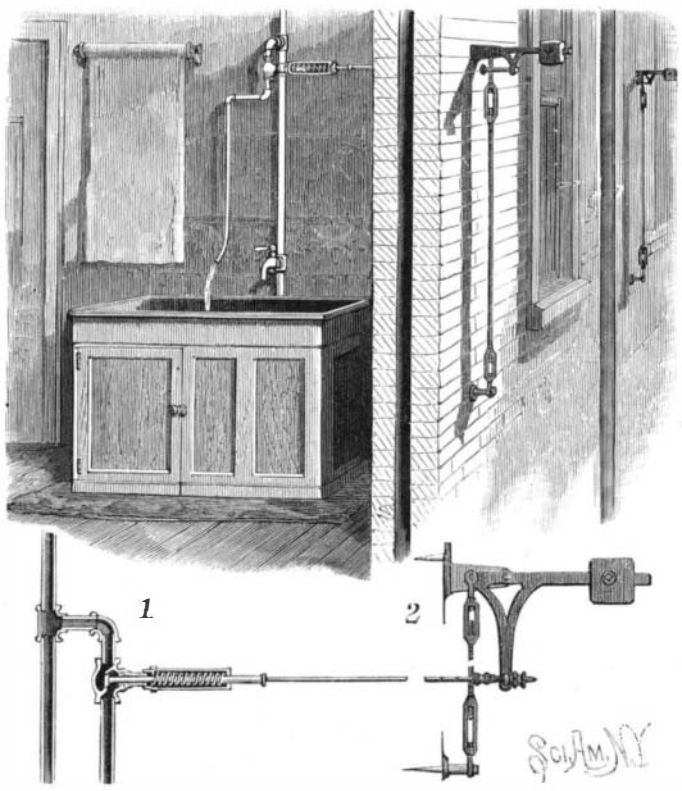
PROTECTOR FOR WATER PIPES AGAINST FREEZING.

The device herewith illustrated, designed to protect pipes against injury from the freezing of the water in them, is founded upon the fact that water in motion will remain liquid at a lower temperature than water at rest. One end of a copper rod, placed outside of the building, is secured to a bracket, and the other end is attached to one arm of a weighted elbow lever. To the other arm of the lever is secured a rod, which passes into the building and operates a valve in the water pipe. The arrangement of the parts is shown in Fig. 2. By means of turn buckles the length of the copper rod can be adjusted so that, before the temperature reaches the point at which there would be danger of the water in the pipes freezing, the valve will be opened to allow a flow of water; beyond this point the valve opening will increase and the flow become more rapid as the cold becomes more intense. As the temperature rises, the valve is closed. This plan sets up a current in the pipes, which replaces the water as it grows cold by the warmer water from the main. Whether the valve be opened or closed, the service pipes are always in working order. Certain conditions govern the location of the valve; when the danger from the frost is in the cellar only, the valve is put in any convenient position above, thereby establishing a flow through the cellar pipes. If the whole system of pipes in a building is liable to be frozen, the valve is placed at the extremity, and all branches are connected to that point, so that the opening of the valve will create a flow through all the pipes.

It is apparent that, owing to height of lower arm of elbow lever, a very slight change in length of rod will effect the opening or shutting of valve.



PROTECTOR FOR WATER PIPES AGAINST FREEZING.

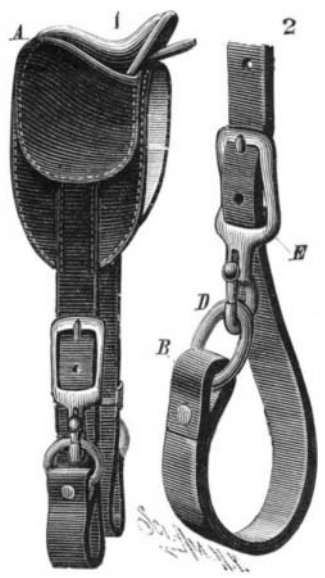
Cutting Things under Water.

When science was in its infancy, much of its fact was mixed with nonsense, and some of the nonsense shows a wonderful vitality. A case in point is the recent republication of a nonsense bit that was current at least forty years ago. It is a recipe for cutting glass with shears or scissors. The statement is that sheet glass can be cut with the greatest ease with a pair of scissors if the glass is kept under water and kept in a level position. That there is not a word of truth in it any one may easily prove on a trial, with the result of dulling a pair of shears.

There is one cutting process that can be better done under water than out of water; that is, the paring of onions. When pared under water the acrid emanations, so unpleasant to the mucous membrane of eyes and nose, are dissolved or held in the water. But neither the quality of glass nor the power of scissors is changed by immersion in water.

IMPROVED THILL HOLDER.

The engraving shows a thill holder, the object of which is to facilitate the work of hitching horses to one-horse vehicles. The holder is a plain strap of suitable length, to be wrapped around the thill, and provided at its outer end, B, with a ring, D. The ring is adapted to be held by a snap hook formed upon the lower end of a buckle, the tongue of which enters one of a series of holes formed in the strap. In use, the



WATTS' IMPROVED THILL HOLDER.

horse to be hitched to the vehicle is placed in the thills, which are raised when the holders are passed under and around them, the ring entering the snap hook. In this manner the trouble of slipping the thills through loops is avoided. Although it is preferable to make the thill holder an extension of the skirt of the harness, it may be made of a separate strap, to be buckled to the skirt in place of the ordinary thill loops. It is apparent that the thill holder is cheap, practical, and convenient, and can be applied to all kinds of harness.

This invention has been patented by Mr. John W. Watts, of 4 Court Square, Montgomery, Ala.

Waterworks on a Small Scale.

The following entertaining account of a primitive but useful waterworks system is taken from *Engineering News:*

The smallest waterworks with which we have, in our researches, become acquainted is at Drewsville, N. H., about four miles from Bellows Falls, Vt. The village consists of a single line of houses built around the four sides of a small "common," of about two acres in extent. The population is 79; the school attendance is 13. It is the home of one of the present proprietors of the Fifth Avenue Hotel, New York city, and from its diminutive precincts have also come several other parties well known in religious, musical, and commercial circles in Chicago and New York. Our family found it a pleasant and healthful place to spend the summer months in on account of its pure mountain air, delightful drives amid lovely scenery, agreeable neighborhood, and its general healthfulness. The houses are supplied with pure and wholesome water, which is brought in wood pipes from a hillside spring a distance of half a mile. The Drewsville Water Company is eighty years in existence, some of the original log pipes being still in use. There are ten shareholders. A small circular wooden well house, 6 feet in diameter by about the same height, is the only structure belonging to the works. Inside this, a pile of stones without mortar is built up to sustain the "reservoir," a wooden box, 2′ x 3′ and 2 feet deep, divided into compartments proportioned to the number of shares owned by individual takers, each share being represented by a small auger hole, which allows the water to run from the common compartment into individual compartments and thence to the distribution pipes. If a "portion" of water is leased by any individual to a neighbor, it is gauged by the stem of a common clay pipe, which is the unit of measurement.

The little community is absolutely dependent on this water supply for domestic purposes. No other source of supply has been discovered, and if a "portion" cannot be obtained from a shareholder, there is no alternative but to move to some other place where water is more accessible. In 1876 new wood pipe for about the whole half mile was laid, and a new well house built, at a total expense of $282.91, which represents about the cost of maintenance of the Drewsville waterworks for three-quarters of a century. The treasurer and superintendent of the company is Mr. E. C. Bond, the village postmaster and storekeeper. The principal duty of the office is to provide a safe and convenient place to hang the key of the well house.

The New York Postmastership.

President Cleveland, in reappointing Mr. Henry G. Pearson to continue as Postmaster in this city for the ensuing four years, has given general satisfaction to the non-partisan but business portion of the community. Mr. Pearson has been in the office almost continuously from his first entrance, in one of the lowest positions, in 1860; he became its chief in the natural order of promotion, and has been foremost in perfecting the admirable system on which its business is conducted, so that he easily obtained the unqualified support of the business community for his maintenance in a position which he has filled neither as a Democrat nor as a Republican, but as a "business man," acceptable to the business community of the metropolitan city of this continent.

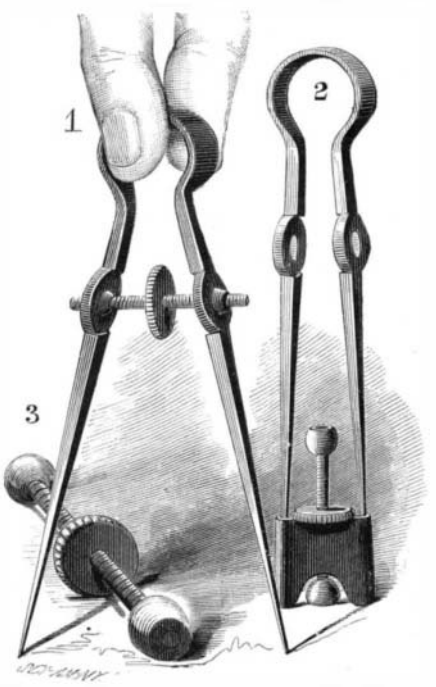
Colored Varnishes for Tin.

Thirty grammes of acetate of copper are ground into a fine powder in a mortar, then spread out in a thin layer on a porcelain plate, and left for a few days in a moderately warm place. By this time the water of crystallization, and most of the acetic acid, will have escaped. The light brown powder that is left is triturated with some oil of turpentine in a mortar, and then stirred into 100 grammes of fine fatty copal varnish warmed to 75° C. If the acetate of copper is exceedingly fine, the greater part of it will dissolve by a quarter hour's stirring. The varnish is then put in a glass bottle and placed for a few days in a warm place, shaking frequently. The small quantity of acetate of copper that settles can be used in making the next lot. This varnish is dark green, but when applied to tin it requires four or five coats to get a fine luster; but two coats are sufficient if heated in a drying closet or on a uniformly heated plate, to produce a great variety of shades of gold. A greenish gold, a yellow of dark yellow gold, then an orange, and finally a reddish-brown shade, are obtained, according to time and temperature. The colors are superior in brilliancy to those obtained with the English gold varnishes, and have the advantage of permanence in the light. If a good copal varnish is used in making this polychromatic varnish or lac, the tin can be hammered or pressed. The production of golden colors depends on the reduction of cupric oxide to cuprous oxide (protoxide to suboxide), which, in small quantities, dissolves in the copal varnish with a golden color. The more the heat, the greater the reduction, and hence the darker the color. Success depends upon applying it evenly and warming uniformly.

IMPROVED DIVIDERS AND CALIPERS.

The legs of the divider are united at the upper ends by a spring, and each is provided, at about one-third of its length from the upper end, with a widened part having a central circular aperture, the edges of which are made concave transversely. In each aperture a spherical nut is placed from the outside; extending through the nuts are the ends of a screw having right and left threads, and having a milled disk at the middle. The spring presses the legs from each other, and this exerts sufficient outward pressure against the nuts to hold them in place by friction and prevent their turning. By turning the milled disk in one direction or the other, the legs will be separated or brought together. When the dividers are to be folded for transportation, the screw is turned out of the nuts and withdrawn from the legs, the points of which are placed in a case, Fig. 2, to protect them, and the nuts are placed on the ends of the screw, which is placed in the case, between the legs, as shown.

The improvement can be worked entirely with one hand, the legs can be rapidly brought together or separated, and a stronger spring can be used, thereby giving more rigidity. It will be particularly useful when applied to small dividers, which can be then adjusted with one hand and without removing them from the



BARBER'S IMPROVED DIVIDERS AND CALIPERS.

paper. This invention has been patented by Mr. Charles S. Barber, of 45 Barbour St., Hartford, Conn.

A VERY curious article of export was recently made to New Zealand. It consisted of a consignment of "bumble bees." At present clover does not "seed" in that country, though it grows readily, because it is believed there are no bumble bees to fertilize the flowers. The importer hopes to remedy this difficulty by the introduction of *bumble* bees; but why this latter instead of the more useful *honey* bee, our informant omits to state.

© 1885 SCIENTIFIC AMERICAN, INC