

## SETTING DIAMONDS IN TOOLS.

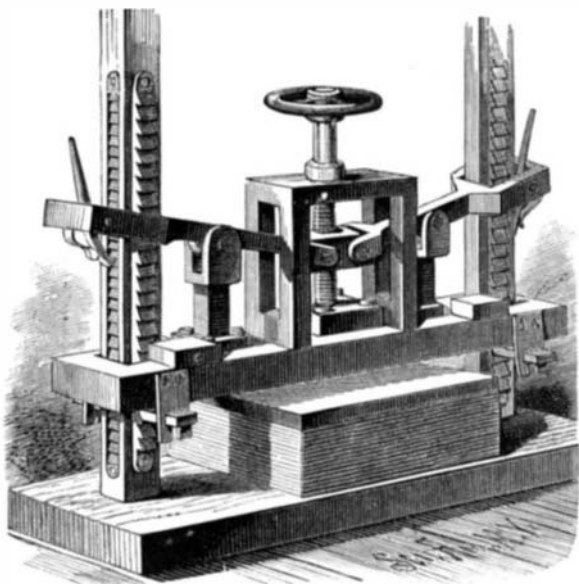
The engraving shows an improved method of inserting diamonds into the teeth of boring, drilling, sawing, grinding, and other tools, by which the diamonds are rigidly and permanently secured in position without bracing or soldering and without any possibility of their getting detached. The large cut shows the tool mounted for drilling; Fig. 2 is a vertical transverse section of a boring tool; Fig. 3 is a top view of the same; Fig. 4 is a top view of a tool of larger size; Fig. 5, top view of a hollow drill; and Fig. 6 is a side view of a tooth for stone cutting saws. The stock of the tool is provided with one or more transverse recesses of dovetailed shape, the sides of which converge slightly toward the longitudinal axis of the recess.

Inserted in the recesses are the diamonds, which are shaped at two opposite sides so as to correspond exactly to the shape and size of the recess. To obtain diamonds of the proper size required for the different tools, the raw diamonds are broken up, which is accomplished by making a slight incision with a diamond cutting tool at the point where the diamond should be separated, and then cleaving the stone in the line of the incision by a suitable tool. The diamonds are then cut into shape, and inserted with the narrower end foremost into the bit by aid of a few light blows. The double wedge action of the recess holds the tapering base of the diamond rigidly in place. The diamond projects at both sides of the bit, and is also pointed at its center when required for boring purposes. For larger sizes of boring tools, several diamonds of smaller size, shaped as described, are driven close to each other into the recess, as indicated in Fig. 4. When used for stone cutting saws, or for rock drills, the stones are so inserted that the longitudinal inclination of one transverse recess is in the opposite direction to that of the next adjoining recess, thereby exposing the stock to the same strain on both sides. By this method the diamonds can be inserted at the place of use by an average mechanic, so that the necessity of returning the bits for setting is obviated; and when they become worn off they can be exchanged, and used with bits of smaller size until they are entirely used up.

This invention has been patented by Mr. Anthony Hesses, who may be addressed care Messrs. Geopels & Raeger, Tryon Row, New York city.

## IMPROVED PRESS.

Our engraving shows a press designed for the use of book binders, printers, metal workers, and for purposes where a compact and powerful apparatus is desirable. The follower is mortised to allow the passage of two standards that rise from the ends of the bed. The sides of the standards are fitted with ratchets, and in grooves on the platen are sliding dogs that are forced into contact with the ratchets by springs so as to prevent the rise of the follower. The dogs are drawn out to allow adjustment of the follower to or from the bed, according to the height of the material to be pressed, and suitable levers may be provided for moving all the dogs at once. At the middle of the follower is a stand supporting a screw operated by a hand wheel on its upper end. Levers, hung on fulcrum posts on the follower



DE NOBILI'S IMPROVED PRESS.

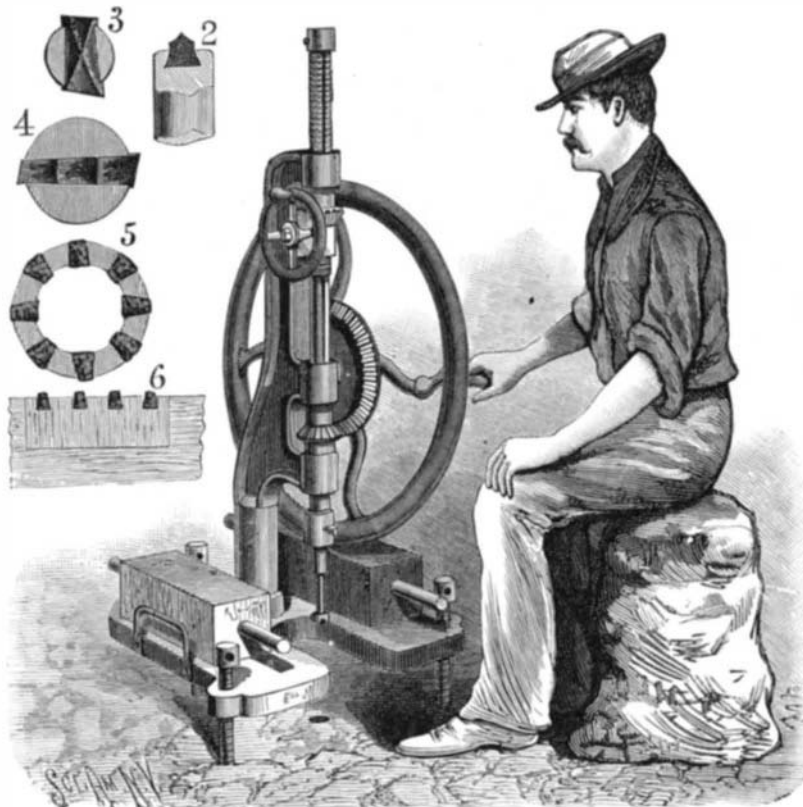
and having their outer ends forked to stride the standards, are jointed to a nut on the screw. Hook ended pawls hung on the outer ends of the levers engage ratchets on the standards in such a way as to permit the levers to descend but not to rise. In operating the press the material is placed on the bed and the follower adjusted on the standards. Then by turning the screw the platen is forced down by direct pressure of the screw and also by the downward movement of the nut acting through the levers. This con-

stitutes a simple and compact device, which exerts great pressure.

This invention has been patented by Mr. A. De Nobili, and additional information may be obtained from Mr. Emil Zucca, of 250 Washington Street, New York city.

## Curious Rock Formation in Orange Mountains, N. J.

The work on the quarry near Mt. Pleasant Ave., near the top of the mountain, which has been carried on for many



HESSELS' METHOD OF SETTING DIAMONDS IN TOOLS.

years, has recently revealed a very curious formation of rock and has attracted much attention. So much interest has become centered in this discovery that Prof. Geo. H. Cook, of Geological Bureau, New Jersey, made a recent visit to Orange with the special object of making an examination of this geological formation; and his report reveals the curious fact that the formation there, and at the famous Giant's Causeway, Ireland, are almost identical. The rock is basaltic trap, and is deposited in columns from 15 ft. to 40 ft. high, as perfectly cut as if moulded in forms, and owing to their hexagonal or pentagonal shape offer the suggestion that their formation was crystalline. At the two extremities of the quarry the columns are vertical, while in the middle they diverge in every direction, from a point at top of clearing perhaps a hundred feet above the base of the quarry. The columns at the northern end are the largest, some of them being 4 ft. across a single side, while the smaller columns present faces not over one foot across.

Prof. Cook states in a letter to the *Orange Journal* that "it belongs to the same class of rocks, both in material and structure, with the Giant's Causeway in Ireland, but it is on a much larger scale, as will be seen by comparing the dimensions (which are given above), with the following taken from a description of the noted curiosity of Ireland, which says: 'In diameter the pillars vary from 15 to 20 inches, and in height some are as much as 20 feet.'"

These basaltic columns are undoubtedly of igneous origin, and the curious feature of them is that they seem to rest upon a platform of red sandstone, of which the mountain is principally composed, and which is a rock of earlier formation than the trap itself. The explanation is that the trap, while in a molten condition, was forced through openings or fissures in the sandstone during some period of volcanic upheaval. It is believed further that there must have been more than one eruption of matter, as the peculiar inclination of the layers would so indicate. The matter of working the rock is very simple, from the fact that the columns are so distinctly cut that without very much effort on the part of the workmen they can be dislodged from beds and rolled to the base of the quarry, almost in their complete integrity. Although there are numerous quarries and formations of trap in the mountain, this is the only one, so far as discovered, which presents the peculiarities observed above.

## Lectures by Sir William Thomson on Molecular Dynamics.

By invitation of the authorities of the Johns Hopkins University, Sir William Thomson, D.C.L., F.R.S.L. and E., etc., Professor of Physics in the University of Glasgow, will deliver in October next a course of eighteen lectures on "Molecular Dynamics," before the Physical Section of the Johns Hopkins University, Baltimore, Md.

The opening lecture will be given on Wednesday, October 1, at 5 P.M. The other lectures will follow on consecutive days at the same hour. Professors and students of physics are invited to attend, and arrangements will be made by which they may easily obtain temporary lodgings, provided an early intimation is received of their intention to come.

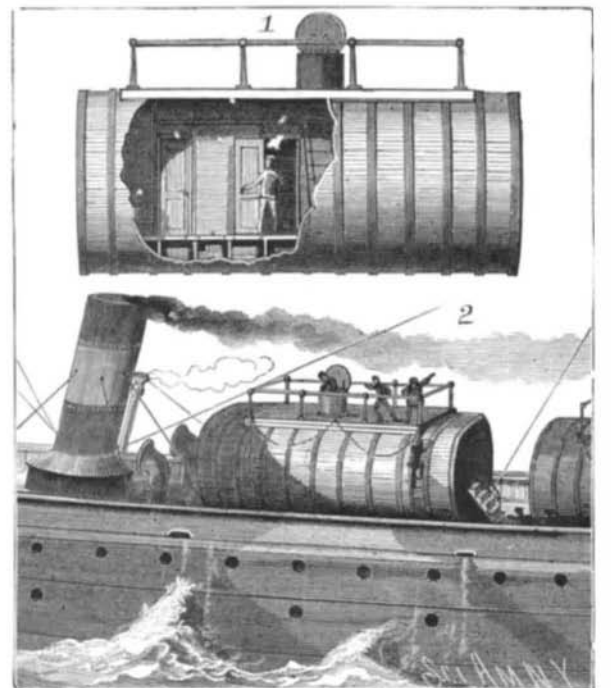
## The Value of Trade Marks.

About a year ago what is styled the New York Cab Company began to run cheaper cabs in the city than the hackmen had theretofore afforded. Their vehicles were so distinctive as to be at once readily recognized, the lower panels being painted yellow and the upper ones having the device of a crown with three feathers issuing from it, encircled with a garter of gold. These cabs at once became favorites, and a prominent hack owner immediately painted over a number of his vehicles in pretty close imitation of the same style, so that the public generally would easily be deceived thereby. The original company then began suit for infringement of trade mark, which Justice Lawrence has just decided in the Supreme Court.

In his opinion Justice Lawrence says that the cabs of the company were painted in a novel and peculiar manner, and that the infringer's cabs were painted and lettered to create the impression that they belonged to the same company. The Justice says: "The true doctrine in cases of this character is, I think, that no one should be permitted to so dress his goods or wares as to enable him to induce purchasers to believe that they are the goods of another." He cites a large number of cases, and goes on to declare that an exact imitation of a trade mark is not necessary in order to convey a false impression. A partial one may be equally effective in misleading one. He does not mean to say that the cab company has an exclusive property in color or words, but that "it has established a trade mark in the color, words, and device as combined, which entitle it to call on a court of equity for protection against an imitation designed to mislead the public and deprive the plaintiff of its profits."

## LIFE RAFT.

Since the life boats, life rafts, etc., used at present on steamers and sailing vessels do not present sufficient facilities for saving the lives of persons on the vessel in case of accident, Mr. John R. Adams, of Houston, Texas, has invented a life raft so constructed that it can be used as a stateroom ordinarily and as a raft in case of danger. This life raft is provided with two oval end pieces, on the edges of which are placed staves held in position by heavy bands drawn together by nuts and bolts. On top is a platform surrounded by a railing. A ladder leads from the hollow shaft on the platform down to the floor of the raft. Between the floor and the shell are formed compartments in which water, food, and other necessaries are placed. The raft is divided by a longitudinal central hallway, extending from end to end, and by transverse partitions forming a series of staterooms. Doors lead from the hallway into the staterooms and into a toilet room formed at one end. Access to the compartments beneath the floor is had by trap doors. In each stateroom are bunks, which are hinged to the side walls and provided with suitable means for holding them in place. At the end of the raft opposite the toilet room is a door opening to the hallway. The raft is held on deck by chains, and the staterooms are used, access being had through the end door, which in case of danger is closed



ADAMS' LIFE RAFT.

and securely bolted, the entrance then being made through the shaft. In case the vessel sinks, the raft, being disconnected from the deck, is washed off and floats like a huge cask or barrel, and as it is closed on the sides and ends it can be thrown about by the waves without injury to the occupants. As all the staterooms on deck can be constructed in this manner, it is evident that a steamer can carry sufficient rafts for a large number of persons without wasting any room.