### IMPROVED SURFACE PLANER.

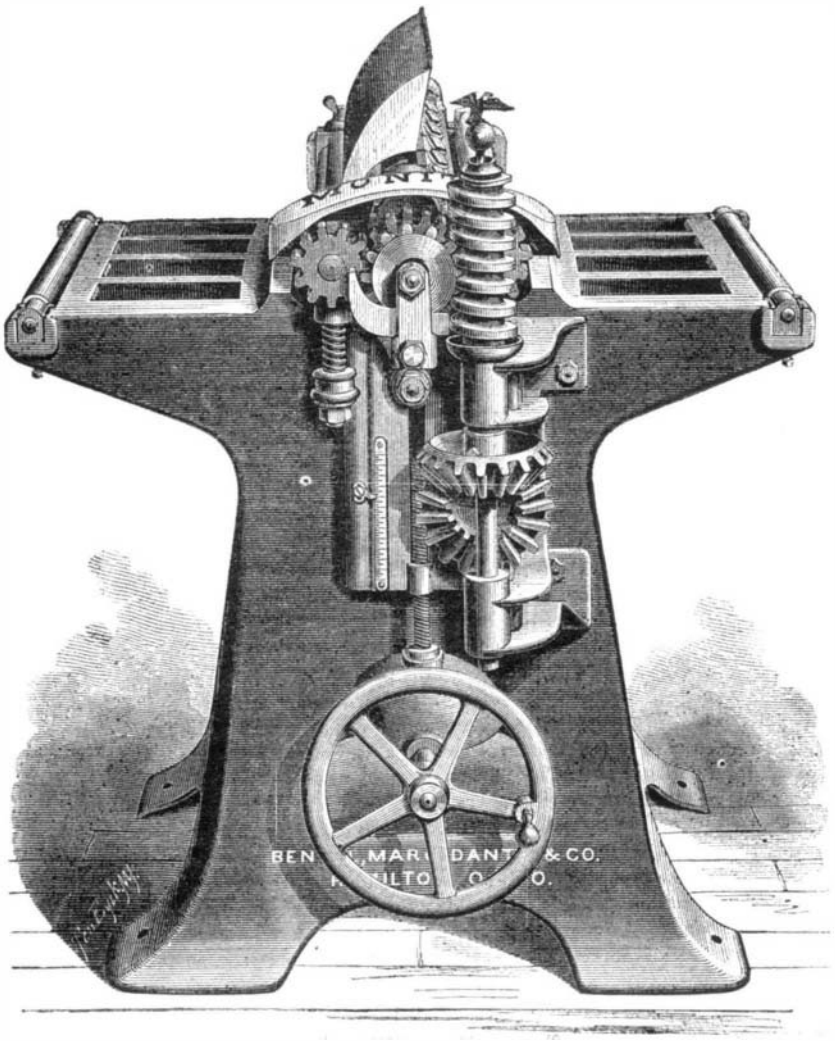
It is claimed this machine will plane or surface hard or soft wood from ⅛ to 6 inches thick and 24 inches wide, and in any quantity from 10,000 to 20,000 feet per day, and will plane smoother than the average large sized planers. It is very strong, and is capable of doing its work in the most thorough manner, being built entirely of iron and steel, heavy and substantial in all its parts, the proportions being such as to insure the greatest durability and strength.

The main frame or stand is a solid and strong casting in one piece, forming a rigid and solid support for the material to be planed, thereby insuring smooth planed work. The cutter cylinder has long steel journals perfectly fitted by scraping into self-oiling bearings lined with the best anti-friction metal, made for the purpose. The journal boxes form the upper part of strong adjustable slides with long gibbed bearings, and the cylinder can be raised or lowered, while in operation or not, by means of a hand wheel placed in a convenient position for the operator. Any wear of the slides can be taken up and nicely adjusted by the gibs. A graduated scale attached to the slides shows at a glance the distance between the table and cutter cylinder. The upper feed rolls are held down by cast steel spiral springs, which are very sensitive to the unevenness of the material, and act quickly and strongly.

The two driven feed rolls are in close proximity to the cutter cylinder; the distance between them is only 7/8 of an inch, so that short and long stuff can be planed without clipping the ends. An adjustable roller scraper is attached to the back feed roller to keep it free from gummy matter. The feed arrangement is extraordinarily strong, and powerful; the gearing is of a small diameter, and is not at all liable to break. The feed can be instantly started or stopped, and the material returned if desired.

The machine has four idler rolls and two driven feed rolls, all of wrought iron, making in all six rolls which can be adjusted to take up the wear. The cylinder bonnet can be quickly swung back for the purpose of sharpening the knives, and the gearing bonnet can also be raised for oiling the parts.

For further particulars, address Bentel, Margedant & Co., Hamilton, O.



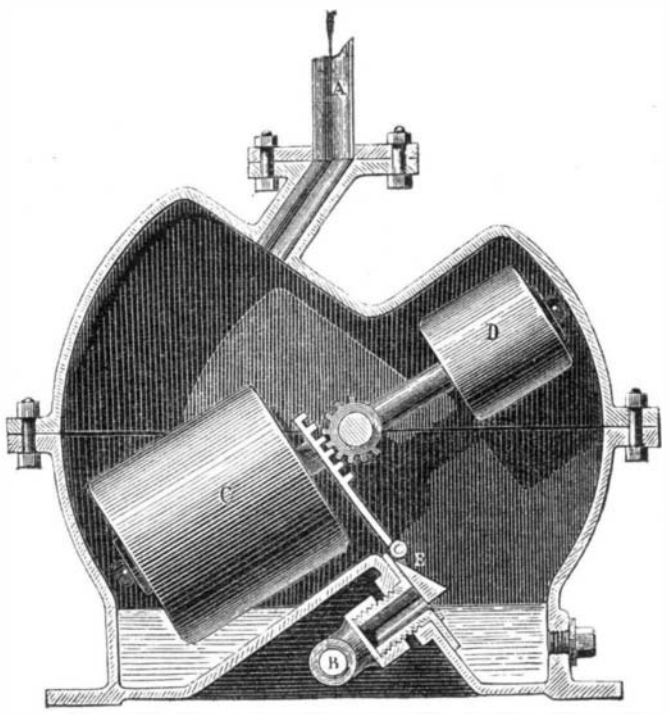
BENTEL & CO.'S SURFACE PLANER.

### Imitating Enamel on Iron.

F. W. Oliver's process consists in producing on iron various designs of different colors, and imitating vitro-enamel in the following manner: A crystalline appearance is given to tinned iron by means of a mixture of water and sulphuric and nitric acids, applied thereon, and afterwards washed off. An impression of a design is made on suitable transfer paper, on which coatings of solid white and silver bronze dust and colors are applied. The plate, prepared as above, is coated with a mixture of turpentine and copal varnish: it is then heated, and the design transferred thereon in the usual way, and the plate is baked and polished.

### APPARATUS FOR REMOVING CONDENSED STEAM FROM PIPES.

We extract from the *Moniteur Industriel Belge*, the annexed engraving of a simple device for removing water produced by the condensation of steam in pipes. The action of the mechanism is entirely automatic. A is the entrance pipe, and B the exit pipe of the water: C is a float balanced by the counter weight, D, and resting on the surface of water which accumulates in the lower part of the vessel. As the float is raised by the addition of water, a pinion on the shaft, on which its rod turns, engaging in a rack, elevates a slide valve. E, and so opens the escape orifice. The water then flows out until the float falls low enough to shut the valve once more. A device of this kind, attached to the steam heating apparatus of a building, would doubtless prevent that disagreeable clacking and hammering due to the water forming in the pipes, and the consequent injury to the latter owing to repeated strains.




APPARATUS FOR REMOVING CONDENSED STEAM.

### Supplying Caged Birds with Green Food.

"Among other advantages," says a correspondent in *Science Gossip*, "derivable from the regular supply of such plants as chickweed, shepherd's purse, and groundsel to caged birds, especially finches, I find that these almost always increase the appetite, leading them to eat more seeds, in cases when they appeared falling off a little from their ordinary food. In early spring the leaves of the plantain are much relished by bullfinches and canaries, and they seem to have a wholesome effect. I should like to hear the opinions of bird fanciers regarding the statement, often repeated in books, that birds derive no benefit, but rather the reverse, from green food given in frosty weather. I have not found any evil result, on a small scale, provided the food is not given too damp."

### Improved Method of Laying Underground Telegraph Lines.

Mr. A. Holtzman, of Amsterdam, Holland, is the author of a method which is alleged, after two years of trial, to give the most satisfactory results. But as there are no patent laws in his native country, he is obliged to seek for compensation and encouragement to extend his invention, to the more liberal institutions of foreign countries. The Holtzman plan consists substantially in providing a cast iron trough, which is filled with a peculiar bituminous insulating compound, which he terms *brai liquide*. The gutter rests in the bottom of a ditch in the earth. The compound is put in while warm and semi-liquid. The telegraph wires, insulated with gutta percha, are then submerged, separately, in the compound in the trough; the latter is then closed by a cover and the ditch filled with earth. The compound soon cools and solidifies, and holds the wires, in perfect insulation, unaffected by moisture, temperature, or decay. A telegraph line of forty miles length near Amsterdam, on the above plan, has proved an entire success. Although laid in bad swampy soil, no breaks have occured. It is alleged that this method of laying wires is economical.

### Metal Deadening.

When a wire, by which a weight is suspended, is made to swing about by torsion, the amplitude of swing, it is known, ever diminishes; the successive amplitudes form, according to Gauss and Weber's observations, a converging geometrical series, and the natural logarithm of the exponent of this series is called the *logarithmic decrement* of the arc of oscillation. We understand by the deadening of the swings, or oscillations, the phenomenon of their ever growing less. The cause of this *deadening* is partly in the resistance which the air opposes to the motion, but partly in the wire itself, the detortion of which also presents resistance to the motion.

This phenomenon of internal deadening (*dämpfung*) of the metal has formed the subject of a recent investigation by M Heinrich Streintz, described by him to the Vienna Academy The resistance which wires oppose to torsion within the limits of elasticity is less the oftener such torsions are produced, or (as the property is denoted) the wire "accommodates" itself to torsions. The same decrease of resistance is observed where the wire has been annealed. Now, a newly drawn wire is denser, it is known, than an annealed one; the molecules in the former are nearer each other, and are in a state of reciprocal tension, and so they must present a greater resistance to displacement.

When a newly drawn wire is heated, the reciprocal tension is still further increased: as we find indicated by the fact that the deadening becomes greater, and, at the same time, in consequence of this tension, an actual pushing asunder of the molecules takes place. If the wire is then allowed slowly to cool, the molecules go together again, but no longer in the way corresponding to their natural state of equilibrium—they do not now go into their earlier condition of tension; and we obtain a wire, consequently, in which the internal friction is less. Now, as through frequent turnings, within the limits of elasticity, the wire becomes softer for such turnings, the same occurs in other changes of form.

It is known that steel pens become softer through use, which involves continual slight changes of form within the limits of elasticity. A similar thing occurs in the seats of iron chairs, formed with tips of wrought iron or steel. They lose their hardness through use, and are ultimately bent.

Accommodation plays an important part in musical instruments. It is a well known fact that trumpets, before they can be employed in public performances, must first be blown in or used for a considerable time, in order to develop their full tone action, and make them capable of being easily blown. In fact, the deadening has first to be lessened for the tone vibrations (or the resistance of the metal to these), and this is effected by putting the metal frequently in vibration. A trumpet may also be blown out of tune. If, when quite new, it comes into the hands of an inexperienced performer, who often blows certain false notes, the trumpet is blown out of tune. This is to say, the deadening decreases for these particular tones, so that the trumpet is more easily thrown into these vibrations than into others, which are not so often excited; and it becomes, therefore, very difficult for even a practised performer to avoid these false tones. It would in this case be of no use to diminish the deadening of the trumpet metal by a temporary heating, for this process would affect all the tones similarly; only correct blowing will bring about the desired result.

A similar experience is had with stringed instruments. In these, it is not the strings that require long playing, for their resistance to the vibratory motion is (owing to the smallness of mass to be moved) unimportant; but the resonance ceases. However excellent the construction of the latter, a long continuance of good playing is indispensable for them. This is accounted for by the fact that the good player awakens a stronger tone, and so vibrations of greater amplitude; hence, also, for these, the deadening is diminished. Further, he excites only a certain kind of overtones, which determine the clang color, and for these overtones the deadening is diminished. Through long rest without use, the advantages of this playing-out are again lost, as the accommodation also partly disappears through rest. That pianos do not also grow better after long use is due to the fact that the mechanism of the piano wears out.

The circumstance that, with increasing temperature, the deadening grows so very quickly may perhaps serve somewhat to explain the process of hardening of steel. The soft steel is heated, and thereby the molecules are brought into a state of greater internal friction. If now, the hot steel is quickly cooled, the molecules have not time to part with this condition of greater internal friction; it still remains, in part, in the cold state, and we have then a hard steel. The steel, it is known, is harder the quicker the cooling occurs. The resistance of the molecules of hard steel to magnetization, and the greater magnetic residuum, witness also to the greater internal friction of its molecules.

### Dry Rot in Lemon Trees.

A malady has attacked the lemon plant, the origin of which is believed to be the forced cultivation of the fruit. The lemon plant is very hardy, and infinitely easier to cultivate than the orange, and this fact has probably induced a certain amount of carelessness in its treatment, from which growers are now suffering. The tree was originally a native of the dry and hot soil of Persia, whence it has been transferred to various other countries, where, under different circumstances of soil and climate, it has been made largely to increase its yield of fruit. The disease which has now made its appearance is called *la sécheresse*, or dry rot, and seizes the extremities of the plant, sometimes the roots, sometimes the branches, whence it gradually spreads through the whole tree, drying up its sap in its course.—*Nature*