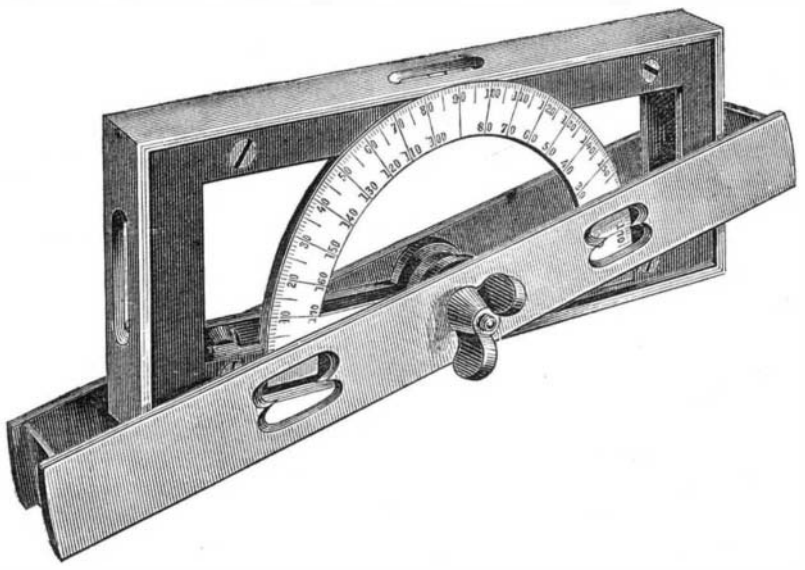
Improved Combination Tool for Machinists and Other Mechanics.

The object of the inventor of this instrument is to supersede a number of separate tools usually required in the shop. It may be used as a spirit level, plumb, try-square, bevel protractor, clinometer, etc., and is adapted to the wants of the machinist, woodworker, draftsman, and surveyor.

The implement is a metallic rectangular frame, having seated in its top and one of its ends spirit glasses for leveling and plumbing work. To the bottom bar of the frame is pivoted a steel frame, held in any position desired by means of a thumb nut. The bolt with which the nut engages is not the pivot upon which the swinging steel frame turns; its object being merely to hold the frame fixed in place. The center of the swing frame has on either side an inward projecting cone fitting into a corresponding recess in the stock of the implement. This gives the frame a large bearing and one always perfectly tight without danger of wearing. A graded semicircle guides the position of the frame, through holes in which the operator can readily see the degree at which he desires to fix the frame. The whole being built strongly of metal, there is very little danger of breaking or wearing out.

It is the subject of one patent obtained through the Scientific American Patent Agency, Jan'y 1st, 1867, and application for another on improvements by A. F. Ward is now pending. All inquiries should be addressed to W. S. Batchelder & Co., Pittsburgh, Pa.



WARD'S IMPROVED COMBINATION LEVEL.

Whitewashing.

A correspondent of the *Germantown* (Pa.) *Telegraph* furnishes the following:

As the house cleaning time will soon be here, it may not be amiss to say a few words in regard to whitewashing. There are many recipes published, but we think the following to be the best that can be used: White chalk is the best substitute for lime as a wash. A very fine and brilliant whitewash preparation of chalk is called "Paris White." This we buy at the paint stores for three cents a pound, retail. For each sixteen pounds of Paris white we procure half a pound of the white transparent glue, costing twenty-five cents (fifty cents a pound). The sixteen pounds of Paris White is about as much as a person will use in a day. It is prepared as follows: The glue is covered with cold water at night and in the morning is carefully heated, without scorching, until dissolved. The Paris White is stirred in with hot water enough to give it the proper milky consistency for applying to the walls, and the dissolved glue is then added and thoroughly mixed. It is then applied with a brush like the common lime white wash. Except on very dark and smoky walls and ceilings, a single coat is sufficient. It is nearly equal in brilliancy to zinc white a far more expensive article.

A Locomotive struck by Lightning.

On Friday last, during the hail storm that visited this section, the eastward-bound train on the Toledo, Peoria and Warsaw Railway, George Boies, conductor, and C. A. Martin, engineer, had just left El Paso when the storm struck it. When about a mile and a half east of that city, the lightning struck a telegraph pole. Instead of shattering it and going to the ground, it burst the insulator, making a blaze of light, passed on the wire to the next insulator, and burst that, with another blaze of light, as intense, a looker-on informs us, as a thousand gas jets, and so on for five poles. It then ran down one pole and leaped to the track, and ran back without doing any damage until it struck the engine. It ran up one of the drivers, and burst a section of two feet out of the solid tire, and passing along the boiler, without doing any damage, it reached the lever and went upward with a blaze of light similar to that on the telegraph wire, and with a detonation like a small cannon. So intense was the light, and so violent was the shock, that the engineer was nearly blinded, and almost stunned. Our informant says that the appearance of the light on the track was brilliant beyond conception. It looked as if there was an immense lake of fire ahead, into which the train was about to plunge, and the contrast between the light and the ordinary daylight that followed seemed as great as that between the brightest day and the darkest night.—*Peoria (Ill.) Paper.*

Venom of Toads.

The toad, formerly considered as a creature to be feared, does in reality possess a venom capable of killing certain animals and injuring man. The *British Medical Journal* says that this poison is not, as in generally thought, secreted by the mouth; it is a sort of epidermic cutaneous secretion, which acts powerfully if the skin be abraded at the time of contact. Dogs which bite toads soon give voice to howls of pain. On examination it is found that the palate and tongue are swollen, and a viscous mucus is exuded. Smaller animals coming under the influence of the venom undergo true narcotic poisoning, soon followed by convulsions and death. Experiments made by MM. Gratoilet, Cloez and Vulpian, show that the matter exuding from the parotid region of the toad become poisonous when introduced into the tissues. A tortoise of the species "Testudo Mauritanicao," lamed in the hind foot, was completely paralyzed at the end of fifteen days; and the paralysis lasted during several months. Some savages in South America use the acid fluid of the cutaneous glands of the toad instead of the curara. The venom exists in somewhat large quantity on the toad's back. Treated with ether it dissolves, leaving a residuum; the evaporated solution exhibits oleaginous granules. The residuum contains a toxic power sufficiently strong, even after complete desiccation, to kill a small bird.

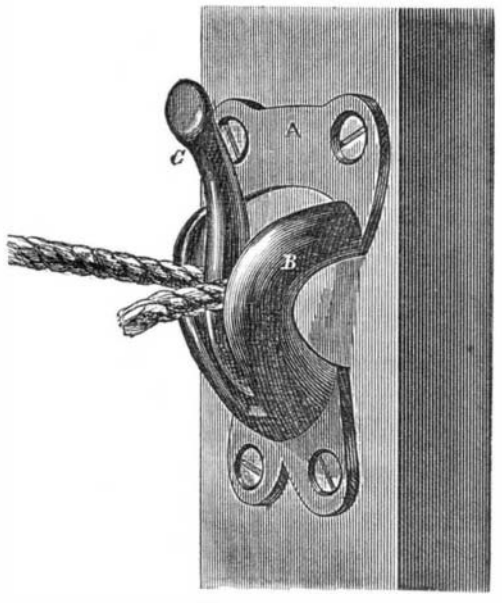
Weldless Steel Tires.

Weldless steel tires are now manufactured in England by rolling. The mill which is used for this purpose consists of two sets of rolls supported by the same framework, but each set working independently of the other. Hydraulic power is employed to press the rolls together. The first set of rolls consists of a single pair. The operation of making a tire consists in placing a hammered ring containing enough metal to form the tire between the first pair of rolls in such a way that the ring incircles one of the rolls. It is then enlarged by rolling, and its section formed in the same manner as a straight bar would be drawn and shaped in ordinary rolling mills.

The second set of rolls is similar to the first with the addition of two side rolls mounted upon a pair of jaws which can be opened and closed by toothed segments operated by a worm having a right and left-hand thread. These rolls finish the tire. Seventy to eighty horse-power are required to drive this mill and the entire operation is completed at a single heat. The same process has been in use for years in this country in the manufacture of weldless iron tires.

GLADDING'S CLOTHES LINE HOLDER.

The engraving shows a neat device for securing clothes lines to any support without the necessity of tying or knotting. It allows the line to be attached or detached instantly, and is adapted to hold not only the ends but to support the line at any intermediate point. It is a simple frame, A, of



cast or malleable iron, with two bows, B, spreading from the bottom up, and having their inner surfaces beveled from the outside inward. Between these is a tongue, C, pivoted at the bottom end and shutting in between the jaws, B. This tongue is also beveled, its lower edge being the thickest.

In use the line is passed over the tongue or looped in between the jaws, and the tongue pressed upward and backward, the bevel of the jaws and tongue firmly holding the line, which can be removed only by depressing the tongue by the hand, thus disengaging the line.

A patent for this device was obtained through the Scientific American Patent Agency April 28, 1868, by James W. Gladding, who may be addressed for state rights, etc., at Normal, Ill.

Deficiency of Mechanics in California.

There seems from all we can gather to be a great dearth of mechanics in California. Wages are ranging at from three to four dollars per day in gold for carpenters, and it is said that at least one thousand more might at once obtain employment there. There is a scarcity of hatters, shoemakers, machinists and workers in all branches of mechanical art. Ten thousand mechanics, it is stated, would readily find employment. Much of the machinery used there is made in England and eastern cities of the United States. Leather is sent to Philadelphia and elsewhere to be made up and returned. It would seem from these statements which are gathered from California papers, as though many young men might better themselves by going there. We understand rates of passage are extremely low this season from New York to San Francisco, on account of the strong opposition existing between the lines of steamers which run between the two ports, via Nicaragua and Panama.

SCARCITY OF FIRST CLASS WORKMEN.

The abolishment of the system of apprenticeship in this country, and the introduction of planers, engine lathes, and other labor saving machines into the machine shops has produced a scarcity of good workmen. The effect of the former has been to encourage a class of half trained mechanics, who, having gained sufficient knowledge to enable them to perform certain kinds of work, and at that to obtain living wages, are content to remain without further effort at improvement. The introduction of machinery to perform what was formerly done by hand has obviated the necessity for that skill in manipulation and nice training of the eye, which in former times were essential for all kinds of work. It is a common thing to find men who can attend a lathe, or run a planer, who are utterly incapable of doing work with a file, and who, if they were set to constructing any machinery requiring nice fitting throughout, would utterly fail. The exceptions to this are rare, and we are afraid they are becoming more so. Mechanical engineers are frequently troubled to find workmen who can properly execute their designs. Especially is this so where new forms are introduced into machinery, when a general lack of resources and expedients will most probably manifest itself. We know of one engineer who could only find at the third trial a shop where he could get work done to his full satisfaction.

We feel satisfied that the training of the eye, in which most deficiency is probably found, owing to the substitution of engine lathe work for hand turning, and planing for the old time chipping and filing, might easily be obtained by practice in drafting, which demands both skill of hand and eye, and to most mechanics would be found a pleasant recreation as well as a valuable accomplishment. At a future time we may say more on this subject.

A New Era in Steam Navigation.

A company has just been formed in New York city, and the necessary capital paid in, for the immediate construction of a new steamboat, 216 feet long, specially designed to run *forty miles an hour*. The boat is to be operated on the plan patented by Stephen I. Gold, a man of science, the inventor of many valuable improvements, among which are Gold's steam-heating devices, now very extensively used. His present invention consists in a new mode of applying steam power to the paddle wheels, by which he is enabled to make use of machinery having great effective force, with but little weight. This results in a reduction of the immersed cross section of the vessel, and a consequent increase of speed over ordinary boats. The new vessel is to be provided with 25-horse power for each square foot of immersed cross section. If this enormous force can be successfully applied to the paddle wheels, the vessel must move at the intended velocity, or something will break.

It has been ascertained that about 1-horse power per square foot of cross section will move a boat at the rate of 10 miles an hour; 4-horse, 20 miles; 16-horse, 40 miles; 64-horse, 80 miles, and so on. But up to the present time no engineering skill has been able to devise a method of augmenting the driving power without also increasing, proportionately, the area of the immersed cross section. Although we have many large and powerful boats, they do not travel much faster than the smaller craft. The fastest of our river boats, such as the *Mary Powell, Bristol,* and *St. John,* have between 3 and 4-horse power per square foot of immersed cross section, and they run from 16 to 21 miles an hour when not affected by wind or tide.

We heartily wish success to the projector of the new boat, and to the enterprising gentlemen who have united to furnish the necessary pecuniary assistance. Whatever the final result, the project is most laudable, and cannot fail to be fruitful in engineering experience.—*The Wheel.*

A SUB-AQUEOUS ENTERTAINMENT.—Boston, capital of the land of notions, proposes to introduce into its 4th of July celebration this year a new feature—a submarine race, or walking match under water. The distance is a mile, from Long wharf to the Cunard wharf in East Boston, and it is proposed that three practical submarine divers shall enter the race. A wag says this is a plan of the cold water men, who wish to show what can be done in their favorite element.

BLACK VARNISH FOR IRON WORKS.—Dr. Lunge distils gas tar until nearly all the volatile products are got rid of, the residual pitch being then dissolved either in the heavier oils, or, if a quick drying varnish is required, in the light oils or naphtha. The advantages of varnish so prepared over the original tar, is that by the above process we get rid of the ammonia, water, carbolic acid, and other constituents that give to tar its disagreeable odor, and make it so long in drying.