and flexible partition, substantially as described, so as to make the entering fluid discharge the fluid, alternately, in each apartment, by its pressure upon the opposite sides of the flexible partition.

Third, I claim the shifter, O, whether as set forth, or in any other form producing the same result, and placed between the two portions of the flexible partition and the packing of the tube by the outer edges of the two portions of the flexible partition, protecting shaft c, and shifter O from contact with the packing, and allowing the said shaft to work freely at the same time.

Fourth, I claim the combination of the shaft, c, enclosed in the tube f with the valve throw, substantially as described and for the purpose set forth.

RE-ISSUES.

LOOMS—W. W. Dutcher, of Milford, Mass. Patented June 27, 1846: I do not claim guiding a wagstaff by means of a rocker and stand, my invention not employing any rocker or rocking motion for each staff.

I claim supporting the wagstaff at its lower end so that it may slide longitudinally in connection with supporting it in other respects by a joint link, or its equivalent, applied so as to cause that part of the staff which strikes the shuttle to move in a line parallel or about parallel to the race beam, as specified.

And I also claim connecting the lower end of the two staffs below their fulcra, by means of a spring having an intermittent action for drawing them back, in combination with the application of a positive motion above for driving the shuttle, whereby the returning staff aids in arresting the momentum of the shuttle, substantially as described.

REFRIGERATORS—D. W. C. Sanford, of St. Louis, Mo. Patented Nov. 13, 1855: I claim the employment of an open bottom ice box or equivalent thereof, in combination with a dividing partition open above and below, so placed that by means of self operating, internal circulation, the whole of the contained air shall be kept in motion, and caused to revolve around this partition in currents moving downwards only on one side of this partition, and upwards only on the other side, when the same is combined with a chamber for the refrigeration of food or provisions placed directly under said ice-box, as set forth.

I do not claim by itself a partition dividing vertically one compartment of a refrigerator from another. Nor do I claim placing articles to be refrigerated in a descending current of air.

But I do claim placing shelves or fixtures for holding articles to be refrigerated or the articles themselves in the descending current directly under an open bottom ice-box, in combination with a dividing partition open above and below as set forth.

I also claim in combination with said shelves or fixtures so placed constructing the open bottom of the ice-box in such manner that the air may pass freely down through the same, and fall directly from the ice upon the articles to be refrigerated, while at the same time the drip of the water is prevented, as set forth.

HINGE FOR PICTURE CASES—A. P. Critchlow & Co., (assignees of A. P. Critchlow), of Florence, Mass. Patented Oct. 14, 1855: I not claim a hinge of common construction, or one having each of its leaves either bent at a right angle or provided with a tenon or projecting part, so that it may be inserted in a mortise made in the side of a case or box.

But I do claim the application of a hinge of a daguerreotype or picture case, molded of a plastic material, or made of a frangible substance or substances, such being made with each of its leaves bent twice, as set forth, and so applied to the halves of the box, that it may not only embrace two contiguous sides of such halves and be independent thereof, or not have any tenon or projection to enter the same, but may extend or lap over and be fastened to the top and bottom plates of said box, substantially as described.

SEED DRILLS—James Selby, of Lancaster, O. Patented June 19, 1855: I claim the regulating at pleasure the quantity of seed discharged by means of the transverse slides, F, or their equivalent, in combination with the reciprocating F, as shown and described.

California Bituminous Springs.

MESSRS. EDITORS—In this vicinity, and in many other places in California, "tar springs" abound, which the natives use to cover houses, lubricate axles, &c., and when mixed with sand it congeals and answers for flooring and pavements; and I think it will soon be manufactured into a burning fluid that will answer for lights, cooking, and warming our houses in cool (we cannot say cold) weather. A friend of mine is now engaged in the chemical preparation of the fluid, and has succeeded admirably, with one single exception, and that is, he has not learned to destroy the odor. He has produced a fine bleached gas, but the odor makes it objectionable.

As to the origin of the tar we are of opinion that it comes from beds of coal, and can account for them upon no other principle. Indeed, coal has been found at San Diago, and there has been some prospecting here, but it was not done on what is considered scientific principles. They dug for it on the level of, or below, the "tar springs," while I contend that the coal is in the adjacent hills or mountains; that the tar cannot violate a law of nature by running upwards. What think you, Editors? H.

Los Angelos, Cal., March, 1857.

[The "tar springs" of California, we suppose, are similar to the petroleum springs which are found in various other parts of our country, and in every quarter of the globe. There are such springs in Kenawha, Va.; at Scottsville, Ky.; Oil Ceeek, Pa.; Liverpool, Ohio., and Hinsdale, N. Y. We believe that no particular use is made of the fluid petroleum in this part of the continent, except as a lotion for bruises and rheumatic affections. It has a pungent odor, and although it can be made to burn with a pretty good light, its smell is offensive. This, perhaps, may be obviated by distilling it with some acid; we believe that this is not impossible in this age of advanced chemistry. Coal oil and kersosene possess just as offensive odors when first distilled as native liquid petroleum, and yet very beautiful oil is made from coal by the processes through which it passes for purification.

In the Burman Empire, East Indies, petroleum is obtained from numerous wells on the banks of the Irawaddy river, and is used by the inhabitants to burn in lamps. The city of Genoa, in Italy, is illuminated by gas made from the petroleum of a spring in the vicinity. Such springs are often found in places far removed from coal regions, and we are of opinion that they are sometimes found on higher and sometimes in lower situations than coal beds. The petroleum wells of New York are far removed from coal formations, and yet it appears to us that our correspondent may be correct in his surmises respecting the origin of such wells. The source of these wells may be in coal beds in the mountains at a considerable distance. The heat and pressure may distil and force the petroleum out of the coal beds, and naturally enough it will seek a lower level to escape. The artesian wells of Paris are supplied with water from a lake about two hundred miles distant in a mountainous region, and the "tar springs" of California, as well as the petroleum springs of New York may in a like manner have their source in distant coal formations.

If the offensive odor could be removed from the petroleum obtained from native wells, we believe, that a valuable and profitable business might be carried on in manufacturing burning fluid from it, not only in California, but every other place where such wells exist.

Mechanics' Halls.

MESSRS. EDITORS—As anything pertaining to the welfare of mechanics, whether as individuals or as a class, either in moral or physical progress, is of interest to the readers of the SCIENTIFIC AMERICAN, allow me to present an instance of the power and effective energy to which they can devote themselves, when rightly directed, as combined in associations for their moral and intellectual improvement. The instance I will refer to, is that of an association existing in Worcester, Mass., which, two years ago, numbered less than five hundred members, but containing men of noble parts. Feeling that the moral and intellectual demands of such an association were commensurate with the undertaking, after mature and deliberate consultation, they came to the conclusion that some kind of edifice should be erected for the use of the association, so as to contain halls for exhibition, reading and library rooms, &c., for the use of members and apprentices belonging to it. One of the whole-souled fathers of the institution whose head and hands had long been devoted to mechanics and improvements—who from a blacksmith's apprentice has risen to an honored position—generously started the "ball" with a subscription roll of $10,000, and it soon increased to more than twice that sum, thus producing a fund upon which to make a beginning. Bonds were then issued, and were soon taken up almost entirely within the association. A building was afterwards commenced, which from the furnishing of the plans to the finishing of its beautiful ornaments, were all executed by its own members, each in his own department, vieing the best to advertise his skill with the permanency of its adamantine walls. This structure now rears its noble form from the center of the city, far above all surrounding buildings—the first to attract the attention of the stranger—the pride of the city and county—and it stands dedicated to the arts and sciences, and to moral and intellectual improvement.

It was erected within two short years by a small association, then numbering less than five hundred members; it now numbers seven hundred, and is in a fair way to pay interest, besides laying up a surplus as a sinking fund with which to pay the bonds when they become due. The edifice presents an elaborately ornamented Corinthian front of 100 feet, rising from pave to apex, 86 feet, running back 145 feet in length. On the ground, besides a spacious entrance hall, there are four stores; on the first floor, a lecture room, 50 × 80 feet, library room, reading room, cabinet room, and some four or five office rooms. Over these is the grand exhibition hall, extending the length of the building by 80 feet wide, with a ceiling over 40 feet from the floor. The cost of the edifice, including the ground, was about $115,000. This sum, large as it may seem, is but the result of well directed energy, backed by a firm purpose. May this not serve as a stimulant in many circles where true energy is now latent?

Worcester, Mass., April, 1857. A. C.

Managing Boilers.

MESSRS. EDITORS—As many engineers are giving their experience in the management of steam boilers, I will give mine. I have never been troubled with priming, although frequently using muddy water. I always keep the water high, the fire even, and the steam at one point, as near as possible. Muddy water will certainly cause boilers to prime, and opening a safety valve suddenly, will also make a boiler to prime when the water is high. Steamers entering rivers from the sea are more addicted to priming than if river or sea water had alone been used in the boilers, probably from the boiling point of salt water being higher than that of fresh, thereby the salt water acts like so much molten metal in raising the fresh water into steam. Filling a furnace full of light fuel, and closing the doors quick will cause the boilers to prime. My plan of keeping boilers clean where muddy water is used, is by blowing off from the bottom, immediately after the fire is started, or two or three times before steam is raised; when steam is up, and I wish to blow off, (if the water is muddy,) I shut off the feed water five or ten minutes. By following up this practice, boilers can be kept free of mud easily, thereby preventing safety valves becoming cemented with dirt. All water should be filtered before it goes into a boiler. There is not the attention paid to this subject that its importance requires.

J. M. HARTNETT.

Waukegan, Ill., April, 1857.

Millstones—Their Speed and Setting.

From the numerous brief and clear letters which we have published on the above subject, reliable data have been obtained regarding the general velocity at which millstones are run, but the following letter seems to be complete on several points of milling, such as speed of stones, the amount of work they accomplish, and the horse power required to drive them:—

MESSRS. EDITORS—I notice by the SCIENTIFIC AMERICAN that you wish information respecting the best velocity to run 4 1-2 foot millstones. The Suffolk county mills in Boston have six runs of 4 1-2 feet stones, which make two hundred revolutions per minute; they have done complete work when grinding from eighteen to twenty bushels of wheat per hour. This mill has run successfully for the last eight years. The Pioneer Mills, Alexandria, Va., has twelve runs of 4 1-2 feet stones that make two hundred revolutions per minute, and do most perfect work when grinding eighteen or twenty bushels per hour. The balancing of the running stones, and the arrangement of machinery must be very perfect to work with satisfaction at this rate. I would recommend from 150 to 200 revolutions, according to the amount of work to be done and power employed. The result will be in the ratio of one bushel ground per hour for each horse power employed.

J. R. HOWELL.

Alexandria, Va., April, 1857.

Speed of Millstones.

A correspondent in Richmond, Ind., who has had great experience in milling and millwrighting, informs us that in running four feet millstones he proportions their velocity to the power he has to drive them. If his power is only sufficient to grind 10 or 12 bushels per hour he runs the burr stones 180 revolutions per minute; and if his power is sufficient to grind 20 bushels per hour, he runs them from 200 to 220 revolutions per minute.

How to use the Divining Rod.

MESSRS. EDITORS—I will give you some facts with regard to the divining rod and its use.

The stick I use is the twig of a sweet apple tree—it must be natural, not grafted—or whalebone, both of which must be crotched. It must be held in the hands firmly, with the elbows resting on the hips, the palms of the hands turned up; the thumbs turned to the right and left, and held tight on the end of the stick. I think it will operate better when a person is in health, than when not. It will operate only over running water. Only a few persons can use it. It will not operate in everybody's hands, but why, I cannot tell. If any one disbelieves this, send him to me, and I think I can convince them that I am correct in my assertions. ELIAS BARRY.

Saccarappa, Me., April, 1857.

[From the number of communications which we have received on the "divining rod," we cannot question the *honest* belief of a number of our readers in its virtues. There are many phenomena in nature which are yet sealed up to us, and the divining rod may be one of these; still, we must say that we are skeptics in the powers or virtues which are attributed to it. We believe that any man of a reflecting and observing mind can guess where water may be obtained by boring, without a divining rod, as well as another person with one. Our opinion may be wrong, but we cannot come to any other conclusion by reasoning on the subject from scientific data. If, however, we are at any period of time after this convinced by ocular demonstration that there is scientific virtue in the divining rod, we will frankly make the change of our views known.

County Patent Rights.

MESSRS. EDITORS—I have lately purchased a county right and machine of the patentee; now I wish to know if I have a legal right to solicit orders from other counties for the article manufactured. If you will give the desired information through your paper, or otherwise, you will much oblige,

RUFUS PORTER.

Peoria, Ill., April, 1857.

[We have frequently answered questions like the above through our correspondents column, and now publish this letter, so that our answer may be considered general "to all whom it may concern." Mr. Porter has no legal right to sell his machines out of his own county. A county patent right is the *exclusive* power to "*make, sell,* and *use*" in that county. He may take an order from another county, but he must not sell there; and the person whom he supplies cannot use the machine without the consent of the licencee of his own county.

Alloys of Aluminum.

MM. C. and A. Tissier, says *Comptes Rendus* (Paris), have communicated a short note on this subject which is of importance at the present time when the interest in aluminum which had somewhat fallen off is beginning to revive. The authors find that the valuable properties of aluminum are injured by the presence even of small quantities of other metals. One-twentieth of iron or copper make it almost impossible to work the alloy, while one-tenth of copper renders aluminum as brittle as glass. An alloy of 5 parts of silver with 100 of aluminum works like silver, but is harder and takes a finer polish. The one-thousandth of bismuth renders aluminum so brittle that it cracks under the hammer even after being repeatedly annealed. The presence of aluminum in other metals often communicates valuable properties when the quantity is not too large. Thus one-twentieth part of aluminum gives copper a beautiful gold color and hardness enough to scratch the standard alloy of gold employed for coins, without at the same time injuring the malleability of the copper. One-tenth of aluminum gives with copper a pale gold colored alloy of great hardness and malleability, and capable of taking a polish like that of steel. Five parts of aluminum with 100 parts of pure silver give an alloy almost as hard as silver coin containing one-tenth of copper, and thus permits us to harden silver without introducing a poisonous metal.

Draining the Everglades.

It is stated by some of our cotemporaries that the water so long lying stagnant in that immense tract of country known as the Everglades of Florida, bas recently found an outlet through which it is discharging itself into the Gulf of Mexico. This will leave many millions of acres of dry land capable of cultivation, and well adapted to the growth of the sugar cane.