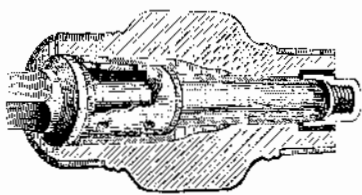


RECENT INVENTIONS.

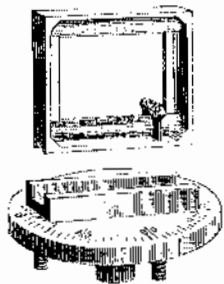
Improved Vehicle Axle.

The engraving shows an improved vehicle axle recently patented by Mr. John J. Maroney, of Bergen Point, N. J. The axle is made with a collar at the inner end or base of its arm, in the usual manner. On the axle at the inner side of the collar is formed a second collar to receive and fit into the end of a hollow cylinder, which is made of a larger diameter than the diameter of the axle, and has an inwardly projecting annular flange, formed upon its inner end. The edge of this flange has a screw thread formed in it to fit into the thread formed upon the collar on the axle. The space between the cylinder and the axle is to receive oil or other lubricant, and may be filled with cotton waste or other packing, if desired. In the shell of the cylinder is formed a number of holes through which the lubricant can escape to lubricate the outer surface of the cylinder and the surface of the part of the thimble skein or axle box that fits upon the cylinder. In the top of the arm of the axle is formed a long groove, and in the bottom and sides of the axle arm are formed short grooves. Both grooves pass through the collar and serve as channels to conduct the lubricant from the cylinder to the forward part of the axle. The thimble skein is made with an enlargement at its inner end to receive the cylinder, and is provided with wings to prevent it from turning in the hub. In the engraving parts are broken away to show the internal construction.



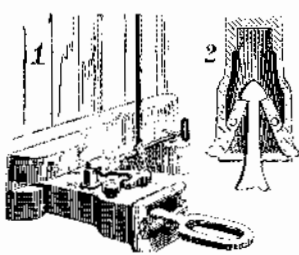
Improved Instrument for Leveling, Surveying, etc.

The object of this device is to combine into one compact instrument the different tools used by engineers who erect machinery, foundations, shafting, bridges, etc. The instrument consists of a rectangular frame, carrying in its lower part a longitudinal and a transverse spirit level. The top part of the instrument is hollowed out for a telescope tube, having a center on one end and a wire cross at the other end. The instrument can be used as a try square, as a spirit level, as a spirit plumb, and, with a small addition, as an inclinometer. The telescope tube is intended to facilitate the erection of such pieces as are required to be in a straight line toward a given distant point, as for instance parts of line shafts, etc. In this case the engineer places the instrument on the shaft he wants to adjust; he then looks through the telescope tube toward the given distant mark, which mark shows the point where the shaft is to go through the wall, and he then adjusts the shaft until he can see the desired mark through the telescope, the shaft then being in proper alignment, and level. This instrument may be provided with the foot of a surveying instrument, as for instance the one shown in the engraving, which is formed of a shoe having a center in a graduated plate, the plate having adjusting screws for vertical adjustment. Thus it will have all the requirements of a common surveying instrument. The principal feature of this device is its compactness considering the many uses to which it is adapted. The instrument has been patented by Rudolph Peter, P. O. Box 40 Hartford, Conn.



Improved Car Coupling.

This invention is designed to improve the usual means for uncoupling the pivoted wings of a drawhead from an arrowhead link, and for holding the link up in front, so as to be conveniently guided into an opposite drawhead. The draw head is provided with an inwardly-tapering end opening, behind which the opening in the drawhead is straight, and provided in each side with a recess or groove, in which are placed wings (Fig. 2) adapted to swing laterally, and mounted on vertical shafts journaled in the top and bottom of the drawhead, the upper ends of the shafts projecting from the top of the drawhead. Hooks projecting toward each other, so that the point of one rests against the shank of the other, are rigidly mounted on the upper ends of the wing shafts. One hook is provided with an arm, to the end of which an angle lever is pivoted, the outer end of this angle lever being pivoted to a horizontal movable rod, which extends to the side of the car. A lever pivoted to the rod extends to the top of the car for operating the coupling from the car top. The cars are coupled automatically, the end of the drawbar entering the drawhead, pressing the wings laterally until the arrowhead has passed. Then the springs hold the ends of the wings against the shank of the drawbar, and prevent it from being withdrawn, as the shoulders of the drawhead strike against the



ends of the wings. When the cars are to be uncoupled, the rod is drawn toward the side of the car, turning the shafts, so that the wings will be swung from each other, thus permitting the drawbar to be withdrawn. If the rod is moved in the opposite direction, the inner end of the angle lever will be pressed on the head of the pintle, and the pintle will be pressed down into the drawhead, and depress the inner end of the drawbar, thus raising the outer end, to guide it into the opposite drawhead. This coupling is the invention of Mr. B. F. Metz. Further particulars may be obtained by addressing Messrs. B. F. Metz and J. Kauffmann, Osborn, Ohio.

New Pencil Holder.

The engraving shows a pencil holder having spring jaws for pushing the pencil outward, and conical jaws held to their seat by a spring for holding the pencil against the return movement of the push jaws, the whole being inclosed in a case. The tubular case of the holder is made of convenient length and size, and into the upper end is fitted a short tube having a knob or cap upon its outer end, held up by a spiral spring. The movement of the short tube is limited by a pin projecting from a slot in the side of the case. To the inner end of the short tube are attached the upper ends of two springs which extend downward and are curved outward, and the bends thus formed rest against the inner surface of the case, so that their elasticity will force the jaws, formed upon their lower ends, inward to grasp the pencil or lead. As the tube and springs are pressed downward, these jaws clamp the pencil and force it downward. The lower end of the holder is made conical and fits upon the pencil. The upper part of the point is made tubular in form, and of such a size as to fit into the lower end of the case, where it is secured. Upon an internal shoulder of the point there is a small spiral spring, through which the pencil passes, and which supports two jaws, which are concave to receive and fit upon the pencil. The outer surfaces of the jaws are made conical in form, and fit into a conical tube which fits into the upper part of the point, where it is secured in place by a bayonet clutch, as shown in Fig. 2. As the pencil is forced downward by the downward movement of the spring jaws, the friction of the pencil upon the conical jaws will tend to move these jaws downward into the larger lower part of the tube, and the pencil will slide down between the conical jaws. As the upper or spring jaws begin to move upward, their tendency is to carry the pencil with them, but the spring forces the conical



jaws into the tube, where they are contracted upon the conical inner surface of the pencil with sufficient force to hold it against the pull of the upper spring jaws, so that the pencil will be forced downward a short distance at each downward movement of the jaws. In supplying the holder with a pencil, the point is detached from the case, and the pencil is inserted through the tube and spring jaws from the inner end of the point. The upper end of the pencil is inserted in the lower end of the case, is guided into the space between the jaws, and pushed upward until the point reaches its seat. The pencil is then pushed inward to the proper point, when it is ready for use. When the pencil is not required for use, it can be pushed inward, so that the pencil point will be protected from being accidentally broken. This invention was recently patented by Mr. B. Eybel, 321 East 54th Street, New York city.

New Fire Escape.

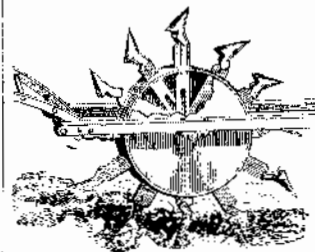
This fire escape is built on a truck having attached to it a base frame provided with upright rods connected at their upper ends in pairs by cross bars. Bearings attached to the corners of a canvas covered frame slide on the upright rods, and are held up by springs connected with the base and top frames, and with interposed sliding side bars. The top frame is held from rebounding by ratchet bars and spring pressed pawls, which can be withdrawn, to allow the top



frame to be raised by the supporting springs, by arms attached to upright rack bars, connected by levers and a rod, whereby both pawls can be withdrawn at the same time. When the apparatus has been drawn to the side of a burning building, the people jump one after another upon the covering of the top frame. As each one alights upon the covering of the frame and forces the frame downward, the several sets of springs are put under tension successively, so that the downward movement of the frame will be stopped before the frame encounters a rigid resistance, and the person will be saved from severe shock. The person using the escape is kept from being thrown off and injured by the rebound of the springs by the ratchet bars and pawls, which detain the frame at its lowest point of descent. This invention has been patented by Mr. Jarvis E. Davis, of Union, Oregon.

Improved Rotary Plow.

The engraving shows an improved rotary plow, recently patented by Mr. G. A. Betancourt, of 108 Aquacate, Entre Teniente Rey y Muralla, Havana, Cuba. This plow has a rotary drum carrying plowshares, and mounted in a suitable frame guided by handles, and drawn forward by horses in the usual manner. The drum is provided with a series of diametrical slots or mortises, in which are placed as many plow standards, each capable of sliding longitudinally through the drum and carrying at each end a plow. As the plow is drawn forward, the points enter the soil in succession, and remain there until the limit of the end motion of the standards. At the same time they are tipped in the soil very much after the manner of hand spading, loosening and turning the soil in a very effective manner. The plows may be made in various forms and sizes, and they may be used in gangs.



Stripes of Red Blood in Fishes.

Professor H. N. Mosely, in his Challenger Notes, says: While dredging was going on off the Kermadec Islands, a shark (*Carcharias brachyurus*) which was attended by a pilot fish (*Naucrates sp.*) was caught; it was, as is commonly the case, covered by a small parasitic crustacean, a species of Pandarus. Some specimens of this parasite had, curiously enough, a barnacle (*Lepas*) attached to them as large as themselves.

On the shark being skinned, I noticed that a layer of superficial or skin muscles, extending all over the animal, and only about one-fourth of an inch in thickness, is colored dark red by blood coloring matter (hæmoglobin) as are all the muscles of mammalia. The main internal muscular mass of the shark is pale, almost white. Professor Ray Lankester has described several instances of the restriction of the red coloring matter to certain muscles only, in animals which possess it.*

A closely parallel case is that of the little fish, the "sea horse" (*Hippocampus*), in which the muscles of the dorsal fin only are red.

Mr. Lankester accounts for the presence of the hæmoglobin in the dorsal fin muscles only in this case, by the special activity of the fin in question, but such an explanation fails in the case of the shark, the skin of which is apparently immovable; moreover the structure of the skin precludes the idea of the red matter beneath it having a respiratory function. Mr. Lankester has shown that hæmoglobin is entirely wanting in one fish at least, the white transparent oceanic surface fish *Leptocephalus*, and I believe that small oceanic flat fish, *Pleuronectids*, will prove also to be devoid of red blood coloring.

Nickel Wire in Silver and Gold Lace.

The silver plated copper wire hitherto employed soon rubs off, and the unwelcome disagreeable red color of the copper makes its appearance in spots here and there. MM. Comte and DeBary Kroess have used aluminum alloyed with silver to avoid this difficulty.

We learn from the *Polytechnisches Notizblatt* that Troeltsch and Hanselmann, in their lace factory at Weissenburg, make use of nickel which has been deprived of its brittleness. Fleitmann and Witte, of Iserlohn, made the discovery, not long since, that the addition of a small quantity of other metals would render the nickel so ductile that it could be drawn out into wire of the finest numbers and be scarcely inferior to copper. Wire has been drawn so fine that 18,000 meters only weighed 100 grammes (or twelve miles weighed about 3½ ounces avoirdupois).

Ductile nickel differs from copper, so that the increase of price for increased sizes differs from that of the plated copper wire hitherto in use.

For articles subjected to much wear and the action of the weather this ductile nickel will be very useful. For the lace used on military uniforms the plated copper wire will go out of use entirely, as nickel wire would always keep white and no verdigris ever be formed. Great anticipations are made for it in other directions, too.

The Hudson River Ice Harvest.

The Hudson River ice crop of the season just closed is rated as one of the largest, if not the largest, ever harvested. It amounted to nearly 8,000,000 tons.

It is said that not so many new houses were built last fall as the previous one; still, those constructed were quite large, and increased the storing capacity 200,000 tons. The ice gathered ranges in thickness from eight to twenty inches, and, owing to the low condition of the river when it froze over, is as clear as crystal. The housing this year cost from 4 to 7 cents less per ton than last year. Notwithstanding the cry of short crop last winter, about 100,000 tons remained in houses unsold at the beginning of the year. Nearly 50,000 tons of this was ice gathered in 1880, which had been held ever since for a good market. But little ice was stacked.

* E. Ray Lankester, "On the Distribution of Hæmoglobin," *Proc. Royal Soc.*, No. 140, 1873.