

THE LIDGERWOOD ROTARY ENGINE AT THE EXHIBITION.

We have already explained the construction of this machine and some of its other forms, in previous issues. It is sufficient here to point out some of the advantages of the type illustrated, which is designed for hoisting in mines and quarries, and represents one of eight similar engines lately completed by the manufacturers for Messrs. L. B. McCable & Bro., of Baltimore, Md., for use in the permanent water supply tunnel of that city. The machines, being reversible, are each connected with two elevator platforms, one of which ascends while the other descends. They lift 6,000 lbs. with a single rope at a speed of 200 feet per minute, and at about 60 lbs. steam pressure. Larger sizes of the engine are capable of hoisting up to 7 tons, at 250 feet per minute. There are no centers, and by manipulating the single lever the steam is made to hoist, lower, or hold the load.

Small hoisting engines of the Lidgerwood type are now in use on board steamers for raising coal, ashes, etc., and have found a wide utilization in quarries and along docks where cargoes are constantly handled. The portable engine and boiler, which is the third form in which the machine is constructed, is a very completely arranged apparatus, containing everything in the shape of necessary fittings, including a compact heater for the feed water. It is made self-propelling if desired. Still another form is the adaptation of the rotary engine to platform elevators, such as are used in hotels, warehouses, stores, etc. This has compound gearing, which runs noiselessly, and a brake on the flywheel for controlling the load, manipulated by the same lever that governs the engine. There is also a governor for regulating the rate of speed in hoisting or lowering, and the construction throughout renders the machine well adapted for the especial purpose for which it is built.

All of the above forms may be seen at the Centennial Exposition. The small hoisting engines will be found at work raising ashes in each of the three boiler houses. Several other Lidgerwood engines are at work at the Centennial.

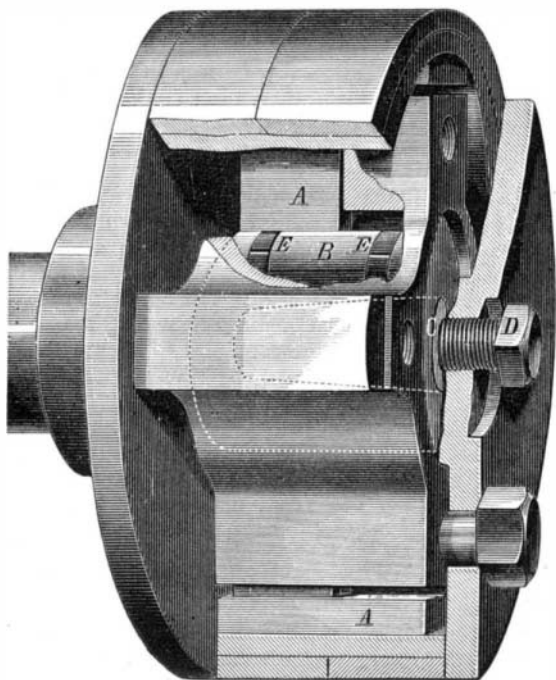
Another adaptation of the rotary engine, and one which has deservedly attracted considerable attention of late, is to the propulsion of small steam yachts or launches. We are informed that in this particular the Lidgerwood machine has attained considerable success. Nine boats, varying in length from 28 to 50 feet, have been fitted with the engine; and one, now in process of building, which is to be 42 feet long, with 6 feet beam, and 3 feet 6 inches depth of hold, is to be propelled at the speed of 12 miles per hour by a Lidgerwood engine equal to a 5x6 inch reciprocating machine.

Among the other advantages of the device, not yet noted, are its simplicity, it having but eight pieces exclusive of bolts, its smoothness and rapidity of action, the fact that its working parts are covered, the absence of brakes, except of course in the elevator engine, and its general utility for all purposes of hoisting or elevating.

Further particulars may be obtained by addressing the Lidgerwood Manufacturing Company (P. O. box 2,132), 165 Pearl street, New York city.

WOOD'S IMPROVED PISTON.

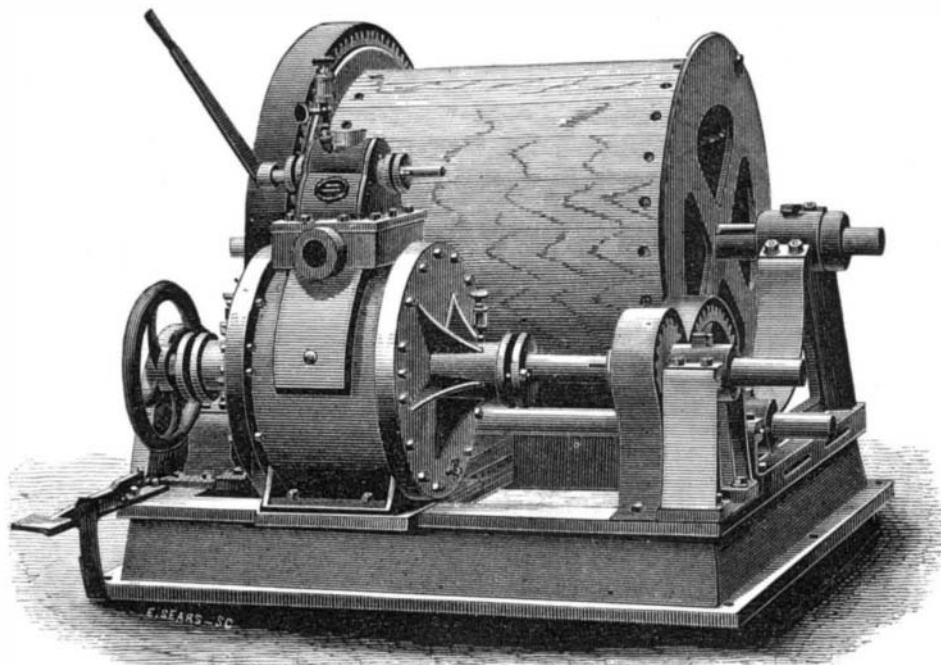
We illustrate herewith a universal expanding device for



the pistons of steam engines, which is capable of expanding the packing rings equally with a positive motion; so that, while the piston can be adjusted as desired, it acts, while working, like a solid piston. While, therefore, it can be regulated so as to take up the usual wear, it will not ac-

commodate itself to the inequalities of the cylinder, nor wear more in one place than in another. A further advantage offered, as will be seen from the following description, is that the necessity of removing the follower in order to adjust the packing, is obviated.

At A are the followers, which slide in suitable ways in the piston head. B is a central core or cylinder, which is bored out conically, as indicated by the dotted lines, and which is provided with a conical plug, C, which is forced in by the screw, D. The core is made in segments held together by circular springs, E, placed in grooves on its exterior. The followers abut upon this core, and also have feet which press against the packing rings, so that, when the plug, C, is forced in by the screwdriver, the core is expanded, and the followers, driven outward, produce a uniform ex-



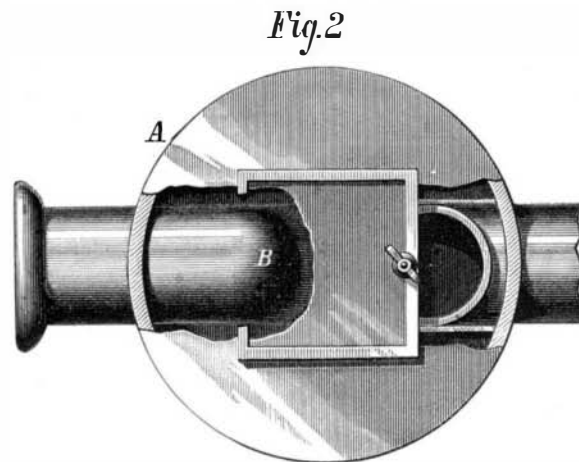
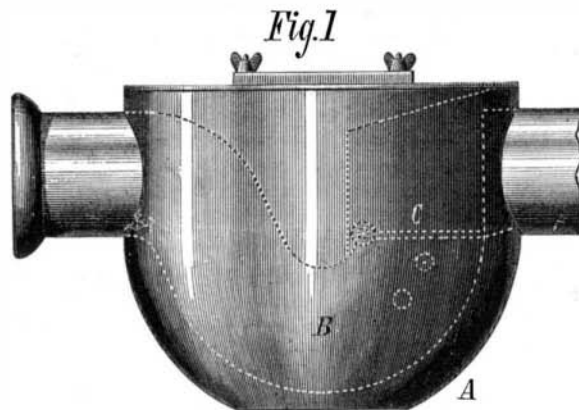
THE LIDGERWOOD ROTARY ENGINE.

pansion of the rings. The piston rod, instead of passing through the head, is screwed into a boss cast on one side of the head, and the plug, C, may be easily removed when desired.

Patent pending through the Scientific American Patent Agency. For further particulars address John Wood, Jr., Conshohocken, Pa.

BEDELL'S SEWER GAS TRAP.

We illustrate herewith a recent invention in a very important department of sanitary engineering, that which re-



lates to house drainage. It consists of a terra cotta tank, A, 18 inches deep by some 16 inches in diameter by 1/2 inch thick, inside of which is a U-shaped pipe, B, 6 inches in diameter, also made of terra cotta, the pipe and the tank being cast or molded in one piece. A little below the bottom of the outlet or discharge pipe, this siphon is closed by a copper valve, C, which, when down, is entirely under the water which fills the whole interior of the tank to a height of some two inches above the valve. The tank again is sealed perfectly watertight, the cover being molded on the tank before it is baked, and the opening (shown in Fig. 2) closed by a thick plate of glass imbedded in putty and held down by thumbscrews. Around two sides of the valve, as shown in Fig. 1, are sheets of copper or tin, so that, when

the valve is up, all connection with the tank is cut off, and the sewage thus prevented from entering the tank and forced to go out by the discharge pipe.

The action of the trap, then, is this: The matter to be discharged enters through the pipe, which is provided with a flange or lip, flows down the siphon, and lifts the copper valve, which, as it rises, cuts off, with the two copper sides placed at right angles to it, all connection with the tank, and forces the sewage to pass out through the discharge pipe. When the matter has passed out, the valve falls, closes the opening in the pipe, and thus the process known as siphoning, by which the water is so often drawn off from similar traps, and the gas from the sewer thus allowed to pass up through the house, is prevented. The gas which comes up the discharge pipe from the sewers can, by this arrangement, get no further than the tank, for the siphon is closed by the metallic valve lying two inches under water, and the tank is filled with water to a few inches of the cover, and hermetically sealed, and the small amount of gas that does find access to the tank cannot escape either by the pipe or the tank cover.

It is well known that a sewer gas trap, to be of any service whatsoever, must accomplish two things: it must render impossible the process known as siphoning, and must offer a mechanical resistance to the pressure of sewer gas, to prevent the gas being forced through the water. These two important features are claimed to be accomplished by the invention described. We are informed that the time required to set one in perfect working order is ten minutes.

For further particulars address the patentee, Mr. William Bedell, 985 Eighth avenue, New York city.

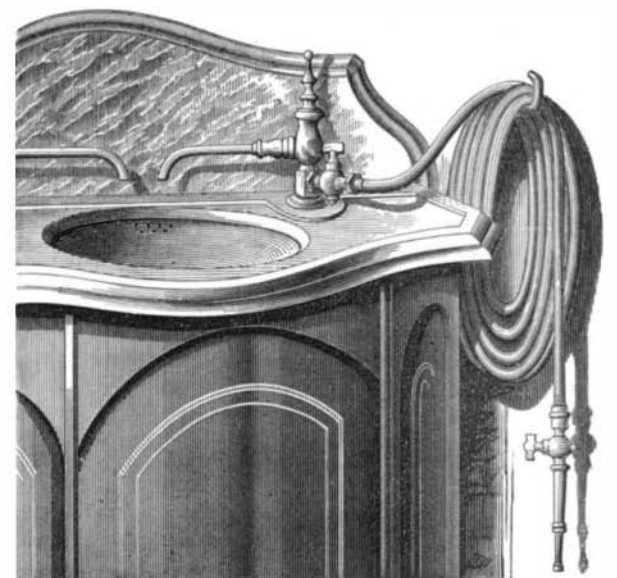
Sensible Assertion.

The Colorado Farmer, published at Denver, utters the following truthful sentiment: Now is the time when the intelligent and educated farmer is going

to have the advantage over the one who does not keep himself posted. When times are good, any one who knows how to raise good crops makes money. But when the country seems to have too much of everything in it, the man who picks up the improvements first, and who has raised good big crops cheap, is the man for the times; and we have to say that no man of brains, who has taken up farming for a business, should quit it now; for he cannot sell out without loss, and the time is sure to come when he will do well.

HOSE ATTACHMENT FOR FAUCETS.

It has been well said that few great conflagrations have ever occurred which a pail of water would not have extinguished, had it been on hand at the proper time. There are so many causes of little fires which may easily grow into great ones, in every dwelling, that it is a good plan to have the needful pail of water, or its equivalent, always ready; but as filled pails are not handy articles to leave promiscuously about a house, especially where there are children, the ingenuity of inventors has been taxed to supply some other means for a prompt water supply. Such a device is that herewith illustrated, it being nothing more than a length of hose provided with a nozzle, as shown, and coupled to an enlarged portion of the ordinary basin faucet. The hose is long enough to lead to any part of the adjacent room or rooms; so that in case a coal falls out of the grate and sets the floor on fire, or a curtain blows out the gas flame, or a lamp upsets, or any similar accident occurs, it is not the work of a minute to lead out the hose, turn on the water, and at once play on the incipient blaze.



The device can be used wherever there is a water pressure whether derived from a tank on the roof or from the town mains. It will also be found useful for shampooing purposes. It is one of those simple yet handy little inventions which may often be the means of saving valuable property.

Patented July 18, 1876. For further particulars relative to sale of rights, etc., address the inventor, Mr. D. G. Tremoley, 103 South Fourth street, Brooklyn, E. D., N. Y.

A Master Piece of Mechanism.

There has been on exhibition for some days in the store of Bates & Sons, a Little Monitor sewing machine, made from gold and silver. It is the handiwork of James W. Du Laney, a son of the inventor, and speaks highly for his mechanical ability, taste, and good judgment. The machine was shipped to Philadelphia on Tuesday last. The plate, needle bar, lifters, foot bar, tensions, spool case, and some of the screws are of gold, while the other parts of the machine are of silver and white metal. Upon the bed plate is a neat model of the Little Monitor resting upon the water and surrounded by a wreath of laurels. The Monitor has two flag staffs with flags, and the design gives the entire machine an appearance of elegance and taste that will command much attention from the sight seers at the great show. The machine is in complete working order, well wrought, and proportioned as only a master hand at mechanics could do it.

The firm has now on exhibition at Philadelphia over a dozen machines of different patterns, some inlaid with ivory, others gold mounted, and all bearing testimony to the ability of their manufacturers. In a future issue we shall speak more fully of the machine, its inventor, and the manufactory.—*Rhinebeck Gazette of July 20.*

THE PEARLY ALOE.

One of the most ornamental of the large tribe of aloes, numbering some 200 distinct species, is the *Haworthia subulata*, generally called *aloe margaritifera*, or pearly aloe, of which the annexed engraving is a representation. It has a very short stem, and leaves which are flat above and convex below; in short, triangular in shape and rounded towards the tip. The leaves are covered with a number of white, horny tubercles, which resemble pearls, and give the name to the species. The flowers are greenish, with whitish lobes marked with a green line, and are grouped together in a terminal spike. The beauty of this aloe, however, resides in the leaves, the flowers being, comparatively speaking, insignificant. It is by no means difficult to grow, nor any of the genus to which it belongs; the best soil for it, says J. C., in the *English Garden*, is a mixture of three parts loam and equal parts of leaf mold and sand, and it likes good drainage and partial shade in a cool greenhouse.

Singular Property of Tomato Leaves.

"I planted a peach orchard," writes M. Sroy, of the Society of Horticulture, Valparaiso, "and the trees grew well and strongly. They had but just commenced to bud when they were invaded by the curculio (*pulgion*), which insects were followed, as frequently happens, by ants. Having cut some tomatoes, the idea occurred to me that, by placing some of the leaves around the trunks and branches of the peach trees, I might preserve them from the rays of the sun, which were very powerful.

"My surprise was great, upon the following day, to find the trees entirely free from their enemies, not one remaining, except here and there where a curled leaf prevented the tomato from exercising its influence. These leaves I carefully unrolled, placing upon them fresh ones from the tomato vine, with the result of banishing the last insect and enabling the trees to grow with luxuriance. Wishing to carry still further my experiment, I steeped in water some fresh leaves of the tomato, and sprinkled with this infusion other plants, roses, and oranges. In two days these were also free from the innumerable insects which covered them, and I felt sure that, had I used the same means with my melon patch, I should have met with the same result. I therefore deem it a duty I owe to the Society of Horticulture to make known this singular and useful property of the tomato leaves, which I discovered by the merest accident."

The Battle of the Gazes.

A comparison of the weight and cost of a passenger train on the Eastern, standard gage, and on the Boston, Revere Beach, and Lynn Railroad, narrow gage, respectively, has been made. These two roads run nearly side by side and the carrying capacity of the two trains is practically the same. The heavy Pullman car is a disadvantage to the Eastern road in the comparison, as are also the baggage car, which is not required on the short line. A locomotive, baggage car, Pullman car, and four passenger cars on the Eastern road give capacity for 230 passengers, weigh 138 tons, and cost \$63,000; one locomotive and six passenger cars on the Revere Beach and Lynn road give capacity for 272 passengers, weigh 58 tons, and cost \$18,000.—*Engineering News.*

Railway Economy.

The long engine runs adopted last winter on the New York Central and Hudson River Railroad (engines go through between Buffalo and Albany, 300 miles) have resulted in a notable economy in locomotives, the company having been able to lay up 42 of its stock of engines, notwithstanding a large increase in traffic. There are

other considerable economies effected by it, as in fuel (saving heating up, cleaning, switching, etc.); and the company is altogether satisfied of the wisdom of the change. It is not pleasant for the men, who are compelled to be away from their homes a much longer part of the time; but the economy is such that there is no prospect that the practice will be abandoned for the old one.—*Railroad Gazette.*

Construction and Maintenance of Public Highways.

The Association of Sanitary Surveyors, of London, the other day, at their late conference, discussed the question of road making, but the several bearings of the question were left unsolved. Mr. E. B. Ellice Clark, C.E., the Borough Surveyor of Derby, read an exhaustive paper on the subject, in which he advocated, for macadamised roads, a rough paved foundation, with center channels, instead of side water tables. He also suggested a paving of all streets now macadamised; and stated that granite, wood, and asphalt were severally adapted for varying kinds of roadways—namely, granite for roads where heavy traffic has to be considered, and where noise is not a material objection; wood where quietness is an essential condition; and asphalt in cases where these necessities have to be combined, and where flat gradients and facility of cleansing can be secured.

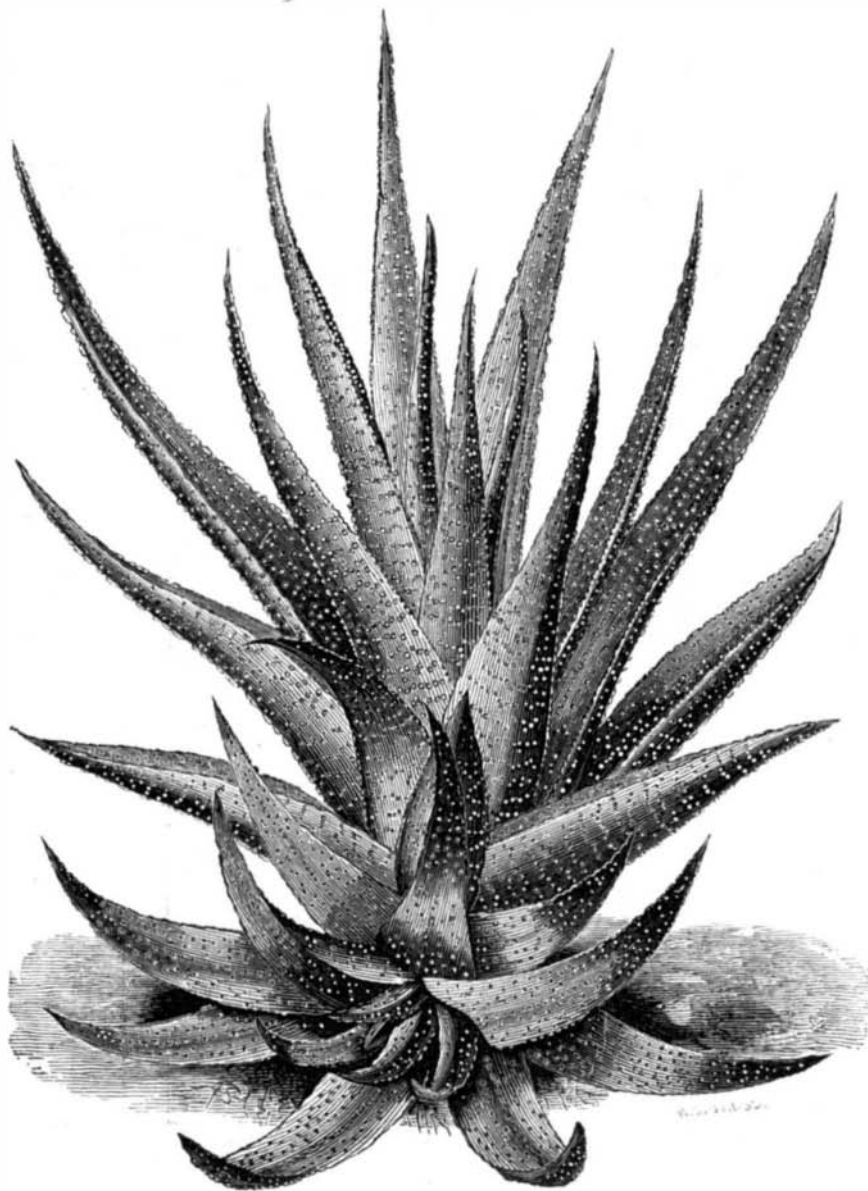
We may learn of the old Romans the art of forming a good foundation. Large stones were first laid—

must be considered in coming to a conclusion. It is shown that Moorgate street, with a daily traffic of 7,400 vehicles, costs 33 cents per square yard per year to pave and maintain. Mr. Clarke estimates a saving of \$250 a year for cleansing a street of about 3,000 square yards in area if paved instead of macadamized. Allowing \$65 per yard, including concrete, as the original cost, the total cost per annum for maintenance is a little over 20 cents per yard, if we allow 8 cents per yard annually for this item. In the annual saving of cleansing, a paved road has by far the greater advantage, and we may therefore at once admit the merits of paving over macadam. The same authority says, *ceteris paribus*, "it is cheaper to pave a roadway having a traffic of 1,000 vehicles per diem over its surface than to macadamize it, and this would be the minimum number to commence paving with."

SUCCESS OF WOOD PAVEMENTS IN LONDON.

As regards paving materials, Mr. William Heywood, the City of London engineer, whose experience may entitle him to be considered an authority, says, speaking of the relative merits of asphalt and wood, asphalt is "the smoothest, driest, and cleanest paving, but wood the most quiet." As regards cleansing, wood is more difficult and expensive to cleanse than asphalt; and as both require occasional strewing with sand or gravel, there is not much difference in this respect. As regards repair both asphalt and wood can be laid and repaired with equal facility; but wood is superior to asphalt as regards safety, whether considered

in reference to the distance a horse can travel before it meets with an accident, the nature of the accident, the facility with which a horse can recover its footing, the speed at which travel is safe, or the gradient at which it can be laid. As to durability and cost, it is shown that in the city wood pavements have a life varying from 6 to 19 years, 10 being an average life with repairs, that the durability of asphalts is not known, but that wood is dearest if we contrast the tenders received for laying and maintaining for a term of years. Again, referring to the safety of the materials, Mr. Heywood reports that a horse can travel 132 miles before a fall takes place on granite, 191 miles on asphalt, and 446 miles on wood. These approximate figures are deduced from observations in the London streets. From the above conclusions there is an overwhelming balance in favor of wood, though granite has its admirers, Mr. Clark thinks that, where there are few shops, and noise is not objectionable, granite is the cheapest and best material; but that in streets of business where absence of noise is a desideratum, preserved wood paving is the best, though expensive. Asphalt, with iron studs on the surface, as used by the Val de Travers Company, is, as Mr. Clark says, objectionable: though we should like to see a combination of wood and asphalt. The Derby surveyor consequently recommends for some of the streets of that town granite pitches 5 inches by 3 inches, and for others creosoted wood. The experience of London has certainly gone to show us that wood paving is not only less dangerous and less injurious to health than granite, but also more durable than some of the asphalts. The noise of granite paving is unbearable. The objections raised against wood are the absorption of putrescent matter in the fibers, the permeability and splitting of the blocks, and the consequent undermining of the foundation. These are hardly supported by experience. Mr. Deacon, the Liverpool engineer, observes that the wear is very small. Among the different kinds of wood pavement, the "Ligno-Mineral Wood Pavement,"



THE PEARLY ALOE.

laid in Gracechurch street—Mowlem & Co.'s method—the "Asphaltic Wood Pavement," and the "Improved Wood Pavement," may be considered among the most desirable. In most of these the blocks, about 9 inches long by 3 inches wide, and 6 inches deep, are filled between with a quantity of lime and gravel, or liquid tar, or asphalt, and the grain of the wood is disposed crosswise to the surface of wear. In all cases it is desirable to saturate the blocks with oils, as in the ligno-mineral process, or to creosote them. Mr. Clark refers to some pavement at Sunderland, where creosoted Baltic red wood was tried, and which required no repairs for five years. Perhaps we may cite the "Improved Wood Pavement," now being laid in various parts of London. Two layers of inch boards, creosoted, laid transversely and longitudinally, are placed on the foundation. Upon this the blocks are placed, kept apart by strips nailed to the flooring.

NICHOLSON SYSTEM.

These joints are then filled in or rammed in with fine ballast, run with liquid tar, the surface of the road being strewn with fine gravel. An elastic foundation is given by this plan of boarded flooring, tending to distribute the pressure, and reducing the wear of the blocks. The ligno-mineral and Carey's wood pavement are laid on a concrete foundation and on a bed of ballast or sand. In the first case the blocks are sawn at an angle of about 60°, the object being to expose the fiber obliquely to the wear. The angles of each course are reversed. Henson's pavement has been tried in America with some success. The great merit of all these pavements is their elasticity.—*The Building News.*