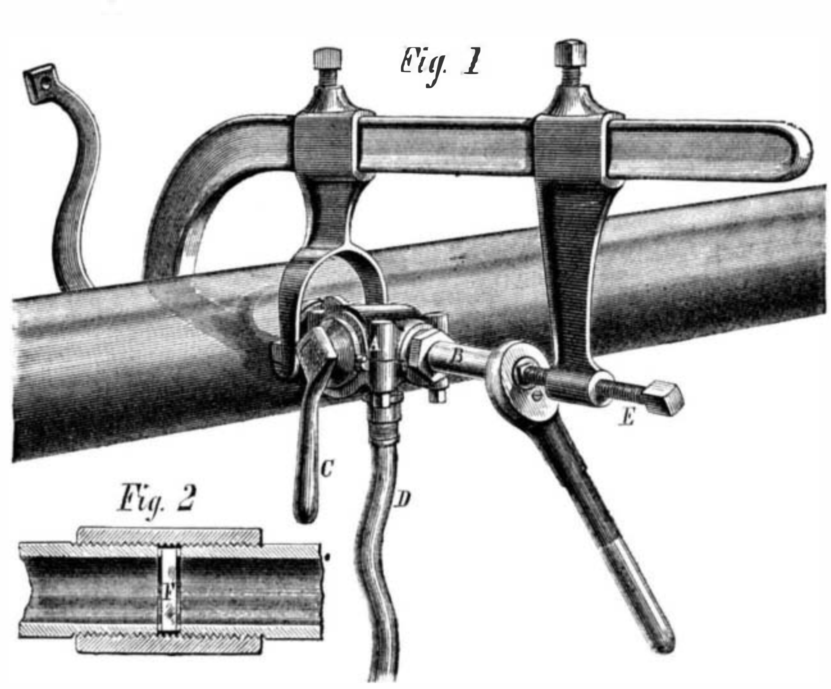
YOUNG'S WATER MAIN TAPPING MACHINE.

This invention, an engraving and description of which we presented in the SCIENTIFIC AMERICAN of June 7, 1873, has recently been the subject of several improvements. These mainly consist in the material used in the construction, the main bar being made of cast steel, and all other portions of steel or brass, thus avoiding any difficulty from springing while in operation. The two parts of the drill case, A, are clamped by bolts and receive the drill, B. At the end nearest the pipe is a detachable washer, in a socket having a concave face to be clamped against a packing gasket in order to make a watertight joint. Instead of making this packing in two parts as formerly, it is now formed solid and a round stop cock employed, over which the packing is pulled when the machine is removed. The handle at C communicates with a cock within, to close the aperture when the drill is removed, said cock having a notch to allow of the passage of the tool. After the hole is drilled and the point of the implement drawn back beyond the cock, the latter is turned so as to close the orifice. The connecting pipe is then substituted for the drill, the cock turned back, and the connection made. The hose at D serves to conduct away chips blown out. The drill is operated by the ratchet lever shown and fed by the screw, E.

The apparatus as improved may be adapted to 1, $\frac{3}{4}$, $\frac{1}{2}$, and $\frac{3}{8}$ inch pipe, by substituting different drills.

This inventor has also patented, through the Scientific American Patent Agency, April 1, 1873, an extra improvement on his device, by which a disk of glass, F, Fig. 2, is substituted for the stop cock usually employed and left buried in the earth, thereby decreasing the expense and simplifying the process. For the purpose of keeping the water back while the connection is being made, the service pipe is constructed in sections coupled together by a union and having between their ends the glass plate. As soon as the work is done, one of the sections is screwed up tightly, thus crushing the glass and permitting the water to flow. The pieces are, of course, quickly washed out.

Further particulars regarding these devices may be obtained by addressing Mr. William Young, Easton, Pa.



YOUNG'S WATER MAIN TAPPING MACHINE.

IMPROVED DUMPING WAGON.

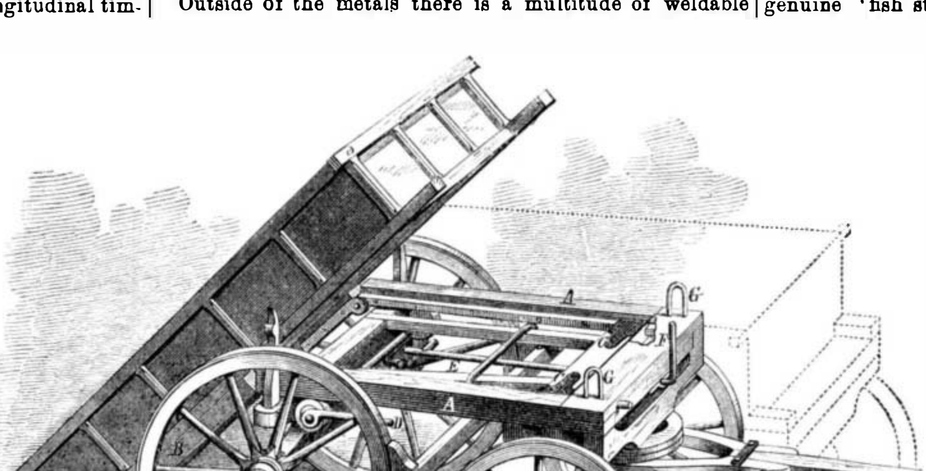
The action of the dumping wagon represented in the annexed illustration is in one sense automatic, inasmuch as, in order to dump the load, it is merely necessary to back the vehicle up to the place of deposit. The construction is such that, when the wagon is thus situated, the rear axle and wheels remain stationary while the front axle and wheels are moved toward them, causing the wagon body to slide over the rear axle and finally to tilt rearward. The reverse operation—that is, simply starting the draft animal ahead—pulls the wagon body back into its place.

The mechanism and its mode of operation are as follows: Under each side of the wagon box are two longitudinal timbers, each of which is made in two parts hinged in the center. The front ends, A, of these timbers are connected by the foot board and are secured to the upper part of the fifth wheel, while the rear portions, B, are permanently fastened to the wagon body. On the sides of the rear hounds are pivoted slides, C, which fit over and move on guides attached to the inner sides of the parts, A, of the bed timbers. Just forward of the rear axle, and suitably connected thereto, is a shaft, on either end of which are adjusted rollers in eccentric journals. To the latter are attached handles, D, by pressing down which the rollers are thrown in action, lifting the wagon body clear of the axle.

Supposing the wagon to be first in the position of the dotted lines in the engraving, it is evident that, the rollers being turned into action and the front axle and frame being pushed to the rear, the wagon body will slide over the rollers until the hinge of the long timbers under the bed is reached. The weight of the load will then bear the rear end, left unsupported downward, and the contents of the wagon will necessarily be discharged. The vehicle is represented in our illustration while in this position.

It will readily be understood, without further explanation, how the application of draft to the pole or shafts of the wagon speedily pulls the front axle forward and causes the body to fall back in its former position. A longitudinal bar, E, having a horizontal projection, and which passes through a keeper in the rear hounds, is then turned by means of the handle, F. The projection, assuming an upright position, just forward of the cross piece of the rear hounds, prevents the same from moving forward and locks the parts in place. The rear levers, D, are also turned up, thus allowing the body to rest directly upon the axle. The forward end of the box is also secured by pins passing through staples, G, which enter slots in the body timbers. The rear wheels are provided with suitable brakes, and the general construction of the vehicle is of strong and durable description. We are informed that the invention is now in use in Louisville, and has proved both efficient and useful.

Patented August 19, 1873. For further particulars regarding sale of rights, etc., address the patentee, Mr. Daniel D. Smith, 376 West Jefferson street, Louisville, Ky.



SMITH'S IMPROVED DUMPING WAGON.

The Philosophy of Welding.

In order to find a true analogy to welding, we need go no further than the vulgar "sticking together" of two pieces of cobbler's wax, pitch, putty, or clay. These are in a viscous or semi-fluid condition, and they cohere by an action similar to the transfusion or intermingling and uniting of two liquids. Iron and platinum pass through a viscous or pasty stage on their way from the solid to the liquid states, and the temperature at which this pasty condition occurs is the welding heat. Other metals are not weldable, because they pass too suddenly from the solid to the liquid condition. Ice, although it fuses slowly, in consequence of the great amount of heat rendered latent in the act of fusion, passes at once from the state of a brittle crystalline solid to that of a perfect liquid. It passes through no intermediate pasty stage, and therefore is not weldable, or does not cohere like iron, etc., at a temperature below its fusing point.

It is usual to cite only iron and platinum, or iron, platinum, and gold as weldable substances, but this, I think, is not correct. Lead should be included as a weldable metal. The two halves of a newly cut leaden bullet may be made to reunite by pressure, even when quite cold. This is obviously due to the softness or viscosity of this metal.

Outside of the metals there is a multitude of weldable substances. I may take glass as a typical example of these. Its weldability depends upon the viscosity it assumes at a bright red heat, and the glass maker largely uses this property. When he attaches the handle to a claret jug, or joins the stem of a wine glass to its cup, he performs a true welding process.

The chief practical difficulty in welding iron arises from the fact that at the welding heat it is liable to oxidation, and the oxide of iron is not viscous like the metallic iron. To remedy this oxidation the workman uses sand, which combines with the oxide and forms a fusible silicate. If he is a good workman he does not depend upon the solidification of this film of silicate, as the adhesion thus obtained would be merely a soldering with brittle glass, and such work would readily separate when subject to vibratory violence. He therefore beats or squeezes the surface together with sufficient force to drive out from between them all the liquid silicate, and thus he secures a true annealing or actual union of pure metallic surfaces.

Cast iron or steel containing more than two per cent of carbon cannot be welded. Why? I think I may venture to reply to this oft repeated question by stating that the compound of iron with so much carbon is much more fusible than pure iron, or than steel with less carbon, and that it runs more suddenly or directly from the solid state into that of a liquid, and hence presents no workable range of weldable viscosity.—*W. Mattieu Williams, in Iron.*

Fishing by Means of Explosives.

At a recent meeting of the California Academy of Sciences, Mr. A. W. Chase, of the U. S. Coast Survey, read a short paper on the capture of fish by the explosion of cartridges by means of fuses under water, which he has practiced with much success. He says: "I have found that the ordinary waterproof fuse will burn about one foot to every twenty-five seconds, and by experiment that a cartridge will explode in from four to six fathoms with from three to four inches of fuse. I have, however, made no exact experiment on the subject. The shock of the explosion is most severely felt downwards, as the resistance is greater; and the different varieties of sea fish found near the rocky shores of the islands as a rule being found on or near the bottom, it is desirable to explode your cartridge about midway between the surface of the water and the rocks beneath, as you thus reach both the deep lying fish and those, like mackerel and smelt, which swim between."

The *modus operandi* adopted by Mr. Chase was to take a small skiff and row out to the kelp beds surrounding the island. "Here, in six or eight fathoms of water, the bottom is distinctly visible. When an unusually large school of fish would swim by, I would quietly light the fuse and drop the cartridge into the water gently. If the water was, say, eight fathoms deep, I would graduate the fuse for explosion at four. The cartridge would slowly sink—generally in a spiral—and a few bubbles of air or smoke arise to the surface. When the fire reached the fulminate of mercury, there would be a sudden white flash, then a quick, sharp detonation, the blow striking the bottom of the skiff as if some one had struck it with a hammer. Then, in a space of time varying from eight to ten minutes, every fish within a radius of forty or fifty yards would slowly come to the surface. Those within the immediate vicinity of the explosion, of course, were killed by bursting the bladder and injury to the large intestines, and had to be speared up from the bottom. Those, however, at a greater distance would be simply stunned, and could be taken in with a net. Care had to be taken to avoid touching those only slightly stunned until the net was fairly around them, as the slightest blow would arouse them from their torpor.

I am now about to relate what will, perhaps, be called a genuine 'fish story'; but as I have, in addition to my own, the testimony of my men to the fact, I give it as it occurred:

I had brought up by an explosion a number of yellow bass fish, weighing about four pounds each. These are delicious in chowder, and so instead of putting them in alcohol I had them cleansed, which was done by scaling, removing the intestines, and cutting off the fins and tail. The head, however, still remained joined to the back bone. These fish, from the time they had been taken from the water up to the time of cleaning, remained apparently lifeless. Nor did the removal of the intestines arouse them. They were then taken up to the old barracks, where I was temporarily camped, and hung upon nails driven in the clapboards. Some little time after they had been thus disposed of, one of the men came in and asked me to go out to look at the fish. I did so, and found every individual bass slapping around in as lively a manner as if he had been freshly caught and hung up. They had, in fact, recovered from the explosion, and proceeded to die in the common fashion. I took one down and broke the backbone where it joined the head. Its struggles ceased instantly, thus showing that the vital force had been arrested in the nerve centers and brain at the time of explosion, and, when the effect had passed away, that the fish had resumed a galvanic life. It was probably about half an hour from the time of explosion when this occurrence took place. I have not been able since, however, to secure the same result, although I must state that the only time since then that I have tried the experiment was on the Oregon coast, where I brought up a school of salmon, all of which were pickled for Agassiz. These fish were, howver, too close to the explosion, as they were killed outright."

REMEDY FOR INSECT STINGS.—M. Dauverne says that 30 or 40 grains of quicklime dissolved in water is a thorough remedy for the stings of insects, and far superior to ammonia or any other alkali.