

back is made as thick and wide at the middle as will fit the mortise in the wind shaft. The proper bearing must be given the back on the neck and journal. The proper inclination varies in different circumstances; the general rule is to give them from one to two inches to the foot of fall.—*American Miller.*

New Car Heating Apparatus.

A new car heating system has been adopted by the Metropolitan Elevated Railroad, of this city, and the apparatus has been applied to all of the cars on the road. Each car is provided with two radiators, composed of sections of three inch cast iron pipe, connected end to end by short pieces of one inch wrought iron pipe. These radiators are arranged along the sides of the car, one on each side, under the seats, and the steam pipes of the several cars in a train are connected by flexible pipes. Steam is taken directly from the locomotive boiler and reduced to about 5 lbs. pressure. It is conducted through all of the radiators in the train upon one side, and is returned to the locomotive by the radiators and connections on the other side. The water resulting from the condensation of steam is discharged into the water tank of the locomotive.

A steam siphon, which is connected with the discharge pipe, is used to remove water from the pipes, and to accelerate the circulation when required.

This system promises to be very successful. It is controlled by the American Car Heating Company, of Albion, N. Y.

Iron Working Improvements.

An English inventor proposes to prepare from iron a hydrated peroxide by forming heaps or beds of the metal, and keeping it moist with water or a saline solution, and in some cases he hastens the oxidation by the use of a galvanic battery. He takes the hydrated peroxide thus obtained and reduces it to a fine powder. He places at the bottom of a crucible a quantity of the oxide, and over it places cast iron; the crucible is then heated in a furnace until the iron is melted, and as soon as the oxide has acted sufficiently the metal is cast into ingots. These ingots are employed in the manufacture of steel by remelting them with steel or iron scrap, according to the quality of resultant required.

This hydrated oxide is also used with good effect in puddling furnaces, being spread over the bottom, and the iron melted and worked over it.

INCLINE CUTTING, DRAWING, AND STAMPING POWER PRESS.

Nearly every size and description of power cutting, drawing, and double action, also screw lever, pendulum, and drop presses is made by Messrs. Bliss & Williams, of Brooklyn, N. Y. The uses to which these are applicable are very numerous, being employed by manufacturers of house-furnishing wares, sheet iron goods, silver and plated ware, etc. The one represented here is of an entirely new pattern, having been designed especially with a view to insure simplicity, rapidity of action, and the effectual accomplishment at one and the same time of that which has hitherto only been done by two or three operations. As its name indicates, it is for cutting and drawing boxes and many other articles formed from sheet metal.

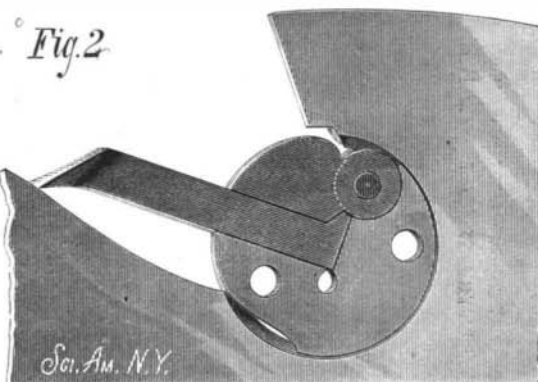
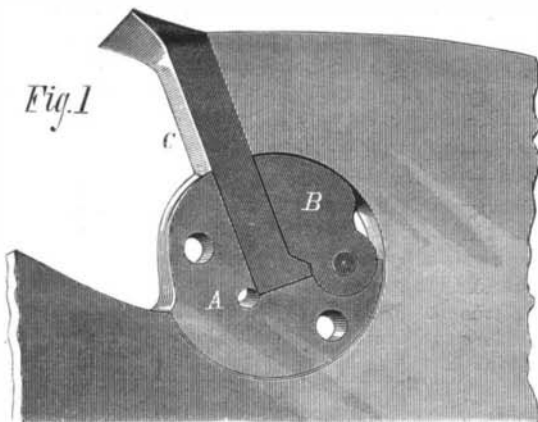
This press has a new motion that is operated by a cam outside the press, and which actuates the (incased) under slide, upon which is fastened the die or pattern. This die, meeting the punch as it descends, embosses the design on the cover or box, which is at the same time formed by the process of drawing. One operation is thus saved, and the work is performed well and with great accuracy. This press is especially adapted for the formation of sardine boxes, spice box covers and bottoms, blacking boxes and covers for the same, besides many other articles of similar character, with or without embossing or lettering. Work 6 inches in diameter and $1\frac{1}{4}$ inch in depth can be drawn. When required the press can be arranged to draw $10\frac{1}{2}$ inches in diameter and $1\frac{1}{4}$ inch in depth. The engraving represents the press to a scale of three quarters of an inch to one foot. The speed of the balance wheel is 60 revolutions per minute; diameter 36 inches, width 5 inches, weight 600 lbs. The total weight of the machine is about 3,300 lbs. The manufacturers have been very successful in the construction of presses for sheet metal work. They received a bronze medal and diploma at the Centennial Exhibition in 1876, and have recently been awarded a gold medal at the Paris Exhibition for the presses exhibited there.

Further information may be had

from Bliss & Williams, 167 to 173 Plymouth street, corner of Jay street, Brooklyn, N. Y.

A NEW INSERTED SAW TOOTH.

Our engraving represents a novel inserted saw tooth recently patented by Mr. Frederick Schley, of 88 Cannon street, New York city. It consists of a circular holder made



SCHLEY'S IMPROVED SAW TOOTH.

in two parts, hinged together, grooved around its edge, and fitted to a circular notch at the base of the saw tooth, the saw plate having a V shaped edge which fits the periphery of the holder. A space is left between the hinged portions, A B, of the holder, to receive the tooth, C, and there is a notch for receiving the small projection at the base of the

tooth. This prevents the tooth from drawing out, and it is prevented from lateral motion by a groove in the tooth and a V shaped edge on the holder and saw plate. The tooth is inserted in the holder when it is in the position shown in Fig. 2. It is then raised up into the position shown in Fig. 1.

The tooth is in this manner clamped very tightly, and cannot become accidentally loosened except by a fracture of some of its parts. It will be noticed that the holder (which is shown full size in the engraving) takes up only $1\frac{1}{4}$ inch of the saw plate, and the entire depth of the tooth is not over $1\frac{3}{4}$ inch. This is an important saving when the recutting of the saw is considered.

For further particulars address the inventor as above.

A Curious Experience.

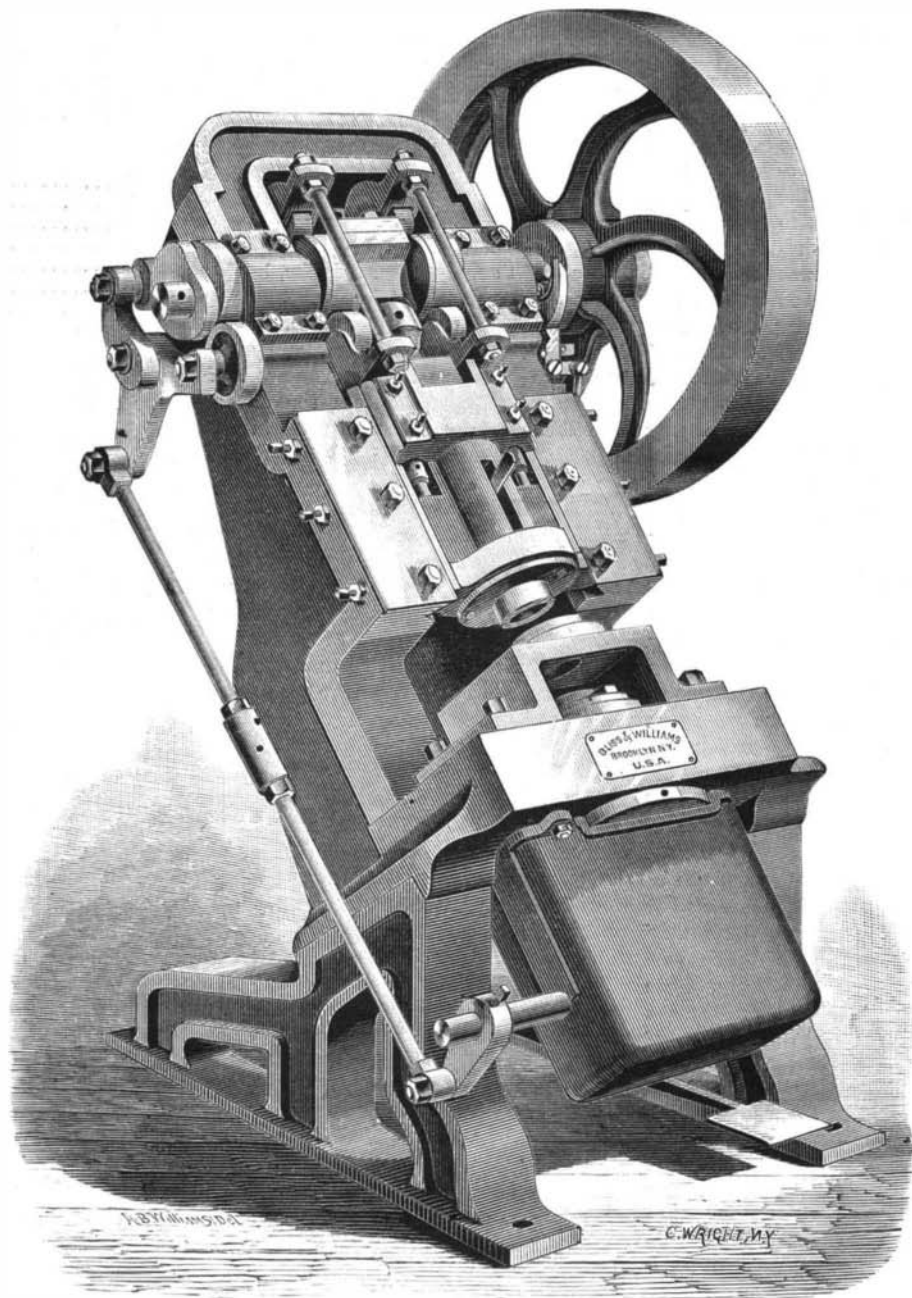
In an account of the part played by General Gordon, of the Confederate Army, at the battle of Sharpsburg, Va., where he was wounded five times, the *Atlanta Constitution* says:

"We hear from General Gordon's own lips a story that, in a metaphysical point, is exceedingly interesting. He says that when he fell (struck by a rifle ball in the face) he was utterly incapable of moving. He gradually began to think of his condition, and this is the half dream and half soliloquy that he carried on: 'I have been struck in the head with a six pound solid shot. It has carried away my head. On the left side there is a little piece of skull left. But the brain is gone entirely. Therefore I am dead. And yet I am thinking. How can a man think with his head shot off? And if I am thinking, I cannot be dead. And yet no man can live after his head is shot off. I may have consciousness while dead, but not motion. If I can lift my leg, then I am alive. I will try that. Can I? Yes, there it is, lifted up! I'm all right.'

"The General says that every stage of this soliloquy is indelibly stamped on his mind, and that in this exhausted state the reasoning was carried on as logically as ever man reasoned at his desk. Doubt succeeded argument and argument displaced doubt just as logically as could be. He says he will never forget with what anxiety he made the test of lifting his leg—with what agony he waited to see whether or not it would move in response to his effort, and how he hesitated before trying it for fear that it might fail and his death be thereby demonstrated."

Accurate Tunneling.

An exceedingly difficult piece of underground engineering, and one which furnishes an admirable illustration of the accuracy of calculation based on scientific principles, has just been completed in Pennsylvania, at the Hampton mine of the Delaware, Lackawanna, and Western Railroad Company. The *Scranton Republican* says: "The mine has been idle for improvements for some time, and the work under notice is the construction of a tunnel in the rock vein, making one slope serve the purpose for which two slopes and a 'dip' were formerly employed, effecting a considerable saving in men, mules, and machinery, and shortening the distance from the scene of the mining operations to the foot of the shaft by at least 2,000 feet. The survey was begun six months ago by Mr. Joseph P. Phillips, Mine Surveyor, under directions of Mr. Snyder, the company's Chief Mining Engineer, and from the outset was attended with the greatest difficulty. Over seven eighths of a mile, principally through old tumble-down workings, had to be surveyed, and 85 sights, at as many different angles, taken before reaching the point opposite the shaft from which operations for the tunnel should be commenced. The most difficult feature was to strike the exact starting point, so that the tunnel, when completed, would be found mathematically correct on grade and point. A variation of a few feet up, down, right, or left would entail additional cost and labor in going over the task to secure uniformity, so that it is not to be wondered at that those responsible for the work regarded it with some anxiety until the workmen met in the middle of the tunnel, and proved the problem to be correct. At least a quarter of a mile of the survey was made through old workings where the roof had fallen in, and in some places the space was no more than two feet high, so that Mr. Phillips and his assistants were compelled to crawl through it. The survey was plotted on a scale of 100 feet to the inch, and the result, when the men who had been tunneling in opposite directions cleared away the last barrier, and met face to



BLISS & WILLIAMS' CUTTING, DRAWING, AND STAMPING PRESS.