

IMPROVED SLOTTING MACHINE.

We give an engraving of a machine for slotting wheels, pinions, etc., for the reception of the keys which secure them in position on their shafts. The solid iron frame supports a circular iron table truly turned, and having several holes for the reception of the vertical threaded studs which confine the yoke that bends the wheel or pinion to the table. A steel saw or cutter projects through a hole in the table and through the bore of the wheel, and is connected at its lower end with a slide moving in ways below the table, and connected by a strong connecting rod with a crank which is driven by a train of gearing from the driving shaft, the latter taking its motion from any suitable source of power through a belt. The gearing increases the leverage of the power over the saw or cutter, so that the motion is very strong and positive, and the work is quickly done. One pair of the gears is made elliptic, which secures a slow movement of the cutter downward while cutting the metal, and a quick return movement upward. The saw is fed up to its work by the lever run at the back of the yoke, and the cut may be made light or heavy according to the character of the work.

The saw is capable of being ground on an emery wheel, so that it is always possible to have a sharp tool. Different sized saws are made for keys of different widths.

The gearing and slides below are protected by suitable shields which deflect the cuttings so that they fall to the floor. The work is very readily placed in the machine and removed therefrom. The capacity of the machine is much greater than ordinary slotting machines employing a single cutting tool.

The difficulty heretofore with machines of this kind has been that they would leave the key-way higher in the middle than at either end, which necessitated the use of files to true it up.

The machine illustrated avoids this and leaves the key-ways true and ready for the keys without further work. Key-ways of equal depth at each end for feathers, etc., are also readily cut. The rounding up of the bottom of the key-way is avoided by rigidly connecting the cutter to a bar which extends down to the bottom of the machine and there passes through a guide. This guide is pivoted so that the sliding bar may adjust itself to the angle of slope desired for the bottom of the key-way. By this arrangement a movement of the cutter is secured which is parallel to its previous cut, and the defects in the key-ways above mentioned avoided. This machine was patented November 11, 1879.

Further information may be obtained by addressing Messrs. Trevor & Co., manufacturers, Lockport, N. Y.

IMPROVED LUBRICATOR.

Two important results are secured by using upon an engine a lubricator that furnishes a continuous and equal supply of oil to its cylinders. In the first place the engine is properly and sufficiently lubricated, and its durability and efficiency is increased; and in the second place a great saving of oil is effected. The engraving shows a complete and simple device for furnishing a continuous supply of lubricant to engine cylinders, and especially designed for locomotives.

Figs. 1 and 2 are vertical sections of the apparatus taken at right angles to each other, and Fig. 3 is a vertical section of the drop tube.

The main chamber, A, of the lubricator is attached to the front plate of the locomotive boiler, and is provided with a pipe, B, that extends downward in the chamber and receives steam from the boiler. The lower end of the pipe, B, is received in a cavity formed at the bottom of the chamber, and is fitted to a valve, C, by which it may be closed more or less to regulate the supply of steam.

In opposite sides of the chamber, A, there are drop tubes, D, communicating with the interior of the chamber near the top, and discharging into a glass tube, *f*, connected with the pipe, *h*, leading to the steam chest of the cylinder. The drop tube is under the control of the valve, *d*, and communicates by a steam pipe, *g*, with the steam room of the boiler. The lower end of the drop tube is reduced in size to insure the falling of the drop in the middle of the glass tube, where it may be observed, and the water of condensation from the steam, entering through the pipe, *g*, is deflected by the conical sides of the drop tube, so that it follows the inner side of the glass tube, and does not interfere with the dropping of the oil. The pipe, *h*, leading to the steam chest has, near the engine cylinder,

a double seated ball checkvalve, which prevents air or steam from being forced back into the oil chamber, A. The apparatus, so far as the drop tubes, side steam, and oil pipes are concerned, is made double to adapt it to the two cylinders of a locomotive, and the oil chamber is divided vertically by a median partition to insure an equal action of the two parts of the device. At the top of the oil chamber there is a plug, *a*, which may be removed whenever it becomes necessary to fill the chamber, and at the bottom there is a small valve, *b*, for letting out the water.

When this lubricator is in use there is an equality of pressure everywhere, and the water resulting from the condensation of the steam from the pipe, B, displaces the oil, which flows over into the drop tubes, D, and falls, drop by drop,

one connection. One hundred of these lubricators are now in use, and the manufacturers refer to some of the largest manufacturing works in this country. Some of the railroad companies who have adopted it say they obtain perfect lubrication up and down grade, and effect a saving of 75 per cent in oil, and obtain more power from the engines owing to this system of lubricating, and effect a great saving on the valves and packing.

This invention was recently patented by Mr. Timothy Holland, and is manufactured by Messrs. Holland & Thompson, 217 River street, Troy, N. Y.

Glycerin.

Notwithstanding the low price which now prevails for raw produce and manufactured goods, there are a few articles which form notable exceptions. Perhaps one of the most remarkable of these is refined glycerin, which, within the last two years, has advanced from about £30 to £130 per ton avoirdupois for 30° B. This enormous advance is due partly to increased consumption, diminished production, and the influence of speculation working on a market devoid of stocks. In view of the present position of the article and the prospect of a continuance of high prices for a considerable time to come, the attention of soapmakers is now being turned to the utilization of their waste "lyes," and various new processes for recovering the glycerin contained in these liquors have lately been tried with more or less successful results. Apart from minor impurities, waste soap "lyes" are generally found to contain glycerin, carbonate of soda or caustic soda, chloride of sodium, gelatin, and albumen. One of the processes for recovering the glycerin which promises to be the most economical and the most successful, begins with concentrating the liquor until the salts contained therein begin to crystallize. The liquid is then cooled and filtered to rid it of gelatin and albumen. It is afterwards made to absorb carbonic acid, which precipitates bicarbonate of soda, and which is separated from the liquor in the usual way. After undergoing this process the liquor is then made to absorb gaseous hydrochloric acid until what remains of carbonate of soda has been converted into chloride, and further, until all, or almost all, the chloride of sodium has been precipitated and separated from the liquor in the usual man-

ner. Arrived at this stage, the liquor contains water, glycerin, and hydrochloric acid. The acid is then evaporated entirely and absorbed in water for using afresh. The dilute glycerin remaining can be purified by filtering it through animal charcoal or by concentrating and distilling it in the usual way.—*Glasgow Herald.*

Iridescent Copper.

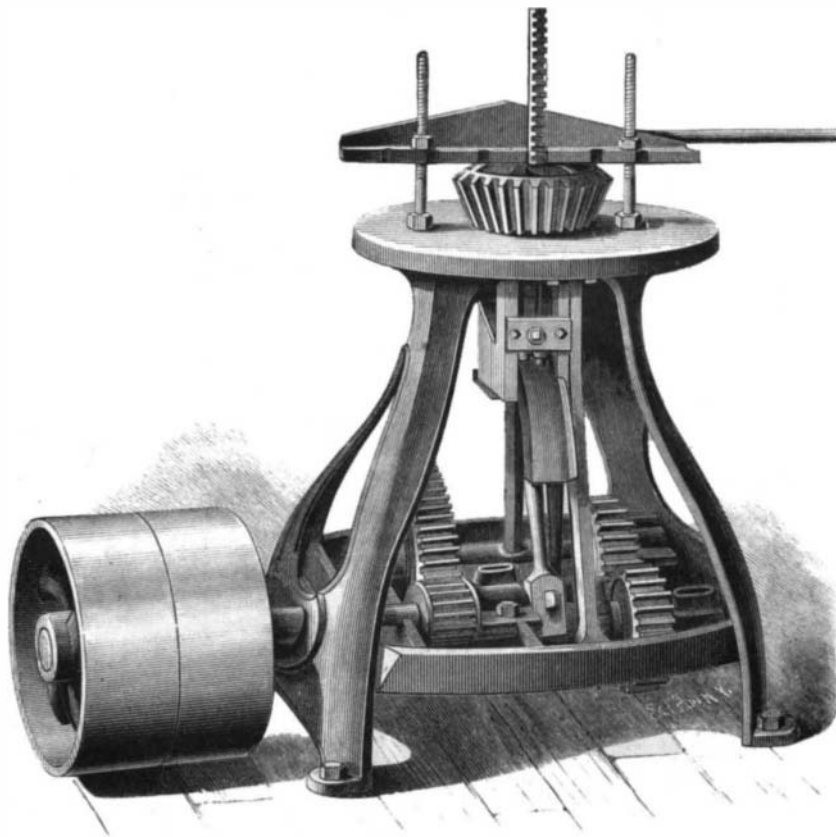
A new invention for coating iron and steel with iridescent copper, says the *Revue Polytech.*, is the work of Dr. Weil, of Paris. First, thirty-five parts of crystallized sulphate, or an equivalent amount of any other salt of copper, are precipitated as hydrated oxide by means of caustic soda or some other suitable alkaline base; this oxide of copper is to be added to a solution of 150 parts of Rochelle salts, and dissolved in 1,000 parts of water; to this 60 parts of best caustic soda, containing about 70 per cent NaO, is to be added, when a clear solution of copper will be formed.

The object to be coppered is to be cleaned with a scratch brush in an alkalino-organic bath, attached as a cathode, immersed in the coppering bath, and treated with the usual precautions, when it will become coated with an adherent film of metallic copper.

As the bath gradually loses its copper, oxide of copper, as above prepared, should be added, to maintain it in a condition of activity, but the quantity of copper introduced should not ordinarily exceed that above prescribed as compared with the quantity of tartaric acid the bath may contain. If the quantity of copper notably exceeds this proportion, certain metallic irisations are produced on the surface of the object. These effects may be employed for ornamental and artistic purposes.

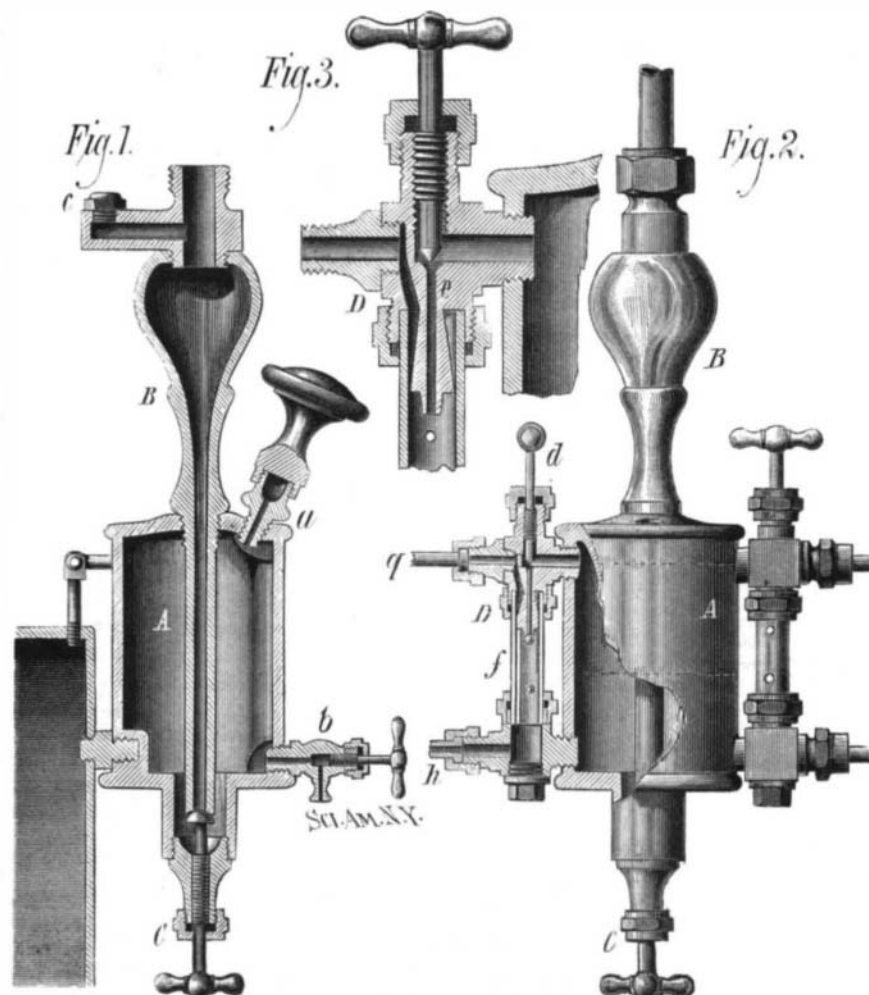
According to the time of the immersion, the strength of the current, and the proportion of copper to the tartaric acid, the iridescences may be produced of different shades and tints, which may be varied or intermingled by shielding certain parts of the object by an impermeable coating of paraffine or varnish, while the iridescent effect is being produced on the parts left exposed.

All colors, from that of brass to bronze, scarlet, blue, and green, may thus be produced at will.

**TREVOR & CO'S SLOTTING MACHINE.**

through the clear space in the glass tubes, *f*, into the pipe, *h*, which conveys it to the engine cylinder. The flow of oil through the drop tube is controlled by the valve, *d*.

With this device perfect lubrication can be insured without the constant attention of the engineer and fireman. The lubricator is readily applied to the boiler front of the locomotive, in the engine room of vessels and steamboats. For stationary engines, the above lubricator can be placed on the wall of the engine room, and supply with oil the one or more engines and steam pumps. A single lubricator is also made to apply on the steam pipe of stationary engines with

**HOLLAND'S ENGINE LUBRICATOR.**