BREECH-LOADING ARMS FOR THE GOVERNMENT.

In March last a Board of Examiners met by order of the War Department to examine and report upon the following :—

1. What form and caliber of breech-loading arm should be adopted as a model for future construction of muskets for infantry?

2. What form and caliber should be adopted as a model for future construction of carbines for cavalry?

3. What form of breech-loading arm should be adopted as a model for changes of muskets already constructed to breech-loading muskets?

The officers detailed for this duty were Major-Gen. W. S. Hancock, U. S. V.; Brevet Major-Gen. R. C. Buchanan, Col. 1st U. S. Inf.; Brevet Brig-Gen. P. V. Hagner, Lieut-Col. Ordnance Dept. U. S. A.; Brevet Brig-Gen. Charles Griffin, Capt. 5th U. S. Art.; Brevet Col. J. G. Benton, Maj. Ordnance Dept. U. S. A.; Brevet Col. Horace Porter, Lieut.-Col., Aide-de-Camp; Brevet Lieut.-Col. Wesley Owens, Capt. 5th U. S. Cavalry.

The following is their report :—

First: That the 45 inch caliber ball has given the best result as to accuracy, penetration and range.

Second: That all rifle muskets and single-loading carbines used in the military service should, if practicable, be fitted for the same cartridge.

Third: That the charge for muskets should be from 65 to 70 grains of powder, and from 480 to 500 grains of lead.

Fourth: That the Board recommends the plan of alteration submitted by H. Berdan. This gives the stable breech-pin, secures the piece against premature discharge, and involves only a slight change of our present pattern of arms. The bore of our present barrel (as has been proved by experiments before the board) can be reduced to the desired caliber by reaming out the grooves and inserting a tube.

Fifth: The Board has carefully examined the various patterns of new breech-loading arms presented to it, but finds itself unable to recommend any one of them for adoption for future construction by the Government. While fully impressed with the great mechanical ingenuity displayed in many of the plans, no one offers advantages for service superior to the altered musket recommended; and therefore the Board considers that, in view of the large number of excellent muzzle-loading muskets now in store, and the slight changes of machinery necessary to make new arms on that plan, should more arms be deemed necessary, there can be no justification for an entire change of model, and the great expense consequent thereon, until some further improvement shall be devised producing more decided advantages than any of the arms not presented.

Sixth: The Board is not reticent with the opinion whether it would be best to have only magazine carbines in the cavalry service. From past experience the Board would be unwilling to dispense entirely with magazine arms, and as these arms can be used ordinarily as single-loaders (retaining a number of charges in the magazine for extraordinary occasions, free from danger of ignition in the ordinary use of the gun), the only objections to their exclusive use are the additional expense of this arm over the simple single-loader, and the greater inconvenience of the use of a lever-gun compared with some patterns of the hinge-breech gun which have been presented to the Board.

In considerat on of the above, and also of the manifest advantages of having single-loading carbines (if needed) and muskets made upon the same pat ern, except in length of barrel, the Board recommends that until a suitable plan for new muske s can be obtained, offering decided advantages over the proposed plan now recommended for altered muskets, no single-loading carbine should be constructed for the army.

The experience of the late war, as well as all experiments by this Board, prove that the Spencer magazine carbine is the best service gun of this kind yet offered. Our experiments detected a defect in the arrangement for the extractor, which has been corrected by the manufacturers, upon the suggestion of the Board, producing, in the opinion of the manufacturers themselves, a decided improvement in the arm, and one that will lessen much the liability to become disabled in the service. It is believed, however, from models and from experiments of the Board, that the magazine arm is capable of further improvement; and the Board would therefore recommend some delay in adopting definitely a pattern "for future construction of carbines for cavalry service." Should new carbines be previously needed, it is recommended that the Spencer carbine, with the modified extractor, be used.

Seventh: The Board is of opinion that for facility of handling, lightness, and accuracy of fire, it will be of advantage to reduce the length of barrel, when practicable, to not less than 33 inches, retaining the present length of bayonet; and also, that with the adoption of the metallic cartridge, the present cartridge box should be modified.

Recommendation 4th may be subject to question. We have very little faith in barrels that are reamed out to admit an interior tube. The object of this recommendation appears to be to adapt the present Springfield musket of 50-100ths caliber to a caliber of 45-100ths. The inner tube must in this case be exceedingly thin, while the barrel proper would be reduced in thickness and strength. Gen. Grant is right in endorsing on the report that "the superiority of the .45 caliber in accuracy, range, and penetration, seems to have been placed beyond a doubt, but a uniformity of caliber being so desirable, and there being such a large number of arms of calibers .50 on hand, it may be advisable to adopt this caliber."

We are not aware of the details of Mr. Berdan's plan of conversion, but have no doubt that our present rifled muskets could be converted into efficient breech-loaders more cheaply and easily than new ones could be manufactured.

Iron for Heavy Forgings.

The Detroit *Post*, in an article referring to some remarks in the Scientific American, relative to the composition and forging of heavy shafts and cranks for steamers, calls attention to the excellent quality of Lake Superior iron for this purpose, and mentions some remarkable tests which tend to show its homogeneousness and tenacity. We were always favorably impressed with the excellent qualities of this iron, from repeated examinations and the result of several experiments, but we were not aware that it possessed the qualities of tenacity, ductility, and uniform density, to so high a degree as is stated by the *Post*. This journal says :—

We believe it to be the most tenacious, uniform, durable and reliable variety of iron, for heavy forgings of the kind under discussion, readily procurable in American markets, if not the best for the purpose to be found in the world. Its tenacity and even quality are wonderful; and it is almost impossible to conceive of a steamer shaft made of Lake Superior iron breaking. It might be bent—if well forged, even at right angles, were a sufficient force applied—but it would stubbornly refuse to break. We have seen with our own eyes an inch square bar of Lake Superior iron bent double and hammered down at the bend, when perfectly cold, without even presenting a fibrous or abraded appearance, but drawing perfectly smooth and as bright as polished tin over the curve. We have also seen an inch-and-a-half round bar, having a solid head forged on each end, drawn out by tractile force like a stick of soft wax, until it was about one inch in diameter in the center, without a sign of parting, or the tearing of any fibers, or the appearance known as "brooming;" but the portion drawn out remained smooth and became as bright as a mirror. Such tenacity and uniform density are exceedingly rare in even the best brands of iron, but are among the universally known qualities of Lake Superior iron when properly forged.

Krupp's Guns.

On page 388 of our last volume we copied an article from *Engineering*, which stated that Krupp's steel guns had "burst on trial." Krupp's American agent denounces the article as "disreputable" and expresses surprise that we should have given place in the Scientific American to such malicious reports. He says in his letter to us "as to their having burst on 'trial' when 'fired to destruction,' as the phrase is, that is a matter of course; but none ever burst in service." *Engineering* does not say that any of the guns burst in service, but simply on trial, which might or might not refer to experimental trials. Our authority is usually correct in its published statements, and we do not see any cause for surprise that we should have copied the paragraph. If there is anything disreputable about it, it attaches to *Engineering* and not to the Scientific American.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Terrasphere.—Eleazar Root, Indianapolis, Ind.—This invention is designed to exhibit correctly to the eye the true motion of the earth, by means of an artificial globe revolving in a vertical circle, corresponding with the plane of the Ecliptic, around a fixed center representing the Sun. It also exhibits the diurnal revolution of the earth, on its own axis, with its satellite, the moon, connected and revolving around it. By these means are shown plainly the physical causes of all those phenomena of nature consequent upon the successive and constantly recurring changes in the relative position of the Sun, the Earth and the Moon.

Dough Mixer and Kneader.—S. J. Talbott, Milford, N. H.—This invention consists of a tapering can, having a double metallic cover, and which is pivoted in a frame by a hoop provided with trunnions and with a handle by means of which it is operated.

Swedge for Welding and Sharpening Horseshoe Toe Calks.—Peter Badore, Montpelier.—This invention has for its object to furnish swedges by the use of which the steel may be drawn to an edge quickly and uniformly for forming toe calks for horseshoes; and by means of which the calks may be sharpened and by the same operation quickly and securely welded to the shoe.

Sawmill.—E. H. Stearns, Erie, Pa.—This invention relates to several novel devices and arrangements of machinery for the purpose of simplifying and reducing the cost of construction, and operating the mill easily, saving both time and material, and performing the work better.

Weeding Hoe.—Mitchell Penz, Naugatuck, Conn.—This invention has for its object to furnish an improved weeding hoe so constructed that it may be contracted or expanded as desired, so that it may be adjusted for use when the plants are at different distances apart.

Iron Manufacture.—James Henderson, Brooklyn, N Y.—In converting cast iron into Besseme-steel, the triple compound of iron, carbon and manganese, is with great difficulty forced into the mass of metal previously treated by the pneumatic process: for the converted metal has a specific gravity, greater than the compound. Mr. Henderson has obviated this difficulty, by charging the blast furnace with a mixture of iron and manganese ores, or indeed, any of the manganiferous iron ores, such as the red oxide of zinc, and Franklinite, so that there is formed on the hearth of the furnace a molten mass of metal, alloyed with metallic manganese in such quantities that it may be run directly into a Bessemer converter and subjected to the usual process of decarbonization, with this advantage over the ordinary method, that the indispensable manganese is thoroughly incorporated, and exerts its beneficial influence from the very beginning, instead of being introduced near the end of the pneumatic process. By this mode, it is claimed that Bessemer steel can be furnished much cheaper than by the older method, and finished Bars, Rails, Plates, etc. can be produced by the same heat that melts the ores into crude or cast iron. The plan, now in successful operation in Austria, is soon to be largely introduced into this country.

Fruit Gatherer.—H. L. Scott, Flessis, N.Y.—This device consists of a basket attached to a long rod, and provided with a pair of shears which extend in an inclined position over the mouth of the basket. The shears are operated by a cord, and when the stems are severed thereby, the fruit drops into the basket, it being thus gathered from any hight without being bruised by falling to the round.

Cross-cut Sawing Machine.—Edwin Hard, Canal Dover, Ohio.—This invention has for its object to furnish a cross-cut sawing machine, so improved in construction that its operation may be more effective, convenient, and satisfactory.

Riveting of Trunks.—Walter D. Burnett, Newark, N. J.—This invention relates to a device for facilitating the riveting of bars or plates to the exterior of trunks, boxes, and other articles, and it consists in having a block covered with metal on which the trunk or box may be fitted, the block being applied and arranged in such a manner that it may, with the greatest facility, be rotated, and the bars or plates riveted to the different sides of the trunk or box.

Governor.—A. A. Henderson, Norfolk, Va.—This invention relates to a method of governing or controlling the speed of marine and other steam engines by eccentrics and cams upon revolving shafts driven by the engine, and arranged in such a manner that any variation in the speed causes them to open or close the throttle valve, thus letting on or shutting off the steam.

Tool for Cleaning Boiler Tubes.—S. Van Auken, Binghamton, N. Y.—This invention consists in a tool composed of three or more spring arms made of elastic sheet metal, and twisted so that the same will yield both ways; the outer ends of said spring arms are formed into segmental scrapers, and they are provided with cams on the inside and outside of said scrapers, whereby the operation of introducing the tool in a tube or removing it therefrom is materially facilitated.

Finishing Lasts.—Matthias Speule, Detroit, Mich.—This invention relates to a machine which is intended to finish the toes and heels of lasts, as the same are received from the last-turning machine. It consists of a vibrating head containing two adjustable clamps which are connected together, and one of which is intended to receive the pattern last, while the other receives the last to be finished. This head stands opposite to a double-spindle stock, one part of which carries the guide-wheel, and the other the cutter wheel. As the pattern last is pressed up against the guide wheel, the cutters act on the last to be finished, and the toes and heel of this last are worked down in exact conformity with the pattern last.

Life Raft.—James Murtaugh, New York City.—This invention relates to a life raft composed of two or more hollow expansible rings, one inside the other, and fastened together by cords, ropes, or other suitable means, in such a manner that a raft is obtained, which, when not inflated, can be stored away in a small compass, and which, when inflated, affords room for two or more persons, and is sufficiently buoyant to carry said persons, and enable them to sustain themselves above water even in a rough sea.

Sleigh Bells.—Abner G. Bevin, Chatham, Conn.—The object of this invention is to construct the rivet by which the bell is secured to the leather, so that the same will at once effectively hold the bell to the leather, and also prevent the bell from turning; and to so construct the whole that it will be cheap and simple and easily made.

Rag Engine.—James M. Shew, Baltimore Co., Md.—This invention relates to an improvement on rag engines, for the manufacture of paper, and consists in attaching to each end of the cutting cylinder a rotated flange or spiral scroll, for the purpose of preventing the rags from working in around the spindle, and choking the cylinder, thus materially increasing friction and wasting power, as is the case with the ordinary rag engine.

Clothespin.—T. L. Goble, Bradford, N. Y.—This clothespin consists of two jaws hinged together at one end so as to open from and close upon each other in combination with a loose sleeve or collar, so arranged upon the said jaws that by properly sliding it it will close or open the jaws, as the case may be.

Sawing Machine.—T. H. Cushing, Dover, N. Y.—This invention relates to a machine for sawing timber in curved forms, such as is used for ships, bridges, etc., etc. The invention consists of two or more reciprocating saws, rotary planers, and a bed or carriage which moves in the arc of a circle.

Cotton Cultivator.—A. K. and B. H. Foster, Hallettsville, Texas.—This invention relates to a cultivator, designed more especially for cultivating cotton, scraping the earth away from the young plants and thinning out the same. It consists of a shave or scraper composed of two parts and a reciprocating cutter operated from the driving wheel or the wheel which supports the implement.

Hydraulic Governor.—S. M. Hunter.—This invention relates to a method of regulating the quantity of water discharged upon a water wheel, or of steam for driving a steam engine, by the action of an engine operated by water, which engine shall be controlled by a common centrifugal governor, thereby causing an even and uniform speed in the machinery propelled.

Steam Valve.—James L. Mackey, Seymour, Ind.—This invention relates to a balance conical valve which is applicable to a single or double cylinder engine and which is composed of a hollow movable flag working in a sleeve which is fitted into a suitable shell that is cast solid with or otherwise rigidly attached to the steam cylinder; the play valve, the sleeve and the shell being provided with suitable steam and exhaust ports in such a manner that by giving to the play valve an oscillating motion, the steam is alternately admitted to either end of the cylinder and the desired reciprocating motion is imparted to the piston.

Clothes-washing Machine.—James Ballard, Almont, Mich.—This invention relates to a clothes-washing machine of that class in which a reciprocating corrugated rubber is used. The object is to obtain a simple clothes-washing machine which may be operated with facility and a moderate expenditure of power and which will admit of the rubber conforming or yielding to the clothes in the sudsbox however uneven or irregularly they may lie or be moved in the latter under the movement of the rubber. The invention has further for its object the arranging of the rubber in such a manner that it will perform the double function of a rubber and presser so that the clothes will be acted upon in a very efficient manner.

Gate and Door Catch.—B. D. Shaw, Beverly, Mass.—This invention consists in a catch for application to gates and doors having two pivoted catches which are operated upon by a rocking lever, which catches will automatically secure the gate when closed, and which can be operated alternately, accordingly as to whether the gate is to open toward or from the operator, for releasing the catches from a nose or pin secured to the gate post.

Self-oiling Device.—Thomas S. Brown, Poughkeepsie, N. Y.—The object of this invention is to obtain a self-oiling device for crank pins and other journals of machinery which have either a rotary or reciprocating motion, to keep the oil in the fountain in a sufficient state of agitation to cause the same to be fed to the journal in requisite quantity to ensure perfect lubrication.

Tire-tightening Device.—T. B. Mase, Milwaukie, Wis.—The object of this invention is to obtain a simple means whereby tires may be tightened on wheels, at any time when they become loose, without the aid of a smith or mechanic, and by an extremely simple and efficient arrangement of parts.

Separating Cockle from Wheat.—Samuel Heflebower, Alexandria, Va. and John Milton Reed, Loudon county, Va.—The grain is passed between a pressure roller and one or more rollers surfaced with a substance to which the cockle alone will adhere; the cockle is brushed from the rollers at a succeeding part of their revolution so as to prepare them for duty.

Trellis for Grape Vines, etc.—B. F. Elliott, Cedar Rapids, Iowa.—This invention relates more particularly to improvements in a trellis or rack for grape and other vines, patented on the 2th of July.

Saw Set.—John Clarridge, Pancoastburgh, Ohio.—This invention has for its object to furnish an improved saw set so constructed and arranged as to set a saw quickly and accurately, and which may be adjusted to set the teeth of fine or coarse saws with equal facility and accuracy, and to set them much or little as may be desired.

Knob Eyelet for Fastening Carriage Curtains.—Charles W. Acker, Watertown, N. Y.—This invention has for its object to furnish an improved eyelet for attaching carriage curtains to the knobs conveniently, easily, and quickly.

Combined Roller and Harrow.—Geo. H. Woodruff, Jerseyville, Ill.—This invention consists in combining two or more sections of field rollers with a harrow in such a manner that the roller may be removed and the harrow used, or separately employed from the harrow, so that the ground may be rolled and harrowed at the same time, or only harrowed, as may be desired and as the nature of the work shall require.

Sprinkling Attachment to Brooms.—Peter Louis, New York City.—This invention consists in the arrangement of a crescent-shaped cup provided with a socket to fit a broomstick and furnished with a vent valve in its upper and with a large number of small holes in its lower surface, in such a manner that by slipping said cup over a broom stick on the butt end of a broom and filling it with water, the water will gradually trickle down over or through the broom and a self-sprinkling broom is obtained which obviates the necessity of sprinkling previous to commencing the operation of sweeping.

Potato Digger.—Charles B. Cannon, Keokuk, Iowa.—This invention has for its object to furnish a machine by means of which potatoes may be dug, separated from the dirt, and sorted, the larger and smaller ones being deposited in separate compartments in a wagon or cart body.

Metal Loops for Tags.—Samuel B. Fay, Franklin, Pa.—The nature of this invention consists in the construction of metal loops or locks for attaching tags or labels to articles of merchandize, formed so as to pass through or over available parts of the articles to be marked.

Sawing Machine.—Washington H. Stewart, Logansport, Ind.—The nature of this invention consists in the peculiar and novel arrangement of a saw frame in combination with the saw shaft and by which the saw is made to run level and in line with the driving shaft and pitman so as to adjust and accommodate itself to different-sized logs.

Broom.—Willard P. Brooks, Fairmount, Minn.—This invention consists in the peculiar construction of the socket and in the arrangements for holding the brush and handle.

Sugar-cane Planter.—J. Eusebio Cortes, Sagua la Grande, Isle de Cuba.—This invention relates to an improvement in a sugar-cane planter by which sugar cane can be planted even and accurate and at the same time covered and the ground leveled by the same machine.

Ellipsograph.—Honestus M. Albee, Webster, Mass.—This invention consists in the arrangement of an arm provided with an adjustable point in combination with one leg of an ordinary compass, the other leg of which is constructed to receive a pencil or pen in such a manner that when the adjustable point is removed from the leg of the compass to a distance equal to the difference of the major and minor axis of the ellipse to be described and said point and leg are moved along on the two cathetí of a right-angled triangle or in the grooves of a trammel, the pen or pencil connected to the compass will describe a portion of an ellipse and by shifting the right-angled triangle and repeating the operation a complete ellipse of any desired proportion can be described.

Hide Worker.—Henry Lampert, Nunda, N. Y.—This invention consists in the arrangement of a round or convex movable beam either in the shape of a round cylinder or in parts of a cylinder of any convenient shape or size for the hides in combination with eccentrics or other suitable mechanism applied to the beam in such a manner that by the action of said eccentrics or other mechanism the beam can be raised or lowered without interfering with its rotary motion and those parts of the hide which have to be worked under the knife can be easily exposed to the action of the worker. It consists further in a worker composed of a stone or wooden scraper and a knife which are adjustable in a head in combination with a spring, crosshead, and pitman, connecting said crosshead with the eccentric wrist pin of a crank or disk in such a manner that by imparting to said disk or crank a revolving motion, the worker receives a reciprocating and a rising and falling motion causing it to act on the hide with the proper force and at the proper time. It consists, finally, in making the working block adjustable by means of a screw rod in such a manner that the scraper and the knife can be made to bear on the hide with any desired force.

Water and Fire-proof Paper.—Thomas Irving, John McNeil, Geo. W. Rich, and Cyrus J. Fay, Elwood, N. J.—This invention relates to an improvement in the manufacture of that class of paper which is used for the covering of sides and roofs of buildings or for other purposes of a similar natnre.

Steam Boilers.—Robert Bailey, Idaho City, Idaho Ter.—This invention relates to improvements in a steam boiler, and consists in constructing it in sections in such manner that it may be readily opened and taken apart for repairing or cleaning the fire flues and spaces in the different sectional parts, which fire flues and spaces are so divided and arranged as to present an immense amount of fire surface in proportion to the size and weight of the boiler, compared with ordinary boilers.

ADJUSTABLE MITER.—Peter A. Snyder, Jersey City, N. J.—The object of is invention is to construct a miter, which may be readily adjusted to any angle, and one which will correctly divide each angle into two equal parts, so that the moldings may be marked by it ready for cutting.

STEAM TRAP.—Thomas N. Davey, Jeffersonville, Ind.—The object of this invention is to automatically relieve steam cylinders, steam pipes, and all her apparatus where steam is used from condensed steam or water of consation; also to give the engineer or operator a full and easy control of the rap valve under all circumstances whether under the pressure of steam r not.

SASH FASTENING.—Benj. S. Hyers, Pekin, Ill.—The nature of this invention onsists in the peculiar construction of a friction wheel which is made to ear upon the side of a sash so as to hold it in any desired position.

HAME FASTENING.—W. J. Alexander, Manchester, Iowa.—This device is for fastening the hames upon the collar, and consists of two portions attached to the respective hames, one slipping into the other and fastening therein by the ngagement of a spring catch with recesses in the socket. The catch piece is detached from the socket by a peculiar motion, and the whole is metallic and intended to prevent the fastening from being gnawed and destroyed as is frequently the case with mule harness.

SAW MILL.—E. H. Stearns, Erie, Pa.—This invention consists in several novel devices and arrangements of machinery by which the construction of ircular saw mills is much simplified and the operation rendered more effective; and the improvements refer especially to the feeding and gigging apparatus which are made to work with great facility and exactness.

SHEEP RACK.—Byron D. Tabor, Wilson, N. Y.—This invention consists in an improved sheep rack, for the purpose of furnishing a simple and efficient feed rack, and one easily set up, and taken down for transportation or storage.

TACKLE BLOCK.—John Briggs, Louisville, Ky.—This invention consists in a novel construction of the shell of the block and in an improvement on the pin of the sheave and hook, whereby a very cheap and durable tackle block is obtained.

SAFETY CLIP.—J. Irving, New York City.—This invention consists in the arrangement of a safety clip in combination with the fifth wheel of a carriage or vehicle in such a manner that by said clip the strength of the connection is increased, and the fifth wheel is prevented from rattling.

MALT EXTRACT.—Leopold Hoff, New York City.—This invention relates to a new beverage which is derived from an extract of barley malt produced by a peculiar process and mixed with certain hygienic ingredients, whereby a compound is obtained which on account of its invigorating and heating qualities, particularly in cases of general debility and consumptive attacks may properly be termed beer of health.

REVERBERATORY FURNACE.—J. M. Whiteside, San Francisco, Cal.—This invention consists in the arrangement of a revolving stirrer to which motion is imparted by mechanical power in combination with the hearth of a reverberatory, in such a manner that the operation of stirring and moving a mass of pulverized ores while roasting or chloridizing in the reverberatory furnace is materially facilitated. The furnace in which the ore is roasted, is covered up and arranged so that all but superheated air is excluded therefrom while the same is in operation, and furthermore jets of superheated steam are injected over the ore on the hearth to facilitate the disintegration and chloridization of the same.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

R., N. Y. asks if there is any material, whether metal or fluid, which is expanded or contracted by the daily changes of light and darkness.

W. L., of Wis.—For reply to your question on the pressure on slide valves we refer you to "Watson's Modern Practice" published by H. C. Baird, 406 Walnut street, Philadelphia. The reply would occupy too much room in our columns, and we have published it several times.

F. S. B., of N. Y.—To make a lacquer for tin to resemble brass, make a varnish by dissolving shellac in alcohol and color it with turmeric to suit your eye. Make the tin clean and apply with a brush.

S. C. D., of Tenn.—The knives of a wood-planing machine can be ground true and regular on an even grindstone, by resting the backs against a cleat secured across the frame at a proper distance from the stone to form the right bevel. Machines are, however, built at a small cost which do the work automatically better than it can be done by hand.

J. W. M., of N. Y., asks if a man could jump from the platform of one locomotive to that of another, the two engines running on parallel tracks, eight feet apart, at the equal rate of sixty miles per hour. We reply: Relative to each other and the man jumping the engines are at rest. Except for the current of wind, sixty miles per hour, a man could jump across with no more effort than from point to point at rest.

W. H. S., of Ill.—We do not think that either the caloric or the gas engine, as manufactured, is adapted to propel carriages over rails or on common roads. The manufacturers of these machines will give you the facts.

H. R., of N. Y.—The benefits or disadvantages of jacketing engine cylinders with steam is still a disputed question. Hopkinson says that where the steam is admitted from the boiler to the jacket, thence to the cylinder proper, an increased amount of cooling surface is exposed, lowering the force of the active steam and occasioning loss. He prefers lagging the cylinder with felt and wood. Bourne, on the contrary, believes there is a saving of steam and fuel by this style of steam jacketing. Our own opinion is that to really effect a saving by a steam jacket, the jacket should be connected with the boiler by an independent pipe and the steam thus used not admitted to the working cylinder. The steam in the outer case would then be higher than that in the cylinder, as it would not lose, as that in the cylinder, by expansion. In this case, the jacket must be strong enough to sustain the full boiler pressure. Jacketing with the exhaust steam we believe to be the sheerest folly.

C. A. G., of N. Y.—If you are successful in completing an engine without any exhaust, as you propose, it is not probable any patent will interfere with you. But what will you do with your steam when you have used it? Condense it and you have a low pressure engine.

M., of Pa.—Our reply to the question of the relative power of engines with different lengths of stroke, or crank, was correct. The *power* exerted is the same in either case. *Power* in this connection being made up of force or pressure exerted, time occupied and steam expended. Only the first condition, or element, seems to have entered into your calculations. In that reply, you will see that we said, "the reason for using different lengths of stroke for cylinders of a common diameter is adaptability to the kind of work to be performed." It may be that your locomotive engineers believe that less power is exerted in starting a train with an engine having long cranks than with one having short cranks. This is apparently, but not really, true. It requires more steam and more time to push a piston three feet than it does to push one eighteen inches, the diameter of cylinders being equal. You cannot get velocity, i. e. expend time, without expending force. Test it on your grindstone with weights.

D. A., of Pa.—One of the minerals you send is a good sample of umber; it is worth a chemical examination. The other specimens are indicative of a coal region; one of them resembles plumbago but is a species of coal.

H. A. S., of Me.—Petrifying wood for razor hones is a new art to us. Silicious matter may be introduced into the body of wood by soaking it first in a weak solution of soluble glass, and then in an acid.

E. F. M., of Ct.—France is the only country that requires a patented invention to be manufactured within its dominions under forfeiture of the right.

J. F. M., of ——.—You have no right to retain the patterns delivered to you by parties who employed you to make castings for them.

D. F. A., of Pa.—The composition of the Zopissa cement has not been made public, and we are not aware that any samples of the article have been brought to the United States. As soon as we procure further information on the subject we shall hasten to give it to the public.

H. O. P., of Mass., desires us to publish "the best methods of finding and recognizing the standard qualities of whale, lard and coal oils." It is not convenient for us just now to prepare a suitable article on the subject. Perhaps some of our readers will furnish the information.

C. A. B., of ——.—To magnetize a steel bar by means of an electro-magnet:—bring one of the poles of the electro-magnet on the center of the bar, and then pressing the two in contact, slide the electro-magnet to one extremity of the bar; perform the same manipulation with the other pole of the electro-magnet on the other half of the bar. The process is to be repeated until the bar becomes fully saturated. The most powerful magnets are obtained by combining thin bars which have previously been magnetized. Magnets should be made of high steel of the best quality, and highly tempered.

SUNDRY ANSWERS.—B. N.—Study our book for Inventors and Mechanics, 25 cts., to know how to calculate horse-power of an engine.—Young Mechanic is informed that minors can obtain patents. See same book.—J. H.—You need not sig new papers.—F. H. M.—You will find a method for attaching rubber o leather in back numbers SCIENTIFIC AMERICAN.—E. S. C.—As to vinegar manufacture, write to H. C. Baird, Philadelphia, Pa., for book. C. P.—ditto. We do not know the parties.—G. H. W.—Rubber can be made snow white. There is a patent for the process. The Goodyear patent for the idea of vulcanizing rubber has expired.—H. B.—No person can use a patented article without the consent of the patentee. It is not new to cement the ends of slates for the purpose you propose. It is doubtful whether the use of the slats would entitle you to a patent. But you can try.—A. P. P. will probably find that the patented jack is slightly different from the one in use. The patent doubtless rests upon the difference.—F. S. C.—Your strap arrangement for coaches can probably be patented.—J. H.—Consult Bourne's book on the steam engine for rule as to lever for safety valve.—D. H. H.—There are ice machines in operation at New Orleans, we believe.—E. G. B.—The "Northern Lights" are supposed to be due to electrical currents.—G. L.—We are not acquainted with the merits of the tanning extract to which you allude nor the company.—D. H. H.—You and your friend will find the nature of the late showering meteors described in recent numbers of SCIENTIFIC AMERICAN.—A. T. The merits of both engines have been discussed in our paper.—J. H. D.—We do not know of any work on boat building.—G. Nearly all the best barrel machines have the toothed cylinder.—W. A. M.—Steam wagons can be successfully used on good roads.—J. A. E.—For best saws and engines see advertisements.—M. B. wants somebody to tell him how to make rings from gold dollars. He has been making one by punching the dollar and hammering the exterior; but he says this leaves a rough hard crease in the middle, and how to soften it he does not know.—J. K. D.—The joint owners of a patent are not partners, and each has the right to make, use, and sell, without accounting to the other.—J. K.—Rebs are now only required to swear that they are citizens of the United States. The oath is the same that all persons are required to take on applying for a patent. To swear that you are a citizen of the Confederate States wont do. The holder of the assignment enjoys the rights of the patentee.

Business and Personal

The charge for insertion under this head is 50 cents a line.

S. Kalfus, 170 Bleecker, N. Y., has for sale ($60), SCIENTIFIC AMERICAN from 1848 up.

J. B. Wilbur, of Johnstown, Pa., desires to know how to remove the scale from new rolled wrought iron. Acid does not answer.

Geo. Francis, Box. No. 4658, New York City, wishes to know where machinery for plaiting or folding shirt bosoms can be purchased.

Jos. C. Haines Lancaster, Pa., wishes to correspond with an author capable of writing on the following subject, "The necessity of every person to be able to hold his horse."

Makers of Ross' Patent Portable Flouring Mill, please address American Tablet Co., Boston, Mass.

J. T. Middleton, New London, Conn., boxes wishes to purchase a first class treadmill horse-power machine.

The best hay-packing and baling press, for field use, is asked for, with prices, by R. Tattershall, Beloit, Wis.

Parkestein.—H. W. Ladd, Philadelphia, asks where it is manufactured.

Small printing press suitable for druggists, with type, etc. wanted by H. Kroon & Son, North Bennington, Vt.

A. Krauss, Tarr Farm, Pa., wants to know where he can get one of them whistles that sounds like the squeak of a pig, warbles like a canary bird, etc.

A. Tavarts, Kingston, Jamaica, W. I., desires to obtain a machine for making paper boxes for matches (to hold 50 matches). Also wishes for improved machinery for matches, and a small, economical, easily-managed steam engine.

G. Wolf Holste, Neshannock Falls, Pa., wishes to know whether Dale's Patent Loom will weave fancy goods. Also whether the motion is simple and substantial.

Information is wanted concerning the best kinds of work suited for execution by convicts in a penitentiary, where coal, wood, iron, leather, etc., are abundant. Also wanted one or more foremen fully competent to direct such labor. Communicate with H. J. Phares, Selma, Ala.

Jno. Selick, Lewistown, Pa., wishes the address of parties who will manufacture an improved cast-iron apple parer, corer and quarterer.

Horse Hay-Fork Pullies, D. M. Garrett, Shelly, Ohio.

Henry Johnston, Gloucester, Mass., desires to know how to make a cement that will stand a sudden heat and that will set as hard as stone. Wants it for molds, to be repeatedly used.

J. M. Goff, Ionia, Ill., desires information where he can obtain flat, untempered, steel wire, three-eighths inch wide, one-sixteenth thick, price per 100 lbs.

Any one having on hand or who will make rivet machines of approved patterns can find a cash purchaser, by addressing with description, price, etc. "Rivets" P. O., Buffalo, N. Y.

N. Spencer Thomas, of Painted Post, N. Y. writes—"We now have a club for SCIENTIFIC AMERICAN in this village, already numbering eleven or twelve against two heretofore sent to this P. O." Similarly encouraging letters are pouring in from all directions.

E. C. R. of Va., writes wishing the cost of an engraving of a new invention he has just patented, and adds, "I proposed taking my patent out through your office, but was advised to make my application direct to the Patent Office. How much trouble I have had, you may well know. I assure you I am heartily sick of *direct* applications, and shall in future do my business through your house." Mr. R.'s experience is the same as that of nearly all others who attempt to obtain patents on home-made papers, as our large business in re-preparing papers and prosecuting cases which have been refused by the Patent Office, bears testimony.

☞ Manufacturers of improved machinery of every kind, Steam, Mining, Agricultural, Wood Working, Manufacturing, will find it a great advantage to keep a short permanent advertisement in the SCIENTIFIC AMERICAN. This paper circulates extensively in all of the States, and doubtless is more thoroughly read by mechanical people than any other publication. Advertisements published in the SCIENTIFIC AMERICAN, costing only a small sum, have been known, in many instances, to bring back orders amounting to thousands of dollars.

EXTENSION NOTICES.

William Coleman and Stephen G. Coleman, of Providence, R. I., having petitioned for the extension of a patent granted to them the 15th day of March, 1853, for an improvement in supporting the topping-lift and peak-halyard block of sail vessels, for seven years from the expiration of said patent, which takes place on the 15th day of March, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 25th day of February next.

Robert Waddell, of Liverpool, Kingdom of Great Britain, having petitioned for the extension of a patent granted to him the 6th day of June, 1854, antedated to April 27th, 1853, and dated in England, the 2nd of March, 1853, for an improvement in balancing slide valves of steam engines, for seven years from the expiration of said patent, which takes place on the 27th day of April, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of February next.

James E. A. Gibbs, of "Steel's Tavern," Virginia, having petitioned for the extension of a patent granted to him the 21st day of February, 1860, for an improvement in design for a sewing machine, for seven years from the expiration of said patent, which takes place on the 21st day of February, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 11th day of February next.

Moses Marshall, of Lowell, Mass., having petitioned for the extension of a patent granted to him the 15th day of March, 1853, for an improvement in knitting machines, for seven years from the expiration of said patent, which take place on the 15th day of March, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 25th day of February next.

IMPORTANT LAW CASE---FIRE-PROOF SAFES.

WM. A. SANBORN vs. SILAS C. HERRING, ET. AL.

N. Y. Supreme Court—Before Judge Barnard and a Jury.

The facts in this case are briefly as follows.

The plaintiff in 1862, was an express and collecting agent and coal dealer in Sterling, Illinois, and in 1865 became a banker.

In March 1862 he bought of defendant's agent in Chicago one of their fire proof safes with a Banker's box inside at an entire cost of $300. The price of the box if sold separate would have been $85. The safe and Box were sent to plaintiff at Sterling, and placed in his office, situated in a warehouse about one hundred feet from an inhabited dwelling, and by the side of a R. R. track. The warehouse was built of wood, and had a common wooden door, with glass windows without shutters.

On the night of August 27, 1865 the ware house was entered by burglars and the safe robbed, as plaintiff claims, of $26,405.

The inside box was about 1½ inches thick, made of three different kinds of metal, and secured by Hall's lock. The testimony of one of the burglars was taken, who swore that the safe and box were opened by the use of chisels, a hammer, a pick axe, a crow bar and sledge, he cars passed by. The sledge seems to have done the final work by driving in the spindle of the lock, thus giving access to the revolving tumblers.

The plaintiff brings this suit for the value of the contents, on the alleged ground, 1st, that the safe was warranted to him to be perfectly burglar-proof, and 2d, that as he made known his business, and that he wanted a secure safe, it was not as strong a safe as he ought to have had, and therefore that he had an implied as well as actual warranty and should recover his loss.

The defendants claim on their side that they never warrant safes perfectly burglar-proof, or that when exposed in warehouses or remote dwellings where burglars can undisturbed use any tools or force they please, they will be secure, and that there was no direct or implied warranty in this case.

They also claim that the safe in question was one of their cheapest make and had on their cheapest lock—that plaintiff selected it from a stock of about 100 safes and took the lower priced and less secure safe after being shown the higher priced and more secure ones, on the ground that he did not wish to pay more than $300.

Further that he ought to have had one of their best safes and kept it in a more secure place, for the amount of money he had in it, and thereby he was negligent, not using ordinary care. Such in brief are the leading facts and claims of the parties, and each side made out a very good case.

The case has occupied the Court and Jury for a week, and the judge in an able charge, among other things submitted the question of warranty substantially as follows.

If there was a warranty it must have been one of these three kinds.

1st. That the safe was absolutely burglar-proof, so that no amount of force could under any circumstances open it. If you find this, there will be no damage for its breach, for there is no data to fix the damage. No safe can be made but what can be opened, and in this view you will find for defendants.

2nd. That the safe was the best one made by defendants, and if not, then you will find for plaintiff the difference in price between this safe and their best safe.

3rd. That the safe was as well made, and of as good material, and as capable of resisting burglars as safes of the class and price to which it belongs usually are; and if the safe in question did not come up to this, you will find for the plaintiff the difference in value between the two safes.

4th. You will find for the plaintiff the amount claimed by him in case you find that defendants falsely and fraudulently represented the safe to be their best when it was not; and that it would resist any and all attacks of burglars, knowing it would not, and that plaintiff believed such statements and was thereby induced to purchase the safe.

5th. The authority of the agent to sell the safe, carries with it the authority to warrant.

The jury being unable to agree were discharged.

For plaintiff, Judge Edmonds & Barlow & Hyatt.

For defendants, S. P. Nash & H. M. Needham.

The only case ever tried of a similar kind was brought by Walker, one of the principal jewelers of London, against Milner, the principal safe manufacturer. Walker's safe was robbed of some £5000 in jewels, and he brought the suit before the Queen's bench against Milner for their value, alleging a warranty. The case was tried about a year since, and found for the defendant.

The final result of this trial is looked for with interest, for in the language of the Judge "it involves millions of money, and the labor of thousands of men."

No man will buy safes if they furnish no security, and no man will make them if made liable for the contents.

Rights of Partial Assignee of a Patent to a Reissue.

IN May, 1863, Andrew Whitely, assignee of a sectional interest in a patent granted to Jonathan Haines, on the 4th September, 1855, applied to the Commissioner of Patents for a reissue of said patent, which was denied examination on the ground that the law did not authorize the Commissioner to grant a reissue to an assignee, unless said assignee held the entire right to the patent. Upon the application of Whitely the Supreme Court of the District of Columbia granted a peremptory mandamus, commanding the Commissioner to refer the case to the proper examiner; whereupon the case was appealed by the Commissioner to the United States Supreme Court, which will soon settle an important question, viz: whether the assignee of a portion of a patent can surrender said patent and obtain a reissue.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,578.—HOISTING APPARATUS AND CARS FOR MINING PURPOSES.—George Williams Sterling, Colorado. Oct. 6th, 1866.

2,590.—ATMOSPHERIC ENGINES.—David Dick, Mealville, Pa. Oct. 8th, 1866.

2,594.—BRICK-MAKING MACHINES.—Antoine McNair, New York City. Oct. 8th, 1866.

2,626.—APPARATUS FOR OPENING AND CLEANING WOOL AND OTHER FIBROUS MATERIALS.—Charles G. Sargent, Granitville, Mass. Oct. 11th, 1866.

2,630.—SEWING MACHINES.—Elias Howe, Jr., New York City. Oct. 11th, 1866.

2,666.—APPARATUS FOR TAPPING BEER CASKS AND OTHER LIKE VESSELS CONTAINING LIQUIDS UNDER PRESSURE.—Thomas Marsh, Central Falls, R. I. Oct. 16th, 1866.

2,674.—MANUFACTURE OF REFLECTORS.—William H. Winder, New York City. Oct. 16th, 1866.

2,704. TYPE SETTING MACHINE.—Augustus Corey and John McM. Harper, both of Philadelphia, Pa. Oct. 19th, 1866.

2,710.—POWER LOOMS.—Erastus B. Bigelon, Boston, Mass. Oct. 19th, 1866.

2,714.—MACHINERY FOR MAKING PINS AND NEEDLES.—Orin L. Hopson and Heman P. Brooks, Waterbury Ct. Oct. 20th, 1866.

2,730.—CONSTRUCTION AND ARRANGEMENT OF STEAM BOILERS, AND MEANS FOR COLLECTING SEDIMENT OR DEPOSIT THEREIN.—Joseph A. Miller, New York City. Oct. 22 nd, 1866.

2,726.—FASTENING FOR BALING BANDS.—Robert Dillon, New York City. Oct. 22nd, 1866.

2,728.—PAPER MACHINE.—Richard Smith of Sherbrooke, C. E., and Oliver Ellsworth of Boston. Oct. 23rd, 1866.

2,754.—MANUFACTURE OF PLOUGHS.—Collins Company of Hartford Ct. Oct. 25th, 1866.

2,805.—CONSTRUCTION OF STEAM BOILERS.—Robert Bailey, Idaho City, Idaho. Oct. 30th, 1866.

2,898.—BRAKE FOR RAILWAY CARRIAGES.—Aaron Hickey, Joseph B. Birdsell and Varium O. Birdsell, all of South Bend, Indiana. Nov. 7th 1866.

2,900.—PROCESS FOR PRODUCING PICTURES, ORNAMENTAL DESIGNS, LETTERS, CHARACTERS OR FIGURES ON MARBLE AND OTHER CALCAREOUS STONES.—Asa Hill, Norwalk, Ct. Nov. 7th, 1866.

2,932.—INSTRUMENTS FOR TRANSMITTING TELEGRAMS BETWEEN REMOTE PLACES, ESPECIALLY ADAPTED FOR SUBMARINE AND SUBTERRANEAN LINES OF COMMUNICATION.—George Little, New York City. Nov. 10th, 1866.

2,974.—APPLICATION OF BEDSTEADS TO APARTMENTS.—Julia P. Brown Mass. Nov. 13th, 1866.