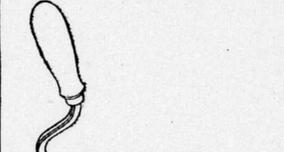
Theodore F. Reynolds and Herbert W. Merrill, Saginaw, Mich., have pat-



ented a cast-iron pump of pressed metal, with the face of a single piece and the rest of the pump of similar simple construction.

Comb, Cutter and Rake.

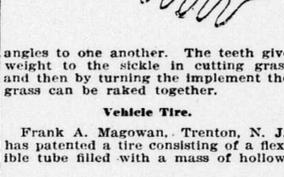
Eugene S. Regnier, Galesburg, Ill., has patented a combination of a cutting blade and rake teeth which are at right



angles to one another. The teeth give weight to the sickle in cutting grass and then by turning the implement the grass can be raked together.

Vehicle Tire.

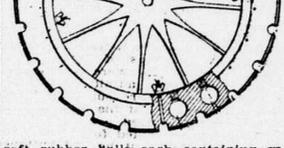
Frank A. Magowan, Trenton, N. J., has patented a tire consisting of a flexible tube filled with a mass of hollow,



soft rubber bulbs each containing gas in a state of high compression, so that each bulb or bulb is distended until it conforms to the other bulbs and to the inside of the flexible tube.

Resilient Tire.

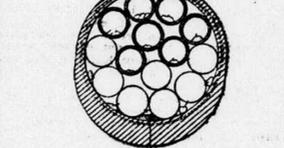
Alfred Ducauble, Neuilly, France, has patented a tire for the wheels of road



vehicles consisting of a rubber boot having continuously open air ducts leading transversely across the tire.

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Scientific Notes.

Superheating is being forced to 554 deg. F. on the Prussian State railroads. When steam is superheated to 500 deg. F., a saving of 10 per cent in steam and 12 per cent in fuel can be obtained, as compared with similar locomotives using saturated steam, the greater saving in water (than in fuel) being due mostly to the prevention of losses caused by condensation.

Wines of the port type are made by taking colored grapes and crushing and mashing them in fermenting vats to ferment the same as for making red wines. As soon as fermentation has reduced the sugar in the must to the desired point (which which fermentation color and other matters have also been extracted from the pulp and skins), the juice is drawn off, put in storage casks, and fortified.

A volcano throwing off molten lava has been discovered in Nevada by McClure, Wheeler and Somers, cattlemen of Lovelock. The volcano is in Rye Patch, Humboldt County. Although that section has been traversed for years, the crater has just been found. The men were in search of cattle when they came on the stream of lava, and tracing it to its source found the volcano.

BURNING A PRIVATEER.

(Continued from page 1.)

actions for which our Navy has always been distinguished.

The following order was sent by the Navy Department to Lieut. Russell: Commodore from the Navy Department.

"Navy Department, 4th October, 1861. "Sir: Transmitted herewith is a copy of a communication from the Department of this date to Flag-Officer McKean, commanding Gulf Blockading Squadron, in relation to the successful blockade expedition dispatched under your command to destroy the rebel privateer Judah.

"For your gallantry on this occasion the Department designs to assign you to the command of one of the new gunboats, and you are therefore detached from the Colorado and you will proceed to Washington, D. C., and report yourself, in person, at the Department.

"I am, respectfully, your obdt servt" (Signed) Gideon Welles.

"Lieut. John H. Russell, "U. S. Steam Frigate Colorado, Gulf Blockading Squadron."

"Navy Department, 4th October, 1861. "Sir: The Department received Flag-Officer Mervine's report of the boat expedition dispatched by him from the Colorado on the night of the 13th September, under the command of Lieut. John H. Russell, of the Navy, to destroy the rebel privateer Judah, moored at the wharf of the Pensacola Battery Yard, and to spike the guns in battery near by.

"An expedition, executed in the face of an enemy so much superior in numbers,

with such brilliancy and gallantry and success, cannot pass without the special recognition of the Department. To those who were engaged in it, not only the Department, but the whole country, is indebted for one of its brightest pages that has adorned our Naval record during this rebellion. Indeed, it may be placed, without disparagement, side by side with the fairest that adorn our early naval history.

"The expedition will give renown not only to those who were immediately concerned in it, but to the Navy itself—we will inspire others in emulation; its recital hereafter will thrill the heart with admiration.

"The Department will cherish the recollection of the exploit, and desires you to impart the same to the officers, seamen and marines who participated in it, its highest admiration of their conduct.

"The loss to the service, and to their relatives and friends, of those who fell in the expedition is a painful feature of it; but the memory of those brave men should not be lost in the hearts of all true patriots, but be ever cherished there."

"I am, respectfully, your obdt servt," (Signed) "Gideon Welles.

"Flag-Officer Wm. W. McKean, "Commanding Gulf Blockading Squadron."

Thanks from Maryland.

"Legislature of Maryland, "House of Delegates, "Annapolis, March, 1862.

(The Great Seal of Maryland.) "Lieutenant John H. Russell,

"Sir: I have the honor to hand you a copy of a resolution passed by the General Assembly of Maryland, Dec. 20, 1861.

"Resolved, That the thanks of the Legislature of Maryland are due and are hereby tendered to Lieut. John H. Russell, a native of Montgomery County, in this State, for his gallantry and bravery in running into Pensacola Harbor directly under the guns of the enemy, and firing and destroying the rebel privateer Judah.

"I am, respectfully, yours, (Signed) "Jno S. Berry, Speaker of the House of Delegates of Maryland."

President Lincoln's Thanks.

Lieut. Russell, in accordance with orders, returned to Washington and reported to the Secretary of the Navy, who informed him that President Lincoln desired to see him. Accompanied by the Secretary he called upon the President, who thanked him for what he had done, and, turning to the Secretary, stated that he desired promotion and that he would have anything that the Secretary would present him.

Lieut. Russell replied, thanking the President, but that he did not wish to go over the heads of his brother officers, who would have done as well, or better, had they been so fortunate as to have had the opportunity.

A vote of thanks for Lieut. Russell passed the Senate. The committee unanimously, but was dropped on account of the absence of Lieut. Russell, who took no action in the matter, and in the short session it was not reached; the matter was reserved neither advancement nor promotion.

Absent-Minded. (Lippincott's.)

"Dear me, Bridget, isn't it time you learned to set the table without help?"

"I think that after I have trained you for a year I ought not to feel obliged to always look at the table before a meal is served."

"Sure, mum, me ould mother did be after schouldin' me for forgittin' whin

Soon after the close of the war of the rebellion a patriotic Philadelphian, Mr. W. C. Strickler, commenced the collection and the systematic arrangement of data concerning the war, giving particular attention to facts that do not appear in official reports. This work was continued, and he collected, conscientiously, for more than 25 years, and the collection is now simply wonderful in its extent and accuracy.

Mr. Strickler's collection embraces all the official information to be found in the U. S. War Department and in possession of the different States, and, in addition, and just as valuable, the many important facts omitted, by mistake or haste, from official reports. Mr. Strickler's collection is, in fact, the most valuable collection that has been made.

The practical use that has been made of all this information has been in the preparation of accurate and full records of service. Mr. Strickler organized the Army and Navy Record Co., of Philadelphia (with a branch office at times in Washington), and for many years has been busy man in preparing the only complete and satisfactory Memorial Records that we know of. Thousands of comrades have them. Prominent officers ordered them, as well as those in the ranks.

In possession of it will be found copies of a few letters that Mr. Strickler is very proud of:

From President Grant: "They will be a satisfaction to the family and descendants of the soldier or sailor, and a positive benefit to himself when living, and I give to the system my unqualified approval."

From President Hayes: "Your design for expressing, and method of preserving, the items of military service, meets with my hearty approval."

Very truly yours, R. B. Hayes.

"The Memorial I ordered for you gives entire satisfaction to myself and friends. It gives me pleasure to commend it as a compact and pleasing method of transmitting to my children the record of military life."

Very truly yours, P. H. Sheridan, Lieutenant-General.

I am very much pleased with the Memorial and I would not part with it under any circumstances.

Very truly yours, Anson G. McCook, Secretary U. S. Senate.

From the U. S. Senator of Michigan: "I received the Memorial of army service and am delighted with it. I never paid a bill more cheerfully."

Yours truly, J. C. Burrows.

You have beautifully epitomized the Admiral's naval career.

Mrs. Virginia L. Farragut, Widow of the Admiral.

Gentlemen: It is with pleasure I add my testimony to those of many of my comrades to the merits of the "Memorial of Service" I ordered of you. It is entirely satisfactory in all particulars, the workmanship and design are of the highest order, and the statistics accurately compiled. It is something every honorably discharged soldier or sailor should have in his home, that the loyal service he gave his country in the trying days of the rebellion may not be lost to his descendants.

Robert B. Beath, Past Commander-in-Chief, G.A.R.

Mr. Strickler is still a vigorous man, but no longer young. In recent years he has shown great solicitude as to the fate of his collection and records—the work of a lifetime when he is gone. We have shared that anxiety, in fact, for it would be a great loss if they were divided and dissipated.

Address THE NATIONAL TRIBUNE, Washington, D. C.

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An extra 12 per cent. dividend on March 1, 1905; 8 per cent. June 15, 1905; 6 per cent. Sept. 15, 1905, and 8 per cent. Dec. 15, 1905.

To each person sending us \$1 to invest we will promptly issue and send you certificate with income coupons attached. We will also send you free of charge a copy of our new and beautiful illustrated Western Magazine, the only publication of the kind in the West, and will keep you posted on the progress of our business.

Send us \$1 and your income actually commences the very day your money reaches us. This is no scheme or humbug. If you are not satisfied, we will promptly refund your money and no questions asked. A few honest agents wanted. Remit your money order, check or cash to the address in your letter and address at once.

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WILD WEST MAGAZINE, No. 91, Denver, Colo.

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"The firm is worthy of confidence upon the ground both of competency and honesty."—THE NATIONAL TRIBUNE, April 1, 1897. Founded 1861 by Milo R. B. WOODRUFF, M.D., and W. H. STEVENSON & CO., 999 14th St. N. W., Washington, D. C. Branches at Chicago, Cleveland, Detroit.

Memorial Records.

The outcome has been that The National Tribune has purchased the collection and records, and with it they have secured the services of Mr. Strickler. The National Tribune will continue to supply Memorial Records, such as have been supplied by the Army and Navy Record Co., under the direction of Mr. Strickler.

The following copy of a record will show how complete these records are:

CHARLES REICHMANN. Entered the service as a private of Co. E, 125th Pennsylvania Infantry Volunteers, April 10, 1862. Promoted to Corporal, August 1, 1862. Chancellorsville, Va., May 3. Mustered out May 19, 1862—expiration of term. Moved to Washington, D. C., Aug. 17, 1862. Duty on Arlington Heights, Va., to Aug. 21. At Fairfax Seminary, D. C., to Aug. 29. At Fort Woodbury, D. C., as a recruit, to Sept. 3. Served in the First Brigade, First Division, Twelfth Army Corps, Army of the Potomac, September, 1862, to May, 1863.

Service. Maryland Campaign, Sept. 3-20, 1862. Marched to near Rockville, Maryland, Sept. 3-5. In line of battle near Rockville, Sept. 6-9. Marched to South Mountain, Sept. 9-10. In line of battle on Antietam Creek, Sept. 16. Battle of Antietam, Sept. 17. In line of battle, Sept. 18. Marched to near Sandy Hook, Sept. 19-20. Duty on the Upper Potomac River from Harper's Ferry, W. Va., to Antietam Creek, Md., and fatigue duty on Maryland Heights, to Dec. 10.

Marched to Fairfax Station, Va., Dec. 10-14. Duty at Fairfax Station, Dec. 29, 1862, to Jan. 19, 1863. Picked for fatigue duty at Stafford Court House and garrison of the post at Dumfries, Va., Jan. 22 to April 23. Chancellorsville Campaign, April 27 to May 9. Crossed the Rappahannock River at Kelly's Ford, and advanced the column to the Rapidan, crossing it April 29. Advanced to Chancellorsville, skirmishing through the Wilderness, April 30. Battle of Chancellorsville, May 1 to 3, 1863. Duty in the intrenchments, May 4 to 6. Relieved from duty, May 9, by special order No. 105, Headquarters Twelfth Corps, and ordered home to be mustered out.

If Comrade Reichmann had preferred it he could have had the roster of his company in place of the service of his regiment.

We have the complete records for 1,600 regiments and the data for completing all the others. We have complete records for all vessels.

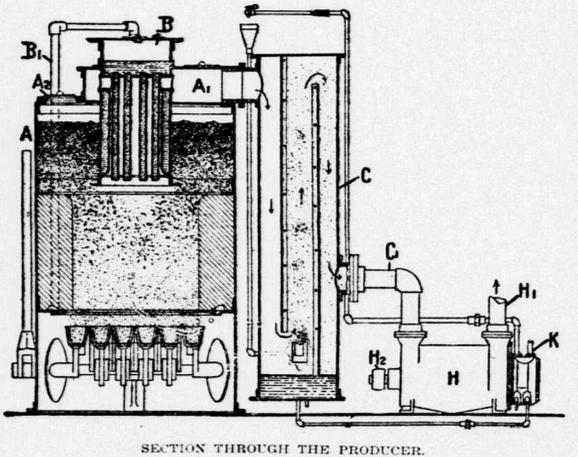
The record for each soldier or sailor is specially written in a center panel, the lettering in aluminum. The borders show all corps badges, also flags and the American eagle—all very tastefully printed in 10 colors.

The price for a record is \$5, and we wish to say that this is a very reasonable price. Each record has to be specially prepared and represents a lot of careful labor.

We have so much confidence that comrades will be pleased that we are free to say that if the Memorial Record sent to any comrade is not satisfactory he can have the return of his money.

To any comrade who would like the Record, but cannot spare the money, we propose that he send us a club of 10 yearly subscribers at \$1 each, and receive the Record as a premium.

Address THE NATIONAL TRIBUNE, Washington, D. C.



SECTION THROUGH THE PRODUCER.

which has just been brought out in a commercial form by the firm of Crossley & Co., England, one of the leading engine manufacturers in the world, is especially attractive, as it seems to combine the greatest efficiency in a neat and compact form. The illustration gives a sectional view of its arrangement. "A" represents the coal magazine, the coal being introduced by the doors ("A-2").

In the center of the coal is the boiler for water, with tubes. Below is the combustion furnace with a pipe, "B-1", to lead the steam and hot-air to the grate bars and mingle the air and vapor with the burning coal, where they assist in combustion and are decomposed into gas. The fire is first started in the furnace and urged by a hand-fan that forces the air through it and carries off the gas. After the engine gets to work it sucks the air through the furnace. The gas generated in the furnace passes into the boiler and there heats the water and is partially cooled itself. It is still hotter than is desired and, therefore, it is drawn into the chamber "C" where it is sprayed with water to make it give up its heat. This water, in order to utilize all the heat, goes back into the boiler, being partially warmed before it enters it.

After leaving the cooler the gas has still many impurities and is damp and, therefore, it passes through a "scrubber" "H" where it is whirled around by a centrifugal apparatus which draws the water and impurities out to one side. On the end of the scrubber spindle is the circulating pump "K" which supplies water for the engine. The action of the scrubber also compresses the gas somewhat, making it the more ready for the engine. This also has the advantage of preventing any too sudden changes in the producer chamber from rapid increase or decrease of the engine speed or load. An ingenious automatic valve also regulates the pressure in the producer chamber. The engine itself is the ordinary two and four cylinder type of the gas engine. The whole is spoken of as the "Captaine," from the French inventor who has done so much to perfect the machine. So far it is claimed that a 19-horse-power engine consumes about a tenth of a pound of anthracite coal per horse-power per hour. The 39-horse-power and 109-horse-power are run with a little more economy of coal. At the present price of coal this would be about a little over 3 of a cent an hour per horse-power for the 19-horse-power engine, a little less than 1 of a cent per horse-power for the 39-horse-power engine, and about 1.5 of a cent for the 109-horse-power engine. The floor space occupied by a 25-horse-power engine is 2.5x3.8 feet and the present room is 3.9x5 feet. With a 50-horse-power engine the length is 7.9 feet, with the other dimensions unaltered. The 25-horse-power engine has two cylinders, but the 50-horse-power has four. The great engine building firm of J. J. Thornycroft & Co. are developing a Captaine marine engine that it is believed will be still further improved. They have already put out a producer gas motor barge which gives very fine results.

Army Motor Wagons.

The days of the patient, long-enduring army mule with the highly-developed vocal organs seem to be numbered, at least in France. There they are developing rapidly a system of motor wagons for army use. These will carry great loads at a speed of 15 miles an hour and they have many other advantages over a mule. That is,



ACTION OF CAPPED PROJECTILE ON STRIKING KRUPP STEEL PLATE.

shells. The shell goes through the armor without deformation, whereas uncapped shells and shot are broken to pieces or converted into irregular masses on the surface of the plate.

By some it is claimed that the cap melts and forms a lubricant for the projectile, so that it passes through the plate with the least friction. It is said against this that it would only apply to soft plates, whereas the capped projectile is intended for use on hard armor.

Another theory is that the cap takes up that amount of energy which would cause the destruction of the projectile required to penetrate the plate. It is said against this that it would only apply to soft plates, whereas the capped projectile is intended for use on hard armor.

The third theory, which is gaining great acceptance, is that the uppermost layer of the armor is softened and the plate transformed into one of equal softness throughout.

In firing an ordinary shell or shot at the best Krupp cemented and hardened nickel-chrome steel plate the head of the projectile is deformed and its broad, round surface cannot pierce the plate, but only compresses it. The rear of the projectile moves forward and its blunt end is taken up on the deformed portion in contact with the plate and so



ACTION OF UNCAPPED PROJECTILE