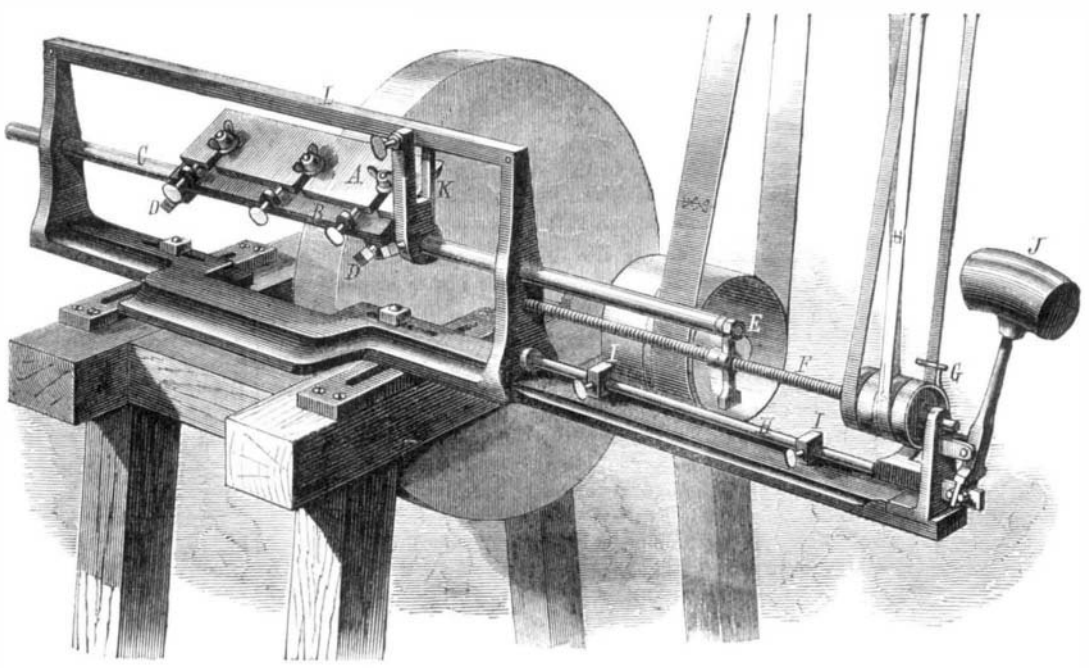
## IMPROVED AUTOMATIC TOOL GRINDING MACHINE.

It is hardly necessary to point out to any mechanic who has ever sharpened a tool, either by hand or by the aid of mechanical apparatus, in connection with the grindstone, that the main difficulty to be overcome is the securing of a perfectly true straight edge. Without entering into the relative merits of the various devices which have been invented in order to attain this object, we desire, in the following description, to call attention to an improved machine, which is claimed not only to grind long cutting edges perfectly straight, or to a perfect curve, but to perform its work automatically without necessitating skilled care. It is also so constructed as to obviate the jumping of the knife on the stone, while its effect upon the latter is to keep it truly round and square on the face.



AUTOMATIC TOOL GRINDING MACHINE.

In our engraving the blade, A, which may be a tobacco, leather, paper, or planing machine knife, or in fact, any other cutter of a length within the limits of the frame, is secured to a tool holder, B. The latter has on its lower side projections through which passes the long rod, C. By means of the set screws at D, the tool holder, B, after being set at any desired angle, may be rigidly clamped to the rod, C, while the knife blade is secured and adjusted on the tool holder by means of the clamping screwr shown thereon.

The rod, C, extends through one of the upright standards of the frame, and carries on its end an arm, E, in which is a nut through which passes the feed screw, F. The latter has near its end four pulleys, two of which are fast and two (the inner ones) loose. The bands of these pulleys are arranged with a simple shifting apparatus, so that only one belt on the fast wheels can be in action at a time, the other belt slipping to the adjacent loose pulley. As the belts, as will be seen from the engraving, are arranged so as to communicate motion in relatively opposite directions, it is evident that, by the means above described, the feed screw may be caused to revolve in either way at will. Communicating with the shifting device, part of which is represented at G, is a stop rod, H, on which are shown two sliding collars, I. The rod, H, slides in its bearings, and is connected to a moving weight or counterpoise, J.

From the above it will be clear that, as the proper pulley is rotated, the feed screw turns, for example, so as to carry the nut on the arm, E, forward, and consequently the tool holder and blade on the rod, C. This motion continues until a downward projection on the arm, E, strikes the forward stop, I, carrying the same along with it and thereby moving the stop rod, H. The latter pulley on the lower part of the counterpoise lever throws the weight over to the right, and, at the same time, thus shifts the belts to the other pair of pulleys, giving to the feed screw a contrary motion. The result is that the knife is drawn along the face of the stone in the opposite direction until the other stop is encountered, the rod moved, belts shifted, and the same operation repeated.

Just to the right of the tool holder is an arrangement which constitutes one of the most important features of the machine. It consists of a sliding piece on the rod, C, to which is attached, at K, a metal spring which bears against the pattern bar, L. This piece is rigidly clamped to the rod, C, by a suitable set screw, and is therefore carried along with it. The action of the spring, as a moment's consideration will show, is to bear the tool against the stone to the exact point desired, while holding it rigidly to give sufficient play to avoid the jumping or jarring of the tool against inequalities of the surface. Hence, no matter how irregular the shape of the stone, the blade is constantly held against all points of its periphery.

We have already shown how the angle of the blade is adjusted. The amount to be ground away can also be limited by set screw attached to the spring carrier, which, as represented, takes against the pattern bar, L. This device prevents any damage to the tool through inattention, as the machine will only allow the grinding to continue to the bounds fixed by the screw. By using a properly curved pattern bar to suit the shape of knife, blades of peculiar form may, through the operation of the spring arrangement, be ground with perfect curves.

The mode of attaching the machine to the grindstone by the bolts and slotted plates, so as to allow of still further adjustment, is clearly indicated in the illustration. Three sizes of the machine are made to suit various lengths of blades, and also an extra smaller form for use with the common hand grindstone. No honing, we are informed, is necessary after the tool has once been properly ground with the device. Further particulars may be obtained by addressing Mr. E. Conner, general agent, No. 95 Liberty street, New York city.

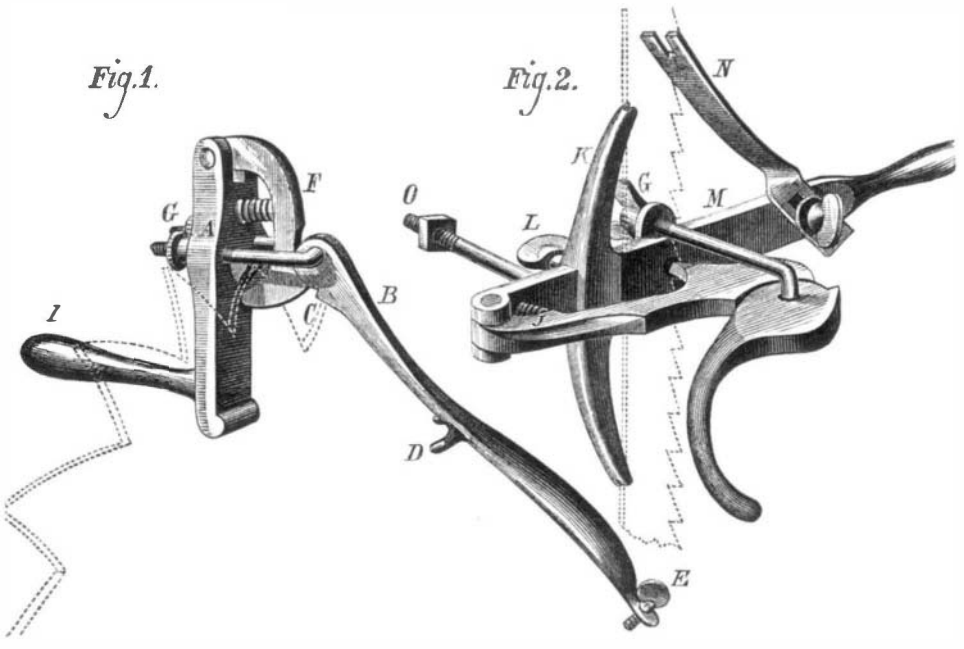
### Chloride of Gold for Toning.

At a meeting of the photographic section of the American Institute, Mr. H. J. Newton, the President, gave the following description of his method of making chloride of gold:—

I take two drams of nitric acid and three drams of hydrochloric acid; in that I dissolve a five dollar gold piece. That is pure enough; the copper is an advantage rather than a detriment. In this way you have 135 grains of gold. Reduce that so as to have eight grains of gold to the ounce, or one grain to each dram, and you will always know when you pour it out how much you have. That will give you about 16 or 17 fluid ounces to a five dollar gold piece. That will keep. You may put in salt if you choose; I sometimes do that. This solution will go farther than any you buy. A few hours before you use it, neutralize it with bicarbonate of soda, borax, or any of the alkalies, according to the tone you desire. Bicarbonate of soda will give you a brown tone, and borax a black. Make it up a few hours before you want to use it, so that it will turn litmus paper blue, and I do not believe you can prepare gold to make better tones. When you make this solution it is acid, but you can neutralize it with bicarbonate of soda down to the point where a drop of it will turn green, or you can make it perfectly neutral, and add a little *aqua regia*.

## IMPROVED CIRCULAR AND BAND SAW SET.

The improved saw set represented in our illustrations is claimed to work easily and surely and without injury to the saw. The manufacturers submit a large number of testimonials from sawyers in all parts of the country, and state that not one of the instruments has been returned to them for any reason whatever.



IMPROVED CIRCULAR AND BAND SAW SET.

The illustrations show the set as applied to a large circular saw and to a band saw. It is, however, we are informed, equally applicable to crosscut or upright blades. The inventor, Mr. C. E. Grundy, is a practical sawyer of some fifteen years' experience, and claims that he has tried every kind of saw and manner of filing, setting, and swaging, and that (for a circular saw to do the most work with the least amount of wear to the plate, bearing in mind the time required to put in order) teeth bent or set give the best result.

It is evident that a piece of steel like a saw tooth point will bend by a slow, firm, and even pressure being applied where it would break by a sudden blow of a hammer, the twist of a wrench, or the spring of a bar of iron.

Further, as the bend with this tool is a curve and not an angle, it is claimed that it will hold much longer, because the set is all equal and even from the point of the tooth; when the teeth are once confirmed to the set, it is only necessary to renew the set by bringing the cam to a given point, such as the stop on the cam.

Reference being had to the engraving, in Fig. 1 is shown a circular saw in position with the set applied. The operator stands behind the saw, the set being attached to the teeth by placing the bed die, A, on the point of tooth, so that the point will project beyond the die one sixteenth of an inch.

The cam lever, B, is then brought down to the stop, C, on the cam, bending the tooth toward the latter.

A four point gage is provided on the cam lever, seen at D, and E is a screw to adjust the same to the amount of set desired. The die bar, F, is governed by the thumb nuts, G, on the cam links projecting through the bed.

The advantage of this arrangement is that the bending power is brought to bear on the tooth between the two bed bearings, so that the operator has only to bear down on the cam lever; and the more power he applies, the tighter he fastens the set to the saw. A handle is provided at I for convenience in handling.

For band or jig saws, the form of the set, as represented in Fig. 2, is changed, having a longer bed, terminating in a handle having an adjustable cam link which can be moved laterally on the bed.

The die bar is the same as the circular saw set, also the cam lever, having a stop. These, together with the thumb nuts, regulate the amount of set to be given to a saw. The die bar is kept in contact with the cam by the recoil of the spring, J.

Sliding laterally upon the bed is a guide bar, K, having a narrow hanging lip and grooves, and fastened in place by the thumb screw, L.

The saw is placed on the set so as to leave the tooth to be set over the bed die, M.

The sliding guide bar is then brought up to the back of the saw, and fastened by the thumb screw. The cam is brought down to the stop, giving as much set as desired by screwing up the thumb nut, G.

A loose adjustable pawl, N, is hinged to the bed, and is used on very fine saws, to regulate the position of the teeth over the die, M, by engaging the pawl with the teeth; and as the saw is moved the pawl clicks on the teeth, every two clicks indicating the tooth to be set. The advantage of the pawl, in setting very fine saws, is that it saves the close scrutiny otherwise needed; and if the operator stops a moment, it is claimed, it shows with absolute certainty where to commence again.

The set can be used with the saw on the pulley, as it can be attached to a bench by the bolt, O. All the various sizes of these tools are now being made and sold throughout the Southern and Western States by Curtis & Co., of the Empire Saw Works, St. Louis, Mo., who have the exclusive control of that part of the United States. S. C. Forsaith & Co., Manchester, N. H., and Grandy Brothers, Stafford Springs, Conn., manufacture and sell throughout the Eastern and Middle States, from whom descriptive circulars and price lists can be obtained, and to whom all orders should be addressed.

Patented, through the Scientific American Patent Agency, April 8, 1873.

### Frost Striations in Mud.

The Rev. F. R. Goulding, in the *American Journal of Science and Arts*, calls attention to the phenomenon of slight but plainly marked striations of the soil after a frost, looking as if a very light harrow had been drawn over it from northwest to southeast, leaving irregular furrows varying from half an inch to an inch and a half in depth from center to center. This aspect occurs, it seems, during black frosts in Upper Georgia, and the striæ invariably run, as above noted, both in shaded and sunny places, and whether the air be still or in motion at the time. They begin to show themselves before the frozen surface has thawed. It is noted as a coincidence that their direction is at right angles to the stratification of the country, the outcroppings of the rocks being in a line from northeast to southwest. Can any of our correspondents throw light on the question? The writer states that he has examined the phenomenon quite closely, but can find no apparent cause.

A NEW tubular wicked petroleum lamp has been contrived by MM. Defienne. It consists of ten small circular wicks in place of one large one. They are arranged in a circle, and are attached to a frame movable by a single rack.