ENGINEERING INVENTIONS.

Mr. George F. W. Harris, of Woodburn, Ill., has patented an improved grader for drains having two adjustable trestles carrying adjustable screw hooks supporting a straight bar suspended from the screw hooks, and carrying a traveling pulley, from which is suspended a grading tool, by which the bottom of the drain can be opened to a uniform grade.

An improvement in compound engines, patented by Mr. Michael Elsesser, of Brooklyn, N. Y., relates to that class of steam engines which have two cylinders, one larger than the other, the larger cylinder taking steam from the exhaust of the smaller or primary cylinder. The invention consists, principally, in forming the valves of the two cylinders integral, and providing the same with a conduit for leading the exhaust steam from the primary cylinder to the inlet ports of the secondary cylinder and with an exhaust passage for the steam from the secondary cylinder, the valves and connecting conduit being contained in the valve chamber and entirely surrounded by steam from the boiler.

An improved valve reversing gear has been patented by Mr. John M. Sailer, of Ionia, Mich. The invention consists of a novel eccentric adjusting cam in combination with the valve rod eccentric, the latter being loosely fitted on the engine shaft.

Mr. Hiram S. Maxim, of New York city, has recently patented an apparatus for extinguishing fires among the shipping and along the water front. The invention consists of a fire extinguishing boat or floating fire engine capable of throwing large volumes of water and of directing the stream or streams as may be required. This boat was illustrated in our columns not long since.

An improvement in the stern of screw-propeller steamers has been patented by Mr. Joseph W. Davis, of Port Jefferson, N. Y. The object of this invention is to provide a strong and rigid bearing for the outer ends of the propeller shafts of steamboats having a propeller shaft at each side of the rudder; and also to prevent one screw from disturbing the water of the other screw. The invention consists in a steamboat hull constructed with three stern posts, to the center one of which the rudder is pivoted, the two screw shafts having their bearings in the side stern posts.

Mr. James F. Marvin, of Fort McDowell, Arizona Territory, has recently patented an improvement in stamp mills. The object of this invention is to increase the yield of stamps in dry crushing. The invention consists in the arrangement of two stamps with an inclined bed on one of the stamps having a rotary grinding motion between its strokes.

An improved pressure roller for sawmills has recently been patented by Mr. Charles E. Lewis, of Bay City, Mich. The invention consists in a crosshead having downwardly projecting arms, a double crank shaft pivoted to the arms of the crosshead, and rollers placed upon the cranks, this arrangement permitting the rollers to adjust themselves to bear equally upon the logs, whether the logs be equal or unequal in thickness.

Mr. Henry Wells, of Glenwood, Iowa, has patented an improvement in car couplings. This invention relates to self-couplers, and it consists of a shouldered drawbar designed to be fitted on the angle formed by the end and bottom of a car, having a flaring mouth and a longitudinal slot in its top for the movement of the coupling hook; and it consists also of a peculiarly-shaped slotted coupling hook and in novel devices for uncoupling.

Mr. William A. Roberts, of Battle Creek, Mich., has lately patented an improvement in car brakes, which consists in a lever pivoted to the bottom of the end of the car, and having its lower end connected with the brake draw rods by a chain passing over a pulley pivoted in a bracket arm on the bottom of the car, so that when this lever is thrown the chain will be drawn outward and draw the brake up tight.

Waterproof Bricks.

Mr. F. E. Kidder, of Boston, says: In order to ascertain what amount of water the bricks would absorb in their natural condition, two bricks of the same kind as those which were treated with the waterproofing were immersed in water, and at the end of one hour one brick had absorbed 9·7 per cent of its weight of water, and the other 10 per cent. This was all that the bricks would absorb, as the weight of the bricks did not increase after several hours' immersion. To ascertain the effect of freezing on the saturated bricks, one of them was exposed, for a few hours, to a temperature somewhat below the freezing point of water, and the freezing of the water in the bricks burst a piece some three or four square inches in area, and about half an inch thick at its thickest part, out of one face of the brick.

To test the protecting qualities of the waterproofing, three of the same kinds of bricks, treated on all sides with waterproofing, were immersed in water at a temperature of abont 65° Fahr. for seventy hours, when no increase could be detected in the weight of the bricks due to immersion.

One of the bricks was afterward immersed in water which was for a short time at a temperature of 78° Fahr., and at the end of forty-three hours it had absorbed 0·6 of 1 per cent of its weight of water. After 120 hours' further immersion in water at 65° Fahr., it had absorbed 1·7 per cent of its weight of water. This brick had several small cracks in it, through which this small amount of water probably entered the brick.

Two other bricks of the same kind, treated on all sides, were immersed in water at 65° Fahr. for one and a half hours without absorbing any water.

In forty-five hours' immersion one brick absorbed 0·8 of 1 per cent of its weight of water, while the other brick absorbed no water at all.

During sixteen days' immersion the brick which before had absorbed a small amount of water took up 1·3 per cent of its weight of water, while the other brick took up only 0·7 of 1 per cent of its weight of water. Both of these bricks had a large number of small cracks, and it was probably in these cracks that the small amount of water taken up by the bricks was contained.

The results of these tests may be summed up as follows:

Bricks *not* treated with waterproofing were entirely saturated after one hour's immersion, when they contained about one-tenth of their weight of water.

Three bricks treated on all sides with the waterproofing solution absorbed *no* water during seventy hours' immersion in water at the ordinary temperature.

Two bricks during sixteen days' immersion absorbed one one-hundred-and-forty-fourth and one seventy-third of their weight of water respectively. The protecting power of the waterproofing is destroyed by immersing bricks treated with it in water at a higher temperature than 100° Fahr., and probably even at a temperature of 85°. But bricks in ordinary situations would never be subjected to the presence of water at such high temperatures. The bricks tested were treated with waterproofing about two months before the tests were made.

Tidal Power.

The utilization of the power which exists in the rise and fall of the tide has long been a favorite scheme with projectors, but its application hitherto has been of very limited character. The introduction of electric lighting, and the demand which it creates for some economical motive power, seems likely to give an impetus of a practical character to the various proposals, which have hitherto been only discussed, for rendering available the natural force which now lies waste along our shores. Great Britain, from its insular character, possesses advantages for the development of that force which countries possessed of a less extended coast line cannot possibly have, and now that a demand exists which will repay the outlay necessary to secure that development, we may expect to see rapid strides in this direction.

Attention has been called to this subject very prominently during the last few weeks by the announcement that the Corporation of Bristol had passed a vote to secure the advice of some eminent engineer as to the best method of developing the power which the great rise and fall of the tide in the rivers Severn and Avon afford, with the object of employing it for the manufacture, so to speak, of the electricity required for lighting the city. It is manifest that that object has only a collateral relation to the subject of this article. It is, in fact, only the immediate inducement to undertake the conservation of a power which may ultimately extend its useful purpose in many other directions. Secondarily, however, electricity may be the agent by which power so obtained may be transmitted, almost unreduced, to great distances inland from the source of supply; but to that branch of the matter we do not intend at present to devote onrselves, deeming it sufficient to point out how extensive the use of electricity may become in the future to aid in the full distribution of that tidal force which is the proper subject of our article. All who are acquainted with the rivers Severn and Avon and the Bristol Channel will at once realize how powerful an agent its tidal rise and fall of from thirty-five feet to forty feet must be. In such a case as this there can be but little difficulty, we should say, in the construction and erection of machinery by which the power of the water column may be utilized. It must, however, be borne in mind that the action of the current engendered by a rising and falling tide is slow, and that its power, if exerted on a limited mechanical area, would therefore be but small. Neither can the head of water obtainable be utilized after the methods common in cases where the supply at the summit is constant and the discharge free from back pressure. In the utilizatiou of the tidal column the head will be constantly decreasing, and any machinery erected must be capable of working under gradually decreasing head, and there will be besides no free discharge at the base of the well in which the turbine must be set

A cursory examination of this subject discloses that there are considerable, though certainly not insuperable, difficulties to be overcome in dealing with the force of the tide after the manner customarily employed with hydraulic motors. The chief consideration which must enter into any design which has this object must be the means whereby the water passed through any such machinery can be got rid of, for it is manifest it cannot be returned to the source of supply immediately on its quitting the machine upon giving motion to which it has expended its power. But one course seems to us to be open for overcoming this difficulty. We would suggest that only a portion—say five-sixths—of the total column should be employed, and that the discharge water from the turbine should be led by pipes to some impounding reservoir on waste land situate slightly above the level of low tide, from which its redischarge into the river would be insured at low water. Of course the direct use of head water will only be possible in cases where the rise and fall of tide is very considerable. Where it is so, it is not impossible that the plan we have suggested might be carried out without having to incur anything like a prohibitory expense.

The obstacles to be overcome in cases of extreme range of tides are not, however, numerous, except under a few local adverse circumstances. Other and more difficult cases will occur in localities where the tide is of too limited a rise and fall to admit of static pressure being economically employed, such as exist on all our sea shores and the majority of our rivers. As regards the last named, it will be practicable in some few cases to erect dams across these beds and utilize the limited head so obtained in a variety of ways. But there must be many rivers where this will be impracticable for very cogent reasons; for such, and in all instances of sea-tides, it seems to us that the old principle of the race will have to be resorted to. On the rising of the tide, water might be admitted through sluices to an impounding reservoir, the lowest level of which must be above low water level, and action would be imparted by it for a portion of the period of influx to the reservoir, to undershot wheels or turbines in the races or sluice channels. At the bottom of the tide efflux would take place through the sluices, producing a reversed action on the machines. It will be patent that, to secure any considerable amount of power with the limited head of water which would be available in such cases, a large volume must be employed, and the necessary machinery would be large and costly.

Our remarks will have shown that the subject divides itself from natural causes into three distinct classes of operation: First, that of extreme range, where two or more turbines might be used throughout, say, three-fourths the time of each tidal rise and fall; secondly, that of rivers which permit of the head waters being dammed back; and thirdly, that of rivers where the latter course is not practicable, and which have a limited tidal range—in which class also may be included works to utilize the tide of the sea on open shores. It is further to be observed that in the majority of instances within these islands, such as are those included in the first and third classes, it will only be practicable to employ the tidal power when the conformation of neighboring land enables it without much artificial improvement for the purpose to receive during the intervals of rise and fall a sufficient storage of water, by the passage to and fro of which the required power may be obtained; but we should say that there are many important towns on our shores, and by the side of our rivers, where such land might be obtained within limited distance, or which might be fitted by excavations at a reasonable cost.

We have purposely refrained in these suggestive remarks from going into the details involved in this important question, and have simply touched upon the chief ideas which occur to any one when thinking over a matter which may become of great national importance.—*The Engineer.*

The Removal of Scars and Cicatrices.

The cicatrices, scars, or marks left by various diseases, burns, or wounds of divers kinds, are often less obstinately permanent than is generally supposed, and from some facts which have lately come under our notice we are inclined to think that their prevention or removal in many cases may be accomplished by some mild but effectual antiseptic.

Among the exemplifications of the efficacy of the formula we are enabled to lay before our readers, is the case of a gentleman of our acquaintance, whose face was so severely burnt by the violent spurting of a quantity of melted lead (owing to a workman having incautiously dropped a *wet* pipe into it), that his eyes were only saved by pebble spectacles from utter destruction.

At first, of course, carron oil was the sole application, and as for *weeks* afterwards particles of the granulated metal had literally to be dug out of the flesh, a deeply-scarred countenance was naturally predicted by all, except the patient himself. One mark of an almost imperceptible character alone remained after the expiration of six months, owing, as our friend says, to the whole face being bathed twice or three times a day, as soon as the oil treatment could be discontinued, with a lotion of the simplest character, as is readily seen by glancing at its constituents.

Lint soaked in the same solution and allowed to remain on some little time will frequently mitigate the visible results of smallpox, and we have known one case of ringworm treated in this way to leave no scar whatever, while a sister of the latter patient, who had had the same disease in a lesser degree, but had not employed this lotion, still retains the evidences of the fact.

The following is a convenient formula: Borax, half ounce; salicylic acid, 12 grains; glycerine, 3 drachms; rose water, 6 ounces. Make a lotion.—*Magazine of Pharmacy.*

Important Patent Decision.

BOSTON, MASS., February 23, 1882.

Judge Lowell, in the Circuit Court for the District of Massachusetts, has to-day decided, in a case of the Seibert Cylinder Oil Cup Company *vs.* the Phillips Lubricating Company for infringement of the patent of the S. C. O. Cup Co. for the method of lubricating the internal working surfaces of steam engines by oil fed in visible drops through water contained in a transparent chamber (called the sight feed, the Seibert Co. being the assignees of John Gates, of Oregon), that the S. C. O. C. Co. are the true owners of said patent; that theirs was the original and first invention, earlier than that of Mr. Charles H. Parshall's, of Detroit; and that parties using this feature in oil cups are infringers. This question was an important one to be settled, because the invention is of great utility and value and fast coming into general use.