

APPARATUS FOR SCOURING WATER-WAYS.

In works like increasing the depth of rivers, channels, and harbors, it is the highest grade of engineering to devise methods of supplementing nature by means of mechanical devices in such a manner as to cause the work to be done mainly by natural forces.

Mr. Holden, the inventor of the system of scouring the water-way, illustrated by our engraving, has grasped this idea and has patented an effective device, by means of which sand on river and harbor bottoms may be loosened and floated so that the natural eddies and currents may carry it away.

According to this invention, two sets of pumps are mounted upon the deck of a suitable boat, preferably a heavy tug boat, and connected with two sets of pipes extending from the deck of the boat upon platforms supported by stays from a mast. From these two sets of pipes hang flexible pipes provided at their lower ends with nozzles, the nozzles of the water pipe alternating in position with the nozzles of the air pipes. The pipes are further stayed by guy ropes from the sides of the tug, and the nozzles are furnished with transverse arms, as shown in Fig. 2, from which are suspended heavy weights for holding the flexible pipes in a vertical position. Water is driven with great force through the water pipes, thereby stirring up the sand and other material at the bottom, and the air forced through the air nozzles, in bubbling up through the water, tends to float away the particles dislodged by the water jets, so that the natural current of the water will carry the sand or other material to a much greater distance than it would if the water jets alone were used. Although this apparatus will generally be carried by a vessel or float of some kind, it may be operated from a dock or temporary structure.

We understand that this invention is very effective in its operation, and bids fair to play an important part in engineering works of this class.

We are informed that arrangements have been made with the Aransas Harbor Company, of Aransas Harbor, Texas, whereby this invention is to be applied at once for dredging Aransas Harbor and the bay, up to Aransas Harbor. It is expected that the depth of the water can be increased thirty feet in less than sixty days by the use of this apparatus.

Further information regarding this invention may be obtained by addressing Mr. E. G. Holden, Fulton, Texas.

The Smoke Nuisance can be Easily Abated.

Something over a year ago the municipal authorities of Chicago began to move in dead earnest against the owners of steam-making plants, manufacturers, railroads, hotels, etc., for their constant violations of the ordinance which declared the emission of volumes of black smoke from chimneys, smoke stacks, etc., to be a nuisance. Hundreds of prosecutions were instituted and fines to a very large aggregate amount were levied. The result has been, says the *Railway Master Mechanic*, that the nuisance has been to a large extent abated. This has been accomplished very largely by the use of devices which force jets of air in sufficient quantities into the furnace to secure complete combustion. This method has proved satisfactory on both locomotives and stationary engines, and has helped largely to clear the atmosphere of Chicago from the black smoke which soft coal produces.

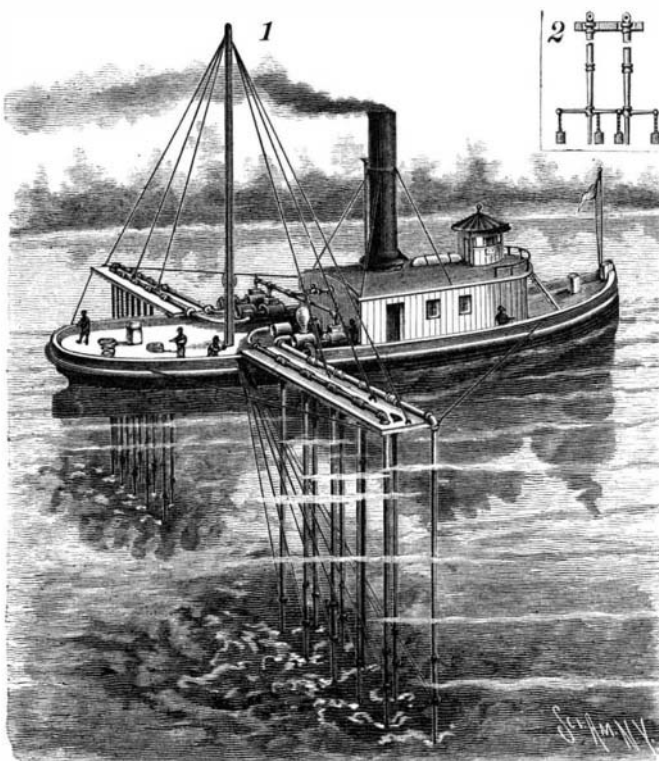
The Chicago & Northwestern has abated the nuisance on 64 locomotives and on 166 stationary boilers, in its depots, office building and shops; the Pittsburg, Chicago & St. Louis on 18 locomotives, one boiler in its shop, and has contracted to equip all other engines running into Chicago; the Pittsburg, Fort Wayne & Chicago has ten locomotives equipped; the Chicago & Northern Pacific is engaged in equipping all its locomotives running into Chicago; the Lake Shore & Michigan Southern has equipped 68, and that number comprises all the locomotives running into the city, including passenger, freight and switch engines; the Chicago, Rock Island & Pacific has equipped 24 locomotives with new devices and repaired 36 old ones, some of them having been in use for the past six years, and has equipped the boilers at its elevators A and B; the New York, Chicago & St. Louis has equipped 8 locomotives and contracted for ten more, which will cover all the engines this road has running into the city; the Chicago & Erie has equipped 18, and has assured the department that it will continue the good work until all the engines running into the city stop their smoke; the Chicago & Grand Trunk is now engaged in equipping all its engines running into the city, it has seven equipped and has promised to finish them all before summer; the Belt Road has equipped three locomotives and the boilers at the Dearborn station; the Chicago & Eastern Illinois has equipped nine new and repaired 16, that had been in use several years; the Baltimore & Ohio has all its engines equipped running into the city, 35 in number, and reports being highly pleased with the result; the Illinois Central has succeeded in stopping the smoke on

12 of its engines and promises a complete abatement of the smoke nuisance in the near future; the Michigan Central is engaged upon 39 of its engines running into the city, and has 13 of them already working satisfactorily. These results are very satisfactory, and establish beyond a question that it is practical to abate the smoke nuisance. Many of the other roads running into the city have made experiments during the past year, but have reported little progress and a good many failures. The department has decided that sufficient time has been given to those who have not yet complied with the ordinance and a vigorous prosecution will be commenced against those who have neglected or refused to comply. Much more has been accomplished in abating the nuisance in factories, hotels and office buildings.

Pump or Injector.

We know of an engineer who had the question asked him by his employer if it would not be better to have an injector for his boiler than the power pump he was using, "because all the heat went right back into the boiler again, and heating the feed water." This is the way he figured it out to see what he had better do:

If 1,000 pounds of water is to be pumped into the boiler by an injector, raising the temperature of the water in doing so 70°, as one heat unit will be required to raise one pound one degree, $1,000 \times 70 = 70,000$ heat units are required to raise 1,000 pounds 70°. Taking the total heat of steam from 62° as representing 1,145 units of heat, this work will require $70,000 \div 1,145 = 61$ pounds of steam, to make which, assuming an evaporation of 8 pounds per pound of coal will require 61 +



HOLDEN'S APPARATUS FOR DEEPENING CHANNELS.

$8 = 7\frac{1}{2}$ pounds of coal to do the work with the injector.

Taking 1,000 pounds pumped by the power pump run by a belt driven primarily by a Corliss engine, against a pressure of 60 pounds, equal to a height of 120 feet would require $120 \times 1,000 = 120,000$ foot pounds of work to be performed, or nearly 4 horse power, for a minute. The engine would use 30 pounds of steam at the outside per horse power per hour, or one-half a pound per horse power per minute. The 4 horse power therefore would need $4 \times \frac{1}{2} = 2$ pounds of steam. This two pounds of steam, on the same evaporation as with the injector, would require one-quarter of a pound of coal to do the work.

Another method he tried was to take a pump duty of 70,000,000 foot pounds per 100 pounds of coal as a basis, a low duty. Therefore one pound of coal would do a duty of 700,000 foot pounds, but as the work he was to do was but 120,000 foot pounds, it would require but its proportion of the pound of coal, or about one-fifth. From this figuring he reasoned that the injector was not going to be so economical as his pump, especially when he would not consider the raising the temperature of the feed water in the matter, because he used a feed water heater and he considered he was getting that heat for nothing, since otherwise he would throw it away.—*Boston Jour. Commerce.*

A Sky Rocket Boiler.

At Pittsburg, April 4, the boiler of the West End Gas Company exploded. The boiler was an upright one and it went straight up through the roof over Foley's livery stable, which is three stories high, and then over a row of frame buildings, in the rear of the stable, and up into a lot on Steuben Street, a distance of about 500 feet. No one was in the building when the explosion occurred and its cause is not known.

Where Does Light Go?

The question put where a transparent surface has been made translucent, as in the case of a cut, frosted or ground surface given to glass, is applicable to light generally. Where does light go? What becomes of the darting, shooting, piercing ray? These questions are equally to the point, whether we accept the theory of emission or of undulation, but particularly as to the latter.

To obtain as full a comprehension of the simple object as possible, let us, for the moment, consider that the expression of movement of light is in a right line—a right line only. This is an effect on the senses which we may say we know practically. Undisturbed, so far as we can calculate, the movement will go on indefinitely and forever; but when disturbed, we call the manifestation deflection (bent as to course), refraction (broken as to course, or a violent deflection), and reflection (doubled back as to course, or the most violent action to which light is susceptible).

Now, if we imagine light to be a solid bar, we will observe, on the basis of what is here advanced, that it might perform all the movements that we are ascribing to a single ray of light, and, if properly projected, as light is, it might go on indefinitely, bending, coiling and twisting through all creation. But we always conceive the idea of light by multiples—we speak of a ray when we really mean a whole bundle of rays, how many it is ever impossible to enumerate. So, continuing the figure of the bar, let us fill our horizon with an infinite quantity of bars, projected from an ever-lasting and ever-moving force, as they go on bending, coiling and twisting, until the sphere of our surrounding is filled and bar meets bar, each with the projection of the other, derived from the same imperial source, and propelled by the same majestic energy. Where do the bars go? On the light principle they cease to be bars, as light ceases to be light when motion becomes rest. With no means of progress or continuance except upon each other, we have come to the inevitable halt of the senses over the conception of an irresistible force and an indestructible body, for bar thus circumstanced cannot displace bar, and with the cessation of action the bars are no more on the principle of light. It is the Greek of nature meeting Greek with the natural product of nihilism after action. In this way light is said to be decomposed.

The same analogy may be carried into our conception of sound, where two identical vibrations neutralize each other and produce silence, and the same with air—the same with water.

Then may we not account for the loss of light as exhibited by the photometer in transmission, through a mass of prisms and reflecting surfaces, of the ground glass or the frosted globe, as perfectly natural? For, in the passage, ray has met ray and become extinct. This warfare is eternal—it is going on everywhere. Otherwise the universe would be all light, and primal sources would in no way be needed to combat the everlasting tendency to what is darkness to the senses.

Thus then we may reasonably conclude that the loss which we experience in transmission of light is simply a constant tendency of one ray to kill another as nothing else can, and as the prisms and surfaces are multiplied the loss is increased, and *vice versa*. Such at least appears to be the law of the elements that are inherent in matter and of a primary character.—*J. A. Price, Amer. Gas Light Jour.*

Sanitary Qualities of Watercress and Onions.

The watercress is a plant containing very sanitary qualities. A curious characteristic of it is that, if grown in a ferruginous stream, it absorbs into itself five times the amount of iron that any other plant does. For all anæmic constitutions it is, therefore, specially of value. But it also contains proportions of garlic and sulphur, of iodine and phosphates, and is a blood purifier, while abroad it is thought a most wholesome condiment with meat, roast or grilled. The cultivated plant is rather more easy of digestion than the wild one. Botanically the onion belongs to the lily family. The odor of the vegetable, which is what makes it so unpleasant, is due to a volatile oil, which is the same as that in garlic, though in the onion it is milder and naturally does not last so long. There are, besides, easy ways of removing at once all unpleasantness from the breath. A little parsley or a few grains of coffee, or even a swallow or two of milk, if taken after eating, proves an effective remedy. Boiled onions are the least objectionable in regard to odor, and are as easily digested as any. The oil in the onion passes off in the water in which the vegetables are boiled, and if the kettle be kept closely covered and the water changed after they have boiled five minutes, and then again ten minutes later, there will be no odor through the house, and the onions will be white instead of gray, as they so often are. Besides being rich in flesh-forming elements, raw onions are especially good in breaking up a heavy cold, they are also stimulating to fatigued persons and are otherwise beneficial.

The Teredo.

In the office of General Manager C. J. Smith, of the Oregon Improvement Company, are a number of cans of some poisonous compound intended to prevent the terror of Puget Sound, the teredo, from destroying piles or other timbers placed in the water. The stuff is to be sent over to the sound to be tested. A number of things have been tried to protect piles from the teredo, such as creosote, asbestos, coal tar, castor oil, strychnine, etc., but the only perfectly sure method for preventing the teredo from eating up piles is to make them of iron. Covering wooden piles with copper will protect them as long as there is no place in the joints of the copper where a teredo can poke his nose through, but if once the copper gets torn it is goodby, John, to the pile. So far the poisonous compounds used on piles seem to have pleased the teredo much, seeming to act as a condiment on what must be rather a monotonous bill of fare, and assisting in its digestion. The man who finds out the poison which will act as an antidote to the teredo will have a good thing. It may be that if the piles were washed with whale oil soap every day it might keep away the teredo, or if the piles were greased with tallow, perhaps the long, slimy, wriggling pest might not be able to get its teeth into the pile, as they would slip off. The people on the sound can rejoice that the teredo does not go ashore and hunt for tall timber, as if it did the lumber output of that section would soon be nil. It might be that if the sawmills on the sound would throw their sawdust into the sound the teredo would learn to like it, and would prefer "cut feed" to cutting up the piles themselves, and thus some good might be accomplished.—*Portland Oregonian*.

Wealth of the Northwest says: Not only sawmill owners, but all who build docks, booms, or log in the salt waters of this coast find in the teredo an enemy who works in the dark and one that is as uncertain in its movements as it is certain to be felt in some way not profitable sooner or later. Certain localities whose waters are salt and tributary to the Pacific Ocean are reported as free from the ravages of this pest. Mr. J. S. Mundy, of the Bellingham Bay Milling Company, at Fairhaven, Washington, is on record as saying that he has recently inspected piles at that point—under a dock—that have been in use for six years, and did not

find a pile entirely destroyed by teredoes, though some were so badly eaten that it was necessary to replace them. Cedar posts under the mill were found in a condition that did not require that any of them should be replaced. On Gray's Harbor the statement is made that the teredo has never done any damage. There may be some local causes in both these places for this healthy condition, so to speak. It is thought by some that rough water caused by continuous winds prevents this worm from getting in its work. In other localities swift currents from tides may be a preventive. At any rate certain points seem more exposed to their destructive work than others. It may be that these worms haunt certain localities—as fish do—and avoid others, without any cause known to man. At Tacoma, Seattle, Victoria, and other points on the sound the teredo has cut docks down in a year's time, causing heavy damage, and in some instances loss of life. By some it is thought that after six months a pile is unsafe, but this is an extreme opinion. However, in the case of a dock that was cut down by these worms at Seattle within a year after it was built, this opinion is not very much out of the way.

The *Commercial News*, of California, says on this subject that "the teredo is a nuisance and expense here, but the great Northwest coast, which tries in many ways to prove its superiority over California, in one respect at least carries off the palm, and that is in teredoes. Captain Gibson, of the bark J. D. Peters, has presented this office with the section of a pile which was in a raft waiting to be used in the building of a wharf at Seattle. The pile had been in the water only thirty days, and when hauled out on the beach it was noticed the teredo had got in its deadly work, and the stick was, before it had ever been used, rendered worthless by this pest. The section referred to is about a foot in diameter, and contains, by actual count, 212 holes bored by this industrious woodworker. When this log was on the beach, it is said the little pests kept up boring, so that placing the ear near the pile it sounded as if a sawmill was in active operation. With such an illustration of the futility of using wood for wharves, why is it that here and at the north some plan is not devised by city or State authorities to make permanent improvements on the water front of each city? Docks built of stone, though the first cost is greater,

would in a very short time be cheaper than wooden wharves constantly needing renewal, and this section of a pile, which is on exhibition at this office, is an object lesson which merchants, taxpayers, and particularly officials having charge of the wharves in this and other Pacific coast cities should study."

In the year 1884 it is said that one of the large sawmill companies of Puget Sound lost 50,000,000 feet of logs that were allowed to lie in the water until the teredo had ruined them.

So far nothing has been found to protect these piles that is not too expensive for general use. Some one will one day solve the problem and realize a fortune.

Treatment of Diphtheria.

Dr. Guntz, of Dresden, has had great success in the treatment of diphtheria with bichromate of potash in water containing carbonic acid, which he has found by numerous experiments on animals, as well as in the course of extensive clinical observation, to be entirely harmless. For an adult 600 grammes (about a pint) are ordered per diem, in which are dissolved three centigrammes (about half a grain) of potassium bichromate. The whole quantity is directed to be taken in about half a dozen doses, regarding which it is important to observe that they must not be taken on an empty stomach; a little milk or gruel should therefore be swallowed before each dose. Children, of course, take smaller quantities, according to age. They can be given the medicine in a tumbler mixed with some fruit sirup, and they do not generally object to it. At the commencement of the disease Dr. Guntz washes the mouth out with a 1 per cent solution of permanganate of potash containing 0.1 per cent of thymol, or with a corrosive sublimate solution of the strength of 1 in 3,000, taking care, in the latter case, that none is swallowed, and that the mouth is well rinsed with water afterward. In the case of young children the pharynx must be brushed out with the solution. Sometimes iodoform is employed, being applied on the tip of the finger to the affected spots. Dr. Guntz specially remarks that potassium bichromate, though harmless in the way described, is by no means so when in pills, powders, or in solution in non-carbonated water.—*The Lancet*.

RECENTLY PATENTED INVENTIONS.**Engineering.**

SMOKE CONDUCTOR.—An improved smoke conductor, patented by Mr. James R. Johnson, of Charleston, S. C., is designed to adjust itself automatically where it is coupled to the cars of a train, and to retain its connection whether the train is on a curved or a straight track, the whole being arranged so that it may be regulated from the cab of the locomotive. A section of the conductor is mounted upon each car, and one is provided for the locomotive and another for the tender. The forward end of the conductor enters the smoke stack, and a valve is provided for directing the steam and products of combustion from the locomotive smoke stack through the rearwardly extending conductor. In front of the smoke stack is arranged a flaring mouthpiece opening into the stack opposite the conductor, the mouthpiece serving to gather air as the train moves forward, and assist in propelling the sparks, gas and steam through the conductor.

ASH PAN FOR ORE ROASTING FURNACES.—Mr. Simon B. Dexter, of Glendale, Montana, has recently patented an ash pan for ore roasting furnaces, especially those described in a former patent by the same inventor. The ash pan is provided with a water discharge pipe and arranged in connection with the water grate so as to receive the cooling water discharged by the grate and convey it, together with the ashes, to the discharge pipe leading away from the furnace.

PORTABLE SELF-RAISING LADDER.—Mr. Benjamin H. Burling, of Fort Ann, N. Y., has recently patented a portable self-raising ladder, which is readily placed in position for use. It is provided with an auxiliary ladder at the upper end, which may be used as an extension of the main ladder, or as a platform or fire escape, which may be projected horizontally into the windows of the upper stories of a building. The lower portions of the side pieces of the main ladder are thickened and provided with tubes, two on either side of the ladder, for conveying hot or cold water or steam for extinguishing fires. The ladder is supported upon a vehicle furnished with a tongue at either end, so that it may be drawn in either direction without the necessity of turning it around.

Railway Appliances.

AUTOMATIC RAILWAY SIGNAL.—Calvin W. Wilhelm, Mauch Chunk, Pa. This signal is set and locked by means of a lever depressed by the wheels of a train and actuating a series of locking levers and latches, the semaphore being released by the closing of an electric circuit as the train proceeds. The electrical parts are so arranged that one battery at each station operates two magnets; and a train may be signaled a block and a half to the rear.

SAFETY ATTACHMENT FOR RAILWAY CARS.—Robert M. Smith, Cherokee, Iowa. This is a support or platform adapted for attachment to the end of a car adjacent to the coupling device, whereby the cars may be coupled or uncoupled by a trainman without exposing himself to injury. A further safeguard is also provided to prevent the train hand from being jolted from the platform.

Mechanical.

A MACHINE FOR LAYING AND SPOOLING WIRE. patented by Messrs. G. B. Johnson and J. O. Hill, of Princeton, Kan., is designed for use with any variety of wire, or other material usually wound in coils, but it is especially adapted to be used in handling barbed wire fencing, the machine being constructed so that the wire may be laid and stretched at one operation. The frame carrying the wire-winding mechanism is mounted on wheels; a shaft journaled in the frame carries a spool containing the wire, and a rod pivoted to the rear end of the frame carries at its free end a guide roll to guide the wire to the spool. The machine has all the necessary adjustments to adapt it to the use for which it is intended.

DYEING MACHINE.—Mr. Joseph Husong, of Camden, N. J., has recently patented a new dyeing machine. This machine is provided with a vat furnished with a cage supported by bell crank levers, the levers being connected by links and arranged to receive oscillatory motion from a rock shaft, the motion of the bell crank levers being made variable by placing the connecting rod in different notches of the arm of the rock shaft.

CHECK PUNCH.—Mr. George L. Banks, of Fall River, Kansas, has patented a check punch which will perforate a check with figures representing the amount of its face value. The device is provided with a series of figure punches mounted in a frame and capable of being brought to the same point before being operated, a registering and indicating device being provided for bringing the punches into the proper position for use. A pair of feed rollers is employed to move the check forward one space for each figure punched, the lower roller of the pair being mounted on a shaft operated by a pawl and ratchet connected with the punching key or lever.

AN IMPROVED GRINDING MILL for gradually reducing grain to different degrees of fineness for flour and feed has been patented by Mr. Le Grand D. Harding, of Colfax, Washington. In this mill one of the grinding rollers has in its periphery an annular recess to which is fitted the annular projecting portion of a second roller, the two rollers running in frictional contact with each other, or with the grain passing between them. The rollers are made hollow from the center to the ends, to receive spouts for conveying away any dust that may be discharged from the ends of the rollers. The grain is fed to the rollers by a feed roll working in a hopper located above the rolls. The rolls being made hollow in the manner described, afford a ready escape for any heat that may be generated in grinding, and by driving one roller by frictional contact with the other, an economy in power is secured.

Agricultural.

POTATO DIGGER.—Mr. John Franklyn Fowler, of Brooklyn, N. Y., has patented a potato digger, formed of a beam to which is attached a U-shaped hanger carrying a plow or point adapted to pass under the hill of potatoes, and provided along its rear edge with a series of divergent fingers or rods projecting upwardly and rearwardly, so that as the potatoes and the earth are raised together by the point as the implement is drawn forward, the potatoes are crowded

over the rods or fingers, when the earth falls through and the potatoes are discharged over the rear extremities of the fingers upon the ground.

Miscellaneous.

WATER TROUGH.—Bernhard Koeppe, Kearney, Neb. This invention relates to an improved trough for watering stock, fowls, etc., and provides a device to be connected to the water supply to control the inflow of water, so that the desired height of water in the trough will be uniformly maintained by the automatic action of the controlling mechanism.

TRUSS PAD.—Joseph Garcia, Paterson, N. J. This invention provides a pad which may be conveniently filled with a liquid or with air as often as desired, while the interior of the pad may be effectually and thoroughly cleaned when necessary.

A NEW SERVICE AND CASH CHECK, patented by Mr. Geo. D. Smith, of New York City, is especially designed for use in restaurants where it is the rule for waiters to collect from the guests or patrons the value of the food served. His invention is designed to assure to the proprietor full returns for the value of the food served, and to prevent collusion between the employes and patrons, without offense to either, and to secure a more satisfactory service. The check is provided with a series of numerals indicating successively higher values of food served, and provided with a series of dots or marks opposite each of the numerals, so that like orders of the same value may be registered by punching out successively the dots or marks of the series opposite the corresponding numerals of the check.

NEW BOOKS AND PUBLICATIONS.

DIE DECORATIVE KUNST-STICKEREI. I. Aufnahm Arbeit. By Frieda Lipperheide. Berlin. 1890. Franz Lipperheide.

The first part of "Artistic Embroidery" deals principally with cut-out figures or patterns attached by stitches or other means on the cloth. The handsomely illustrated book gives full instructions for making such artistic embroidery, and also gives description and illustrations of the tools necessary for the work. The book contains besides the text a number of colored plates and wood engravings illustrating beautiful designs of embroidered covers, curtains, chairs, etc. copied from original designs of the Spanish, German, Italian, and French schools of the fifteenth, sixteenth, and seventeenth centuries. The book, although primarily intended for the use of ladies doing handwork, will no doubt be welcomed in many shops, factories, etc., requiring artistic designs for embellishing the goods manufactured.

The Charter Gas Engine Co., of Sterling, Ill., publishes a pamphlet giving a large number of letters of recent date, from users of their machines, testifying to their efficiency and economy. They are used for every variety of work, from printing presses to grain elevators, and are designed to be perfectly safe, compact and trustworthy, while working with great economy. The engine uses gasoline direct from a tank, and has an automatic governor whereby only as much gasoline is used as required to do the work.

SCIENTIFIC AMERICAN BUILDING EDITION.

APRIL NUMBER.—(No. 66.)

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2. Colored plate of an attractive residence erected at Bridgeport, Conn. Cost \$6,900 complete. Floor plans and two additional photographic elevations.
3. A cottage costing \$2,700 complete, erected for Mr. R. H. Keller, at Rutherford, N. J. Three elevations and plans. Mr. U. D. Peck, architect, Rutherford, N. J.
4. Photographic view and two floor plans of a cottage at Austin, Chicago. Estimated cost \$3,300.
5. A row of new dwellings on West 82d Street, New York. Cost of each house \$20,000 complete. Messrs. Berg & Clark, New York, architects.
6. Cottage recently erected at New Haven, Conn. Cost \$6,850 complete. Floor plans and photographic perspective elevation.
7. An attractive dwelling erected at Yonkers, New York, at a cost of \$6,000. Photographic elevation and floor plans.
8. Two photographic views of the beautiful residence of Mr. Noakes, on Riverside Park, New York City, a colored view of which appeared in the March issue.
9. Sketch of a sixteen story office building to be erected at Chicago. Cost \$750,000.
10. Sketch of a water-cooled building. One of the novelties proposed and patented for the World's Fair at Chicago.
11. Recently erected English houses. Plans and perspective views.
12. Miscellaneous contents: How to catch contracts.—Toggle bolt for electrical and other fixtures, illustrated.—Composition for retarding the setting of plaster.—Quarrying marble.—The education of customers.—Iron and steel for building purposes.—An improved sanitary earth closet, illustrated.—Stamped metal ceilings, illustrated.—The Plaxton hot water heater, illustrated.—A hot water heater for soft coal, illustrated.—An improved woodworking machine, illustrated.—An improved casing for steam pipes, illustrated.

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