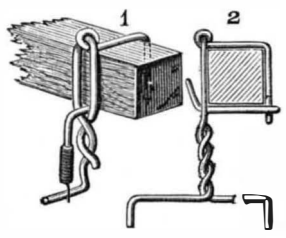
RECENT INVENTIONS.

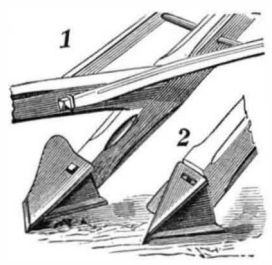
Worline's Clamp Device.

This simple contrivance is designed for fastening a weed and grass turner or a colter to the beam of a plow, and it may be adapted as a splice clamp for beams and other objects required to be clamped together. Different parts of the clamp can be extended in various directions to form various useful devices, such as a weed turning extension for bending over and turning down the weeds and grass in advance of the plow mould board, to cause them to be more effectually and completely covered in the furrows. This device is made wholly of round iron, is very readily applied, and is inexpensive. The engraving shows the construction of the device very clearly. Mr. Chauncy E. Worline, of Prospect, O., is the patentee of this invention.



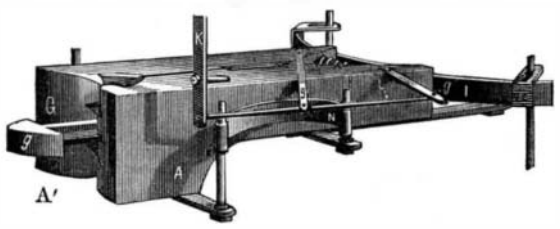
Landside for Plows.

This invention is designed to increase the strength and durability of plow plates, and obtain the efficiency and steadiness of ordinary turn plows without their weight. It consists in a landside for plows made with a slotted flange to rest upon the forward side of the plow standard, and a flange to rest upon the bottom of the furrow, so that the plow will be made stronger, more durable, and more effective, and will be made to run steadier. This invention has been patented by Mr. William B. Wherry, of Overton, Texas.



Car Coupling.

The danger attendant upon coupling in the usual way has prompted inventors to provide some means whereby this work may be accomplished as safely as ordinary railroad work. The devices shown in the engraving are designed to accomplish this work with safety. A A′ are coupling jaws hinged together at *a*. Their forward ends are cut away on their inner surfaces to form coupling hooks, and are cut away to form openings between the jaws for receiving the head of the connecting link, G. The rear ends of the jaws extend past the hinge, *a*, and have a coiled spring placed between to keep the forward ends closed except when they are opened for uncoupling. To open the jaws the rear ends are provided with connecting bars, *g g′*, which connect with



a lever on the under side of the car body. This lever is operated by the hand lever, K, pivoted to the platform of the car. The jaws are formed with slots, through which bolts pass for securing them to the car, and back of the jaws is placed the spring, I, which acts as a buffer spring to relieve the car from shock. Outside of the jaws are placed the coupling springs, N, which press against the jaws and hold them firmly, except when they are acted upon by the lever for uncoupling the cars. The link, G, is of the form shown in the engraving, made with heads, *g*, side fins, and a center piece or stop. The fins are beveled so as to fit in the openings formed in hooked front faces of the jaws. With the link, G, no bolt is needed, as the shape of the heads keep it in its place, but if an ordinary link is used, a bolt, may be used by passing it down through the opening in the jaws behind the hooks. This coupling has been patented by La Vega T. Williams and Edwin D. Knight, of Poseyville, Ind.

Artificial Stone as a Building Material.

The high antiquity of prehistoric remains is frequently authenticated by the presence of the "sun-baked bricks" found among them. The *Encyclopædia Britannica*, in an article on St. Jean d'Acre (a town and seaport in Syria, and in ancient times a place of some celebrity), says: "Its great antiquity is proved by fragments of houses that have been found, consisting of that highly sunburnt brick with a mixture of cement and sand, which was only used in erections of the remotest ages."

In Scotland, Ireland, and Wales it has been found that the most durable material of those old "castles of the gallant clans" is concrete, in which small cobble stones were embedded to form a solid piece of masonry.

The Moors have left samples of their artificial stone inwrought upon the rock of Gibraltar, which have withstood successfully the storms of ten centuries. The Colosseum at Rome presents further examples which have nobly resisted the tests of time; the cisterns of Solomon, near the city of Tyre, which are of still higher antiquity, are almost complete in their preservation; and at Jerusalem there are to be seen five immense courses of Cyclopean masonry, the base of the wall of the city (now inclosing the Mosque of Omar), supposed to be a remnant of the wall of the Temple of Solomon, which, as the record tells us, was "set in its place *without the noise of the hammer and the ax.*"

Scientists have suggested that the Pyramids were mainly built of artificial blocks, manufactured upon the spot, from the sands of the surrounding plain, by some cunning process which has perished with the builders; and travelers have claimed that the Diocletian or "Pompey's" Pillar, and the ruins of Baalbec and Palmyra, are mainly of artificial stone. Whatever may be said of these, we have in the actual measurements of the enigmatical "coffer" in the king's chamber of the Great Pyramid indubitable evidence of its original plasticity. In the first place, we find it depressed upon all its sides, from the corners toward the center, and *unequally* so. The east side of the coffer has been sadly mutilated by tourists, the southern corner being chipped away about two-fifths its height. The mean depressions are at the north end 0·26 inch, at south end 0·19 inch, at west side 0·20 inch, and at east side 0·01 inch. They are observable vertically as well as horizontally. At the south end of the west side there is no depression perceptible; while at the north end of the same side the depression is 0·20 inch, and on the south end, at different distances from east to west, the depressions are 0·08, 0·12, and 0·14 inch. Upon all sides the coffer is highly polished over all these inequalities. Now, no one acquainted with the simplest means of working natural stone would look for these inequalities, and for the corresponding *bulging out upon the inner surfaces* which we find to exist.

The square, the plummet, and the rule would have done their perfect work before the polishing, and if the depressions had been *intentional*, they would have been *regular*. Again, if we take the superficial outside measurements of the coffer, we find the same irregularity. On the east side near the bottom we have a length of 90·5; ten inches below the top, 90·15; on the top, 90·20. On the west side near the bottom, 89·2; near the top, 89·95; at the top, 90·05; mean length, 90·01. At the north end near the bottom, 39·05; near the top, 38·7; at top, 38·67. At south end near bottom, 38·8; near top, 38·6; at top, 38·5; mean width, 38·72. From all which we argue that the coffer was moulded in its present position from plastic material, and that it became thus slightly warped, or shrunken, as it dried—in short, that it is of artificial stone, and not of "porphyry," of "black marble," or of "a darkish variety of red and possibly syenitic granite," as has been variously asserted.

Coming down to a later period and a little nearer home, we have in the city of Santo Domingo some of the most interesting historical monuments of this material. This is the oldest existing settlement by white men in the New World, being founded by Bartolommeo Columbus in 1494. Although built on a solid limestone formation, the city is surrounded by a wall of artificial stone, eight feet thick, built (in 1506) of *mamposteria*, "a composition of earth, powdered stone, and lime." Many of the more ancient houses and public buildings of the city, constructed of this material, are still standing and are remarkable for their solidity; the cathedral, especially, in which the remains of Columbus and his brother Bartolommeo reposed for two and a half centuries, which was begun in 1512 and finished in 1540; while on the opposite bank of the river the so-called "Castle of Columbus," a fortified stone house subsequently built by Diego Columbus, the son of the great admiral, is in ruins.

The Vanne Aqueduct, in France, is another example. Gen. Gillmore characterizes this as "the most important and costly work that has yet been undertaken in this material," being thirty-seven miles in length. This aqueduct, which supplies the city of Paris with water, traversing the forest of Fontainebleau its entire length, comprises two and a half to three miles of arches (some of them as much as fifty feet in height), eleven miles of tunnels, and eight or ten bridges (from seventy-five to one hundred and twenty-five feet span) for the bridging of rivers, canals, and highways. The smaller arches are half circles, and are generally of a uniform span of thirty-nine feet four inches, with a thickness at the crown of fifteen and three-fourths inches. Their construction was carried on without interruption through the winter of 1868–69 and the following summer, and the character of the work was not affected by either extreme of temperature. The spandrels were carried up in open work to the level of the crown, and upon the arcade thus prepared the aqueduct pipe was moulded of the same material, the whole becoming firmly knit together into a perfect monolith. The construction of the arches was carried on about two weeks in advance of work on the pipe, and the centers struck about a week later.

The lighthouse at Port Said, in Egypt, is another interesting structure of this material. It is one hundred and eighty feet high, without joints, and rests upon a monolithic block of the same material containing nearly four hundred cubic yards.

An entire Gothic church, with its foundation walls and steeple in a single piece, has been built of this material at Vesinet, near Paris. The steeple is one hundred and thirty feet high, and shows no cracks or other evidences of weakness. M. Pallu, the founder, says that "during the two years consumed by M. Coignet in the building of this church, the material in all its stages was exposed to rain and frost, and it has perfectly resisted all variations of temperature."

But we have upon our own shores a building antedating these structures nearly thirty years. This is the residence of the late George A. Ward, Esq., at New Brighton, Staten Island, familiarly known as "the cement house," built in 1837, and ten times more solid to-day than the day it was erected. There is no more exposed place to test the stability of this material than the north shore of Staten Island, where this building stands. We confess to some misgivings as we approached it last summer, not having seen it for about thirty years, but we left it more than satisfied, and to such of our readers as require the test of Thomas the doubter, we commend a pleasant trip over the Bay of New York, and a personal inspection.

Another building is the residence of Wm. E. Ward, Esq., at Portchester, N. Y. This is beyond doubt the most expensive private residence of the kind yet erected in this country. It is a perfect monolith, from the lowest line of the cellar wall to the top course of its towers, and is a monument at once of the enterprise, taste, and munificence of its proprietor, a monument, too, which is likely to endure when some other monuments have crumbled in decay. A full description of this building was given in the *American Architect* of August 17, 1877, and a further description was read before the American Society of Mechanical Engineers, at their recent meeting in the city of Cleveland. Perhaps the severest tests to which the material has ever been subjected were in the great Chicago fire of 1871. While granite was chipped and splintered into fragments, while limestone was reduced to powder, while sandstone was disintegrated, and iron twisted into fantastic shapes, artificial stone alone remained intact, and was in shape to be immediately relaid. Several instances could be given, conspicuous among which, however, is the front of the store 114 Monroe Street, which, although thrown down by the failure of its iron supports, was taken up, stone by stone, and relaid. Many of the stones were placed in their original positions; some few were fractured by the fall, and had to be replaced by fresh ones, but none were disintegrated or fractured by the fire, and all were utilized. The front stands to-day exactly as it did before the fire.

The architect is often required to manage a sea wall or a cellar wall where the action of water is to be considered in connection with the safety of his superstructure. And here we claim the vast superiority of this material. In basements it will be found not only waterproof, but *rat proof*. The United States Government has recently employed it as the base of a lighthouse in the Chesapeake, where heavy masonry had proved inadequate, and they would have done better if they had followed the example of the French Government in the construction of the lighthouse at Port Said, and constructed the whole building of the same material. As a sea wall, the jetties of the Mississippi are perhaps the best example we have in this country. When we consider that this great river is the outlet of twenty of our States and Territories, covering an area of 750,000,000 acres—the granary and the principal cotton producing region of the world—the importance of these jetties cannot be overestimated And hand in hand with their far-reaching commercial value is the triumph they have so signally achieved for artificial stone; for it must be conceded that without this element of success, the jetties would have been a failure. Indeed, they had already proved so, and in less energetic hands they might have been abandoned. The jetties themselves, primarily jets or projections of wicker work, anchored in place and secured in position by rubble and heavy stone, proved inadequate to resist the easterly storms that sometimes prevail, and it became evident that some further protection of the work was required. Heavier stones, some of them weighing three thousand pounds, were accordingly and with great difficulty anchored upon the jetties; but these proved also insufficient. Resort was now had to monolithic masses of artificial stone, and they have proved successful where nothing else could; some of the blocks being thirteen feet in width, five feet thick, and fifty-five feet long, and weighing more than two hundred and sixty tons. One mile of the east jetty and half a mile of the west were thus effectually protected, and so complete were the appliances employed upon the work that it required only the hands of two men to mould them and place them in position.

The jetties at the mouth of the Suez Canal are of a cheaper quality of beton, and are not monolithic, the blocks weighing only about twenty tons; but they are sufficient for the purpose, eighteen thousand of them being employed in the work.

From the description we have given, the far-reaching utility of this material is quite palpable. Its durability is established beyond cavil, and it has the approval of the most eminent architects and engineers of both hemisperes. While other material is constantly undergoing disintegration and decay, this as constantly improves by age. In the air, in the water, in the fire, and in fact under all imaginable circumstances, the certainty of using it with success is one of the greatest of its recommendations.—*H., American Architect.*

A New Bisulphide Engine.

What is represented as a successful attempt to utilize the bisulphide of carbon to drive a steam engine is described in the Lowell (Mass.) *Daily Courier*, of August 13. With the engine and heater in use the improver, Mr. W. S. Colwell, gets an expansive force of 51 pounds per square inch at the heat of 212°, which in the steam engine, with vapor of water, is *nil*. The claim is made for this motor that the objections heretofore urged against the use of bisulphide of carbon are all removed by Mr. Colwell's methods, which have been carried beyond the experimental stage.