Notes and Queries

R. H., of N. Y.—We notice your letter in relation to the article on the slide valve, and the criticisms thereon. Also your inclosed tracing. You are correct in one point, which is, that in the first diagram the eccentric is on the upper side, when in order to turn the crank as the arrow points it should be on the lower. This is not a material difference, as the main object was to show the position of the eccentric with relation to the crank. In the second diagram the same position is shown, as we well know, and is there pointed out as an error purposely. The tracing of the valve and eccentric sent is a fancy sketch, which shows nothing except that the parts in question, as you have drawn them, are wrong, and would never work. If you will take the trouble to go on board a steamer you can satisfy yourself by observation of the correctness of our article.

B. C., of Del.—There are only two kinds of primers used in artillery service—friction and percussion. A percussion primer is a quill full of fine powder, capped by a percussion wafer made of mealed powder and fulminate of mercury. A friction primer is a tube full of powder, with a spur on top full of a composition that explodes by friction, and is set off by a wire pulled through it by a lanyard or rope.

J. A. J., of Ill.—In summer the sun rises north of east and sets north of west. For his yearly track through the heavens see a celestial globe.

T. M., of Conn.—A correspondent puts the following query:—"Suppose the piston in the middle of the cylinder, is there any more steam room on one side than the other? I should say not." You would be in error, then for the capacity of the upper side, supposing the engine to be vertical is less than the lower by the diameter and length of the piston rod in it.

C. H. B., of Mass.—Windows are crystallized, or made to imitate ground glass, by dissolving epsom salts in hot beer or a weak solution of gum arabic. You can make any pattern or border you please, by cutting out a design on a sheet of pasteboard, and rubbing the design with a damp cloth.

L. W., of N. Y.—One kind of toilet rouge for the complexion is made by powdering isinglass, or "mica," and coloring the same with carmine.

B. P., of Ill.—Rupert's drops are simply melted glass dropped into water. They form a bulb like a pear, with a stem. The thick end may be struck with a hammer without injury, but if you break the tail the whole affair will explode.

J. R., of N. J.—The density of steam depends upon the pressure, and if the steam is saturated—not superheated—the pressure bears a constant relation to the temperature. On page No. 48 of our last volume you will find a table of densities of saturated steam at various temperatures, from 136° to 288°. At 136·77° a pound of steam fills a space of 132·6 cubic feet; at 242·90°, a space of 15·11 feet; at 288·25°, a space of 7·202 feet.

J. D. H., of Ill.—Find illustration of apparatus for distilling spirits of turpentine from wood on page 24, Vol. XI. It was invented by Seth L. Cole, Burlington, Vt.

D L., of Pa.—Several different machines for mining coal have been described in the English papers, but we do not know that any of them has been practically successful. They were all designed for bituminous coal.

A. P., of N. Y.—You ask us to tell you all about making rods to find mines in the earth. We do so with pleasure; they are all humbug.

Q. B. S. M., of Md.—Any good treatise on geometry will give you the information about the cycloid.

A. A., of N. Y.—It is quite common for different persons to have the same ideas. Your experience on this point will probably prove valuable to you.

D. W., of Ill.—Your specimens are common quartz, of no value whatever.

G. W. J., of Me.—A Blanchard lathe will make your toy boat complete, from stem to stern, out of a single block. Of the value of such a trade you must be the judge.

R. G. N., of Wis.—You can determine the altitude of the sun on land by means of a quadrant and an artificial horizon. For the arrangement of the latter, consult a book on navigation.

C. B., of Mass.—For Patent Report apply to your M. C. Patentees are not entitled to copies. You may get one as a favor.

A. A. H., of Me.—There is no cement in the world that will line a revolver cylinder, that is worn out, so as to make it useful again.

W. E. C., of Conn.—We have no means of judging positively what amount of fuel you will save by a heater, but the economy will be great—certainly 10 per cent. You can inject hot water to your boilers with a common pump, provided the same is so arranged that the feed water flows into it. Take a piece of square rubber, a quarter of an inch less than your stuffing box, wind this with cotton yarn—lamp wick—until the gasket so made fits the stuffing box; cut it in lengths, so that it will meet at the ends, and pack the valve stem with it. A piece of lead pipe, with a piece of hemp gasket run through it, is a good thing to put in the bottom of the piston-rod stuffing box. The pipe must be hammered square first. Put a common hemp gasket over it.

C. C. B., of Pa.—An idea is not patentable unless it takes some palpable form, as in a machine, a design or a new process. Your project for operating balloons by ropes—hauling them down when they reach a certain altitude—has been practiced many times.

W. E. S., of Ind.—To make matches consult Vol. XII., where you will find a variety of recipes for the purpose. We are called upon sometimes to publish the same recipe an unreasonable number of times.

Correspondence

Queries on Belts Answered.

MESSRS. EDITORS:—I have read with much interest the various articles relative to belts. I have known of power being let by the inch of belt running 800 feet per minute, which is a poor way of letting power for the landlord. I have charge of an engine that runs 40-horse power. It has worked as high as 65-horse power, by the rule of 33,000 pounds one foot high per minute with the same width belt, viz., 16 inches. It runs 1,600 feet per minute, which would make 32-horse power according to theory, but practice shows double this power.

I submit the following answers to questions concerning belts in your last issue:—

In my experience I have found that a double belt would do the work with ease that a single one of the same width could not do. Mr. Arnold's plan of running two single belts, one over the other, is new to me, but there is reason in it.

Belts that are soft on one side get crooked, so that in running they go nearly off the pulley, when the resistance of the machine that is driven causes the belt to slip off.

I never knew of a belt that did not run on a tight and loose pulley to twist. Some machinists make the tight pulley a little larger than the loose, so as to have a tight belt. Such a pulley is almost sure to twist the belt, especially if there is a space between the two, and the shipper is very near the pulley.

Opinion is pretty equally divided on which side out the belt should be run. A belt will drive more on the hair side. I think it will wear longer on the flesh side, as the quality grows better as it wears from the flesh to the outside.

Nothing in my experience is so good for belts as neat's foot oil, and but little of that.

A straight-faced pulley is much better than a crowned one. A crowned pulley keeps an unequal tension on the middle and edges of the belt. Crowned pulleys are only useful, in my opinion, to unskillful millwrights.

Lacings crossed on the inside are more liable to cut on each other by the pressure on the pulley.

New York, July 20, 1865. A. M. W.

Tempering Mill Picks.

MESSRS. EDITORS:—In your journal of July 8th a correspondent wishes you to publish what you know about tempering mill picks. As he does not wish to pay for any one's experience, I will give mine gratis. A mill pick should be of the first quality of cast-steel, and should not be overheated; heat of a charcoal fire is better than stone coal. If you use stone coal burn out the sulphur before heating the pick. Heat the point and mass of the pick a straw color; sharpen and refine by dipping your hammer into water, and hammer until nearly cold; heat repeatedly if necessary; sharpen both ends before tempering. To temper, heat very slowly and uniformly; heat to a light cherry red or dark straw; temper in a solution, say, to two gallons of clean water add half pound of alum, one ounce of saltpeter dissolved; then add as much clean salt as will dissolve; dip the point in the mixture as far up as you wish to temper; move it around until sufficiently cool, then rub the point briskly in the scales on the anvil block, then plunge the pick in cool water before the temper runs down. If properly done you will have as good a pick as you wish for.

A MILLER OF THIRTY YEARS' EXPERIENCE.
Wiscay, Alleghany Co., N. Y.

The Main Spring Question.

MESSRS. EDITORS:—On page 36, present volume, in the article on "Main Springs," etc., it appears to me that your correspondent is increasing, rather than diminishing, the liability of the main springs to break. If the spring is thicker in the center, or raised, as he says, having to bend around the arbor and itself, it would have the tendency to fray itself to pieces by the center being the larger and the sides the smaller arc of a circle. The same may be said of the flat spring; that the outside of a spring is a larger arc of a circle than the inner, by the difference of the thickness of the spring, but in the proposed spring it is increased by the difference in addition to the thickness by the hight that the center is raised. The proper spring would be stronger, but would, I think, possess this additional cause of self-destruction. My observation is that the changes of the wind have more to do with breaking main springs than any thing else; let the wind suddenly change from north or northwest to east or southeast and I expect and usually find a harvest of watches with broken main springs, those that have been in ten, fifteen, or twenty years, equally as well as those that have been in only as many days. And it does not make any difference, either, that the watch was in the pocket or hung up at the time of the change of wind. Another cause of broken main springs is, the sultry weather of dog days, in August, when nearly one-half of our work is to repair watches with the spring broken.

I do not know what connection there is between a change of wind and a main spring, but my own observation and that of other watchmakers of large experience confirm the above remarks. The breaking of the main spring is the lesser evil, the breaking of the center pinion, which so frequently follows that of the spring, is the greater; if by some means that could be prevented it would be of more benefit.

A friend has suggested another source of the breaking of springs—thunder storms, when it is not unusual to have a number break, hanging on the board. FRANCIS STOWELL.

A Problem of Raising Weights.

MESSRS. EDITORS:—Can you tell me what will be the constant strain on a rope raising a weight of 3,000 pounds, ten feet per second, perpendicularly?

Also, what is the percentage of loss of power in the crank, in changing the reciprocating motion of a piston to the rotary motion of a shaft?

What authority can you name to me which treats of these subjects plainly and simply?

C. H. R.

New York, July 16, 1865.

[The strain on the rope is increased beyond that of the weight only while the velocity of the weight is increasing; after a velocity of 10 feet per second has been imparted to the weight then to maintain this requires only the strain of 3,000 pounds. The increased strain, while the velocity is being given, depends on the rapidity with which the velocity is imparted. To impart a velocity of 32 feet in the course of one second requires an additional strain just equal to that required to sustain the weight. You will find this problem fully discussed in "Bartlett's Mechanics."

The loss of power in changing reciprocating to rotary motion by the crank results only from the increased friction; the amount of the friction depends of course upon the material of which the bearings are made, the perfection of the workmanship and the quality of the lubricator. The best treatise on friction is to be found in "Morin's Mechanics."—EDS.

Noise an Indication of Rain.

MESSRS. EDITORS:—Will you explain through your paper why sound travels better just before a storm? People living ten or fifteen miles from a railroad on distinctly hearing the cars, exclaim, "It's going to rain." I. T. E.

Grand Rapids, Mich., July 15, 1865,

[The distance at which sounds can be heard depends much on the state of the atmosphere; but if you live north or west from a railroad, you would hear the cars more distinctly when the wind was from the south or east, and that wind would be likely to bring rain.—EDS.

The Crank and Eccentric.

MESSRS. EDITORS:—I have repeatedly seen statements in your paper to the effect that the crank and eccentric were always at right angles to each, or near it. This is not so; in some cases the crank is with the eccentric, as in a beam engine for instance. I think this statement should be corrected in your next issue. G. W. R.

Mystic Bridge, Conn.

[We do not remember to have stated that the eccentric was always at right angles with the crank, because we know better; if we did it was an error. We have said, however, that in most cases the eccen-

tric was at right angles with the crank, as it is. Individuals can set their doubts at rest on this point by looking at any locomotive, horizontal or vertical engine. The illustration of the beam engine is not a happy one, for with a long toe cut-off the lead, or what amounts to it, the travel of the toe before it touches the lifter is so great that the throw of the eccentric is nearly with the crank; but for this lead the steam eccentric would be where the exhaust eccentric on the other shaft opposite it is nearly at right angles with the crank.

We also said in the article on "How to set a Slide Valve," that levers made no difference in the relative positions of the crank and eccentric. This assertion has been criticised by correspondents, but, unless our eyes deceive us, it is quite correct, for we have taken pains since writing that article to examine working drawings of oscillating engines with poppet valves, side lever engines, steeple engines, locomotives and table engines, and we find that, with but one exception, where the valve is worked by a rack and pinion, the diagrams published are correct as regards the relative position of the crank and eccentric.—EDS.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Machine for Refitting Stop Valves.—The valves of that class commonly known under the term of "globe valves," are usually made with conical valves secured to a screw spindle and fitting into a conical seat. If a valve of this class becomes leaky, the only way to refit the same, heretofore, has been by regrinding, or, if that operation was insufficient or too slow, by unscrewing the stop valve from its connecting pipes and sending it to the shop, where it would be refitted in the turning lathe or with the proper tools. Either of these operations causes much loss of time and money. A simple and effective device, by which the operation of refitting said stop valves could be carried out in a short time, and without disconnecting the valves from the pipes, has been a desideratum which will be hailed with delight by everybody who is troubled with leaky valves. The device which forms the subject matter of the present invention, and which is intended to fill the want above pointed out, consists of two parts—one for refitting the valves and the other for refitting the seats. The former consists of a conical concave mill made in the precise form which the valve is to have, and provided with a yielding internal center, in combination with suitable bearings, two for said concave mill and one or more for an adjustable center, in such a manner that by removing the valve from the seat and placing it between the adjustable and the yielding center it is at once in the proper position to be acted upon by the concave mill, and a few revolutions of said concave mill, imparted to it by an ordinary ratchet brace, or any other suitable means, produce the desired effect on the valve and bring it in the requisite shape to fit into its seat. The part for refitting the seats consists of a conical mill or reamer with a cylindrical stem, to be used in combination with a guide, which is made to take the place of the stuffing box and nut through which the valve spindle passes, in such a manner that by removing said box with the valve and valve spindle, and inserting therefor the conical mill and its guide, a few revolutions given to said mill will bring the seat in the proper shape, the whole operation being performed without removing the stop valve from its connecting pipes. The inventor of the above device is Samuel Wing, of Monson, Mass. Geo. R. Topliff, of 60 Pine street, New York (joint assignee), may be addressed for further information.

Adding Machine.—This invention consists in the employment of a revolving disk, marked on its rim with a series of figures, commencing at 1 and ending at 100, or any other figure, and provided with cavities to receive a pin, by means of which said disk can be rotated, and with a helical or cam groove in its face, to operate in combination with a stationary abutment, and with a hinged index and stationary dial, marked with figures from 1 to 100 near its circumference, and with other figures, from 1 to 16, more or less, on the sides of a segmental slot in which the index plays, in such a manner that by inserting a pin in one of the cavities opposite to any desirable figure on the circumference of the dial the revolving disk can be turned on its axis for a distance equivalent to the figure which was opposite the respective cavity, and, at the same time, the index moves in the cam groove, and the figure in question is registered; and, by repeating the operation with the same or other figures, such figures are added up and the sum regis ered on the dial and disk. T. T. Strode, of Mortonville, Pa., is the inventor.

Safety Valve for Steam Boilers.—This invention consists in operating two or more valves on the same lever, said valves being held closed by the action of a weight or spring, in such a manner that when the pressure of the steam rises beyond the desired point the several valves open simultaneously, and the combined areas of the openings thereby obtained for the escape of the steam is greater than that of a safety valve of the ordinary construction; the invention consists, also, in an adjustable fulcrum, applied in combination with the lever, from which two or more valves are operated, and with a weight or spring holding said valves closed against the action of the steam in such a manner that the time when the steam blows off is regulated by shifting the fulcrum instead of by a change in the power exerted by the spring or weight to hold the valves in their seats. S. G. Barker, of Dunmore, Pa., is the inventor.

Calendar Clock.—This invention consists in a reciprocating or oscillating slide, marked with the names of the months, commencing with March and ending with February, and provided with openings opposite to said names, and with a projection which bears on a wheel, the face of which is marked with figures, from 1 to 31, to indicate the days of the months, and which is provided with eleven concentric grooves and oblique channels leading from the periphery of the wheel to the first groove, from the first groove to the second, and so forth, in such a manner that whenever the projection of the movable slide comes opposite to one of these channels said slide drops or moves and a new name of a month is brought in view, and opposite to the figures on the rim of the month wheel. The time when the slide changes from one groove to the other is determined by the position of the communicating channels, which corresponds to the number of days of the different months. T. T. Strode, of Mortonville, Pa., is the inventor.

Machine for Rounding and Polishing Balls, Etc.—This invention consists of a machine composed of four, more or less, longitudinally sliding rotary mandrels, radiating from a common center, and provided with chucks at their inner ends, in combination with suitable mechanism to force these chucks alternately up against the ball to be turned or ground, and with a milling tool or grinding wheel, in such a manner that two of the chucks will clamp the ball at a time, and the ball is thereby turned in either direction, while the grinding wheel or milling tool is held in contact with the surface of the ball by means of one or more screws or by an adjustable weight. The force with which the grinding wheel or tool is forced against the surface of the ball can thus be regulated at pleasure. The position of the revolving chucks, and the time when the same grasp the ball, are governed by a double cam and by weights or springs, and said chucks are so shaped that they grasp the general surface of the ball, and that cavities and projections occurring on the surface of said ball will not be able to disturb the correct central position of the same. John L. Knowlton, of Philadelphia, Pa., is the inventor.

Padlock.—This invention relates to a padlock of that class in which the shackle engages or locks itself when forced down into the lock. The invention consists in a novel means for throwing the shackle out of the lock when liberated from a catch and bolt which holds or locks it, and for retaining or holding the catch and bolt, when the shackle is out from the lock, in proper position to receive the shackle when the latter is pressed or forced into the lock. The invention further consists in a novel arrangement of the means aforesaid with the catch, which operates in connection with the bolt for locking or securing the shackle. H. Jackson, of New York City, is the inventor.

Lock.—This invention relates to a lock for pianofortes, sewing-machine cases, and articles generally having hinged lids. The invention consists in the employment of two bolts of segment form, provided with shanks and connected with a tumbler in such a manner that the bolts will, as the tumbler is operated through the medium of a key, work in the path of a circle in and out from the lock case, in order to lock or unlock the article to which the lock is applied. E. L. Gaylord, of Terryville, Conn., is the inventor.

Drills for Oil and Other Wells.—This invention consists in making a drill, for boring wells, of fast and movable cutters combined together in one stock, in such a way that the movable cutter will be the leading cutter, and, after it has made its stroke, will receive a blow on its end from the descent of the fast cutters, thereby driving it past them into the rock. Elias Baker, of Pittsburgh, Pa., is the inventor.

Method of Cutting-out Buttons from Ivory, Bone, Etc.—This invention consists in a novel method of cutting buttons from ivory, bone, vegetable ivory wood and other substances. In the art to which this invention belongs, as now conducted, buttons are cut out of plates or disks of the material used, by placing the disks in a lathe and bringing up against them, on each side, cutters of the proper shape, which cut out and separate the buttons from the said material. That portion of the material which is left after the separation of the button was accounted as waste. This is especially true of the manufacture of vegetable ivory into buttons. This substance comes in pieces of small diameter, not great enough to furnish the ordinary-sized buttons for coats and other articles of apparel, and yet so much larger than one button as to leave a great part of the material unused. The object is to utilize this waste portion of the material, which is accomplished by cutting out therefrom one or more rings at the same operation which produces the button. Charles H. Bassett, of Birmingham, Conn., is the inventor. Assigned to The Birmingham Button Company, of same place. New York office, No. 102 Duane street.

A Fire-arms Commission.

Mr. Erskine S. Allin, master armorer at the armory in Springfield, has been commissioned by the War Department to visit the various arsenals in England, France and Switzerland, and to be present at trials of breech-loading fire-arms soon to take place in England and Switzerland. Here he will visit Ghent, Antwerp, Brussels and Liege, the town where the famous Belgian rifles are made, next Paris and other cities in France, and finally Switzerland. The rifle trial in the latter country will begin September 2d, probably at Geneva, and will be open to competitors from all over the world, a prize of $5,000 being offered for the best breech-loader, besides the sum which the Swiss government will pay for the patent right of the gun. Mr. Allin will return to London so as to be present at a government trial of breech-loading rifles in that city, September 30th. On his return, about three months hence, he will make a report to the Department of the result of his observations. Our Government could not well have selected a more suitable agent than Mr. Allin for this purpose, as he is admirably qualified for it by his long connection with the armory in its practical workings, and his well-known mechanical ability. D. De Gothal, teacher of languages, and for some time a clerk at the armory, will accompany Mr. Allin as interpreter.—*Springfield* (Mass.) *Republican.*

An Oil Well Destroyed.

Well No. 19, United States Farm, on Pit Hole Creek, was destroyed by fire about seven o'clock P. M. on the 3d inst. The well was finished that day, and was flowing about two hundred barrels, and no tanks being up the oil was allowed to flow on the ground. Some twenty persons were standing in and around the derrick, some of whom it is feared were unable to escape, for the ground for forty feet around was one sheet of flame in a moment, Three men are known to be seriously burned, and only saved their lives by jumping into the creek. The well is still flowing and burning.

THE Pittsfield (Mass.) *Eagle* says the work on the east end of the Hoosac tunnel is progressing at the rate of sixteen feet a day into the solid rock of the mountain.