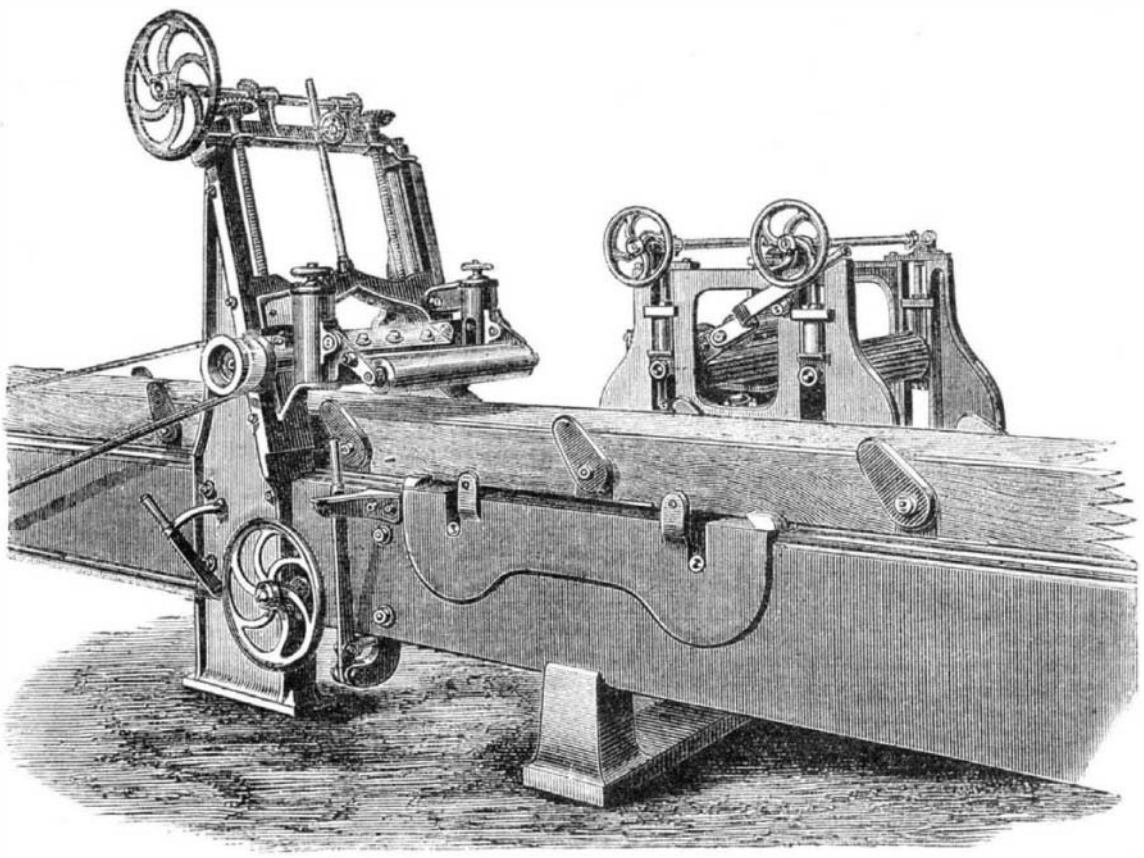
TRYING-UP AND FOUR-CUTTER PLANING AND MOLDING MACHINE.

We illustrate herewith a new wood planing and molding machine introduced by Messrs. Wm. Furness & Co., of Liverpool, Eng., for the combined purposes of dimension planing, or trying-up, and planing on all four sides timber of any length, and up to a given width and thickness. The machine is shown adapted for trying-up or planing perfectly level and out of wind a piece or pieces of timber up to 20 feet long, 20 inches wide, and 16 inches thick. This is done in the ordinary way by revolving horizontal cutters, driven by two bands, one on each side of the machine, the table with the timber traveling under the cutters at the desired rates of feed, a quick return motion being provided for bringing back the table. The novel part of the machine consists in the feed works, which are here shown to be behind the table. These feed works are formed of four calender rollers powerfully geared, between which works the bottom cutter head driven from a countershaft fixed to the framing of the machine. The side cutter heads are in advance of the second pair of feed rollers, and are also part of the feed works. One side cutter head is a fixture, and the other is worked in or out on slides by means of a screw. It will thus be seen that the feed works comprise the feed rollers and necessary driving gear, bottom and side cutter heads, and pressure rollers, etc. The whole is carried by four grooved friction rollers, running on two turned rods supported by the framework of the machine and a bracket at the back.



TRYING-UP AND FOUR-CUTTER PLANING AND MOLDING MACHINE.

When it is desired to use the feed works for tonguing and grooving, molding, or planing all four sides of the timber at once (says *The Engineer*, from which we select the engraving), the table of the machine is rnn forward till the end is almost under the top cutter head, when the feed works can be easily drawn across the framework of the machine. It fixes itself in V slides; and the bands for bottom and side cutter heads having been placed on their respective pulleys—which are fixed on the ends of the spindles, so that no lacing or fastening is required—the machine is ready for work. It will work any size of timber up to 4 inches thick and 12 inches wide. By the removal of the side cutter heads, which is a very simple operation, surfacing or panel planing can be done by the top cutter head alone up to 20 inches wide. A very important feature of the machine is the rapidity with which the feed works can be removed when the machine is required for trying-up purposes, about five minutes being required. A great advantage, and worthy of attention, in this combination of two efficient machines is that they only occupy the same space as one machine, and only require one pulley upon the shaft of the mill to drive them.

NEW MECHANICAL CONSTRUCTION FOR COMPOUND TOOLS.

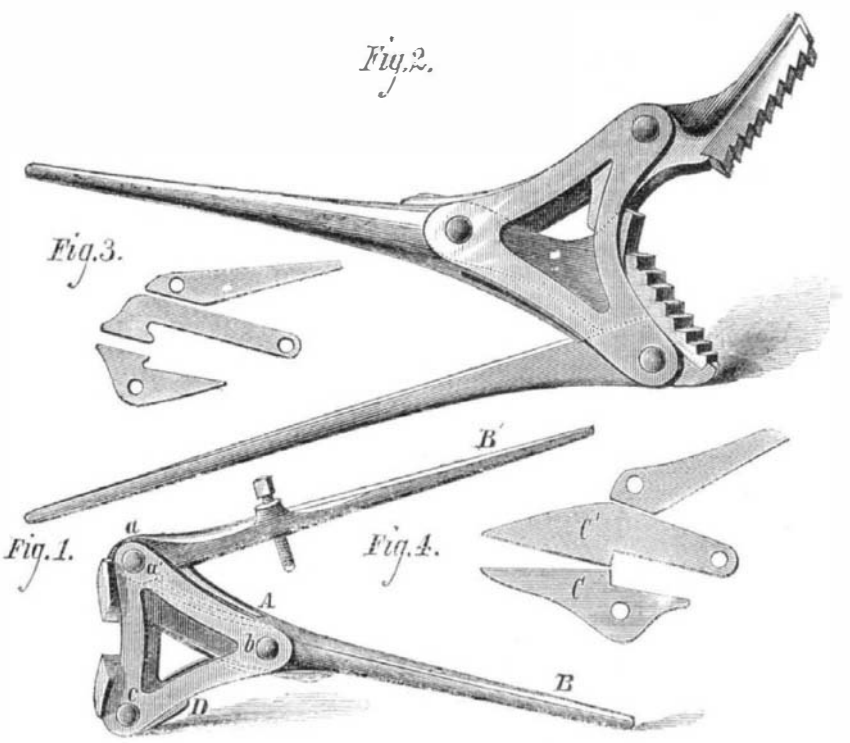
We have lately had brought to our notice an entirely novel construction for scissors, pliers, shears, and other tools of similar nature, which is an invention of considerable utility and merit, and which will doubtless commend itself as a valuable addition to the kit of every mechanic. In using implements with pivoted jaws, a large percentage of the power is wasted in useless strain on the pivot. In the present device, the pivot is abolished, and the jaws are so arranged as to be forced together by a powerful cam lever. To add to the utility of the tool, these jaws are made interchangeable, so that a single stock may answer for saw gummers, pliers, shears, saw set, pincers, and a multiplicity of other implements.

Referring to the engraving, Fig. 1, A is the stock, B B′ the handles, C C′ the operating jaws, and D, a spring for opening the latter. The stock is recessed to form two side pieces, between which the shanks of the jaws are pivoted at *c* and *b*. The upper jaw, C′, Fig. 4, has a long shank which is recessed near its head to receive the cam, B′, which is formed on the handle, B′. The end of the shank of the under jaw, C, which is pivoted, as stated, at *c*, impinges against the shank of the upper jaw. The cam lever handle, B′, is pivoted at *a*.

When the handle, B′, is brought toward the stock handle, the cam on the former presses against the shank of the upper jaw. From this last, motion is communicated to the under jaw, so that each is made to approach the other. By reversing the handle, B′, a more powerful leverage may be brought to bear on the jaws. The cutting edges are thus forced together square and true, not overlapping so as to tear the material apart, as is frequently the case in pivoted cutting tools. There is therefore less strain on the jaws, and they are consequently more durable. A recess is provided through the jaw, C, through which bolts or wires to be cut may extend, so that a bar of any length may be divided squarely at any desired point. Each jaw is tempered separately, thereby giving to both an improved temper, unattainable in the ordinarily constructed implement. Finally, the jaws are easily adjustable, so that in case of injury they may be readily removed and others substituted, or, as above stated, tools for a different purpose may be inserted.

We are informed that, since the date of the patent of the invention, by Peter Broadbooks, of Batavia, N. Y., November 18, 1873, important adaptations of the system have been made, so as to render it suitable for the tools of over fifty classes of m echanics, including, among others, tongs, presses, bolt cutters, pruning shears, punches, pipe wrenches, and horse shoenail clinchers. The construction of the implement last mentioned is shown in Fig. 2. The arrangement of parts is the same as in Fig. 1, except that the jaws are shaped differently and are provided with serrated faces. The jaw operated by the cam lever goes under the hoof, and the angle of the latter enters the curved portion between the jaws. The corrugated face of the upper jaw, therefore, takes against the incline of the hoof, and, as it is rubbed down the same by forcing the handles together, the corrugations catch against and clinch the nails. This is done quickly and without injury to the hoof, thus saving to the animal a large amount of the suffering often caused by the usual mode of clinching.

We have tested various sizes of pliers constructed after the plan described, and find that they cut nails and spikes with great facility, one little instrument, no larger than a conductor's punch, biting off shingle nails as easily as if they were pins. The device is excellently suited for saw gummers.



BROADBOOKS COMPOUND TOOL.

The adaptation of the invention as a hand vise is shown in Fig. 3, and as a shears, in Fig. 4.

Further particulars and descriptive circulars may be obtained by addressing Messrs. S. P. Allen & Co., care of Pollock, Weaver & Co., 17 West Main street, Rochester, N. Y.

New Discoveries in the Mammoth Cave.

Professor F. W. Putnam, of the Peabody Academy of Sciences, Salem, Mass., has recently explored the Mammoth Cave in Kentucky, and has visited several caverns never before entered. His investigations have resulted in finding colored fish without eyes, thus exploding the theory hitherto held that all eyeless fish are colorless. White fish with eyes, and crayfish both with and without those organs, were obtained, presenting many new features of great interest to naturalists. Skeletons of human beings, mounds, and a large variety of valuable archæological relics were found in the new chambers.

Cheap Telegraphy.

President Orton's report of the affairs of the Western Union Telegraph Company is not calculated to inspire much hope in those who believe that the government can run the lines at cheaper rates to the public. On the 1st of January, 1873, a reduction of more than fifty per cent was made in the maximum tariff between the most remote points on the company's lines. This, though occasioning a temporary loss of revenue, has resulted, during the last few months, in a large increase. The reduction was from $7.50 and $5 to $2.50. President Orton now adds that, owing to Messrs. Edison's and Prescott's quadruplex apparatus, which is, at the present time, working successfully between Chicago and New York, and by which two messages are sent in the same direction and two more in the opposite direction simultaneously on a single wire, he believes it practicable before long to cut rates down still lower, and ultimately to establish but four rates for day messages, namely, twenty-five, fifty, seventy-five cents, and one dollar, with half charges (except for the lowest) for night messages.

Decline of City Trades' Unions.

The repeated strikes, and the suffering caused thereby to the workmen participating, are at last beginning to open the eyes of the latter to the evils of trade union rule. It appears that the unions in this city since 1873, taken as a whole, have lost fully one fifth of their members—aggregating 9,000 men. As a rule, these people have found employment, and doubtless now perceive the advantage of steady work, even at lower wages, over starving in idleness in the hope of getting ultimately a few dollars more. Some societies have suffered in a remarkable degree, notably the painters and coopers, which have lost respectively fifty and forty per cent of their members. The building trades show a decline of twenty-five per cent; the shoemakers, twenty per cent, and the cigar makers, thirty per cent. The horseshoers, tailors, hatters and longshoremen maintain their strength, though the numbers of the latter bid fair to be much depleted through the recent difficulties with the shipowners.

The Highest Lake in the United States.

Dr. Harkness has discovered, in Plumas county, California, a body of water, probably the most elevated in the United States, the barometer registering a hight of 7,330 feet above the sea level.

The lake is of triangular shape, having its longest diameter about one mile and three quarters in length. The water during last August was intensely cold and of a deep blue color. The outlet is into Warner Valley, over a declivity of some 2,000 feet. The California Academy of Sciences has named the lake, after its discoverer, Lake Harkness.

Ignorance and Crime.

We doubt if more striking evidence of the necessity of compulsory education laws and the provision of means for their rigid enforcement could be found than appears in a suggestive fact in the pages of a recent report of the National Prison Association. This volume, which is filled with copious statistics of prisons and convicts in this country, deals incidentally with the causes of crime, making its deductions from the various prison reports of the mental and social condition of the incarcerated. Ignorance is proved to be the worst evil with which a community must struggle. Forty-eight per cent of all the convicts in the United States can neither read nor write, and only one per cent of the aggregate have acquired a superior education. We trust that the enforcement of the compulsory laws already enacted in some of the States, will soon justify the wisdom that prompted them, and lead to an improvement in the average education of the lower classes.