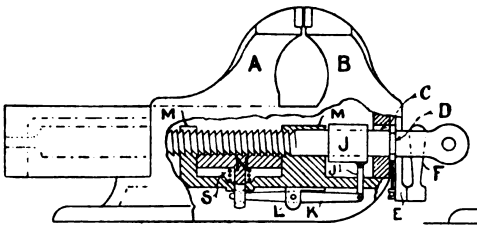


FIG. 1

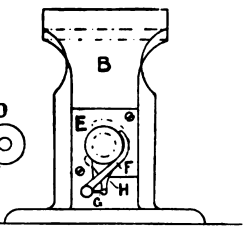
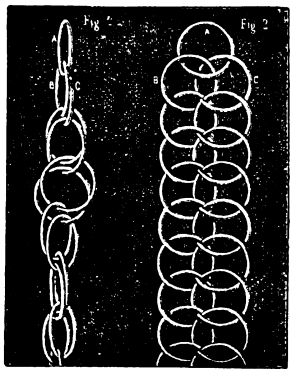


FIG. 2.

vice, having some of the parts cut away. Fig. 2 an end view. The fast jaw of the vice is denoted by the letter A, and the loose or sliding jaw by B, the latter having an oblong hole at C, through which the vice screw passes, and is carried at the opposite end in the usual manner. The vice screw collar D works against the end face of the sliding jaw, and is inclosed by a cap, E, which also acts as a carrying plate for supporting levers arranged in the following manner:—A journal is formed in the lower portion of the cap-plate E, in which is mounted a short shaft, having a lever, F, secured thereto on one side of the cap-plate, and a lever, G, secured at an angle thereto on the other side. To the latter is attached a yoke, H, partly embracing the screw-collar D, inclosed within the space covered by cap-plate E. In the recess within the loose or sliding-jaw B, on the screw is placed a sleeve, J, connecting thereto by link J^1, a lever, K, fulcrumed at L, and extending through a slot-hole cut in the shank of a half-nut, N; a spiral spring, S, is on this shank compressed between the underside of half-nut and vice base; and the half-nut is kept in its position by the lugs M M. On pressing the lever F in the direction of the arrow towards the vice-screw, the short lever G raises the yoke H, and thereby the vice-screw, the latter causing the lever K to be operated on its fulcrum, and the half-nut, N, to move towards the base-plate, thus further compressing the spiral spring S; thereby moving the vice-screw and half-nut in opposite directions, to such an extent that the threads are clear or unmeshed, enabling the operator to move the loose or sliding jaw as required without turning the screw.

THE MAGIC CHAIN.

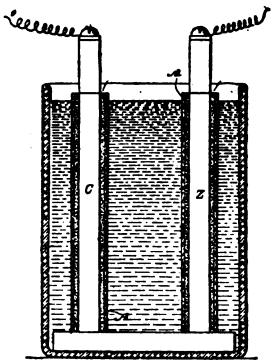
A CURIOUS little thing is to be seen occasionally offered for sale in the streets, and as it is easy to make, and is the subject of a very remarkable optical illusion, it may interest our readers. It consists of two chains, the links of which are crossed, as shown in Fig. 1. By holding



in one hand the highest ring A, and raising the ring B with the other, if the ring A is dropped it will appear to fall through the ring C, and so through the remaining rings, until it reaches the bottom of the chain. The fall of the ring is really an impossibility, and is only an optical illusion. In raising the right chain the rings are in some measure turned, and the movement is transmitted from one ring to the other so that the first one seems to fall from the top to the bottom of the chain, when, in reality each ring drops successively. The movements, however, are so rapid that the eye cannot follow them, and receives the impression that the same ring is descending throughout the chain. Fig. 2 is the plan of the two chains of which we have only shown one end. The chain, however, can be made of any length.

FAURE'S IMPROVED SECONDARY BATTERY.

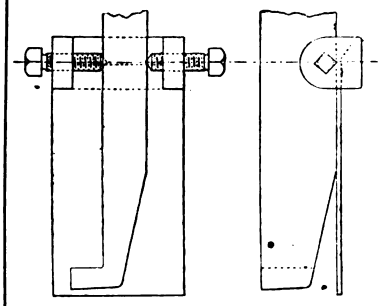
AN improved secondary cell has been recently patented by M. Camille Faure, in which he employs elements widely separated in the electromotive scale. They are composed of finely divided particles pressed together in a self-supporting mass or body, or composed of plates of metals having combined therewith finely divided and compressed particles of the same metal. Each element is inclosed by a diaphragm or septum of prepared asbestos, which consists of sheets 1-32in. thick, dipped into a solution of soluble salt, such as the chloride of calcium or the chloride of barium. The sheet is then dried, after which it is dipped into a solution of a soluble silicate, such as the silicate of soda or a fluosilicate, which are capable of producing with the first-named substance an insoluble compound. The elements so prepared are placed in a cell containing an electrolytic solution, which



must be of such a nature that in the process of electrolysis it forms an insoluble compound with the metal or metals composing either or both elements. Thus, M. Faure takes zinc and copper and combines with the zinc finely divided zinc, and with the copper finely divided copper. The electrolytic solution preferably employed contains the phosphate of potash. The accompanying cut shows the cell diagrammatically. C and Z are copper and zinc plates, having combined with them the same respective metals in a finely divided compressed state. These are wrapped with asbestos A, prepared in the manner described above and immersed in the proper solution containing phosphate of potash. On subjecting such a cell to the action of an electric current, phosphate of copper is formed upon the surface of the copper element, the phosphoric acid for this purpose being electrolytically separated from the solution, and combines with the copper to form an insoluble compound—i.e., the phosphate of copper. M. Faure then substitutes a fresh solution of phosphate of potash for the exhausted solution, and upon connecting the battery in a simple circuit for the purpose of discharge, phosphoric acid is transferred from the solution to the zinc and from the copper to the solution, so that the solution remains unchanged as regards its constituent elements. Of course this preliminary preparation would be avoided if phosphate of copper were placed upon the copper element in the first instance; but phosphate of copper is not easily obtained and manipulated, and the process described is said to accomplish the object desired.

TOOL LIFTER FOR PLANER.

THE annexed illustration shows a device for raising the tool on a planer when cutting a T-slot, which may be of interest to many. It was sent to the *American Machinist* by "Workman, Johnston, Pa.," and we append the comments of our contemporary. The designer says:—"I think it is a good deal better than fastening the clapper of the planer or the tool. It is simply a piece of flat iron, thick enough to allow a ¼ set screw to work in nicely. I will omit sizes, for of course it must be made to suit size of tools used and depth of slot cut. The lugs for the screws are bent at right angles, so it will go over the tool, and the set screws have their points sharpened, so they will work in centre punch marks on the tool. It is put on the back of the tool, then, when the tool goes through its cut, this device swings on its centres away from the tool, and slides over the top of the work; then at the end of the stroke it swings to its place against the tool again, and as the work comes back strikes against it and lifts the tool up, causing



it to slide over. Most all machinists know what a trouble it is to hold the tool rigid in its place; then, if it happens to get loose, there is a wreck, and if that don't happen, the cutting edge of the tool gets dull very soon, on account of being pressed close to the work on the back stroke."

[We think no planer man will fail to see that here is a device worth far more than what little trouble and expense is involved in making it. Some planer hands always lift the tool by hand on the back stroke when doing such work, and we think that, where it is possible to do so, it is much better than to fasten the tool and let it drag through; but either way it is very liable to catch, and when it does the consequences are not usually very pleasant. Here is a device by the use of which all trouble of that kind can be avoided. By having room enough between the lugs, and making the set-screws sufficiently long, it can be thrown over to one side or the other for right or left-hand tools. It is better for almost any tool not to let it rub over the work on the back stroke, especially when taking a finishing cut with a heavy tool; and devices have been applied to planers for automatically lifting the clapper at the beginning of the back stroke, in order to prevent the tool rubbing over the surface of the work. In having the engraving made we took the liberty of changing it slightly, so as to make it in the form shown instead of making it of one piece of sheet metal, bent into shape. In this form the piece tapped for the set screws may be of iron, bent into shape and finished, with a piece of sheet steel riveted to the inside of it, which gives the advantage of a light, thin piece at the back of the tool, with ample depth of hole for the set screws.]

HANLEY'S COMPOUND ROTARY MOTION.

AN improved rotary motion device, which can be applied to cycles and machines with similar mechanical movements, has been patented by Mr. J. F. Hanley, of State-street, New York. The shaft has two cranks set diametrically opposite each other in a yoke-shaped frame, the journals of the shaft passing through circular hubs or bosses on both inner sides of the frame, and upon these hubs or bosses are hung the forked ends of a hand lever, A. This lever is connected by a fulcrum pin at *a* to the middle of a pair of link bars, which at their outer ends are jointed to the ends of two levers pivoted in the yoke-shaped frame at B B, on opposite sides of the crank shaft. These levers, at their outer ends, curve partly around the shaft, and are separately connected by pitman rods, C C, to the two cranks of the crank shaft. When the hand lever A is oscillated, its forked ends turn on the hubs or bosses in the yoke-shaped frame, and through the link bars, to which it is pivoted at *a*, it transmits motion to the two curved levers, which causes the pitman rods C C to act on the oppo-