Patent Laws.

The article from "Junius Redivivus," came one day too late for this number. It will appear next week.

For the Scientific American.

Animal Electricity.

There is a flat fish found on the shores of the Mediterranean which has been known for hundreds of years to give benumbing shocks to any one who handles it. It is named the Torpedo, and when it is dissected there are found two honeycomb organs in it near the head on eachside and occupy the whole thickness of the fish from breast to back. They consist of a mass of roundish columns that appear upright when the fish lies flat. These columns are supposed to be galvanic piles which in the aggregate make an electric charge. As many as 1182 columns have been found in a large fish, and nerves ramify each column and are distributed throughout in fine filaments.

The back of the torpedo is positive and the belly negative and the electric currents pass through the body between the breast and back. On touching either side of the animal, a shock is received, and by seizing it on both sides, a more intense shock is felt; and after receiving the first, the charge accumulates and discharges again, and a succession of shocks will thus be given until the strength of the fish is exhausted. The electricity of the torpedo is of the same character as a discharge of very small Leyden jars. It is capable of magnetising iron and decomposing compounds on a small scale. The use of this voltaic pile to the animal, seems to be given to it for defence and offence. It launches its diminutive thunderbolts upon all creatures that approach it.

The Electric Eel found in great numbers in the South American swamps, is another living galvanic battery. Its shocks are far more formidable than those of the torpedo.—Men, horses, and other animals are frequently drowned in crossing some of the pools by being stunned from shocks by the electric eel. The electric eel is about five feet long and of a yellow color, resembling some water serpents. Its electrical structure is the same as that of the torpedo, but it is formed of thin plates, which lie in the direction of its length and one end of the pile is at the head and the other at the tail, hence its shocks are most powerful when the head and tail are brought into contact with another animal. In the rivers of Africa there is also another electric fish, called the *Silurius Electricus*, which has very simple electric organs. It is something like an eel, and is eaten in Egypt.—There are various electric fish beside these.

There is a great amount of electricity produced by the interior processes of the human body, but how much none can tell, as only a small portion can appear in a free state on the surface. As far as the skin acquires a charge, it is found to be positive, but the amount differs at different times, and also in different persons. A developement of positive electricity seems to be identified with health, vigor and freshness of body, for it is changed into negative by exertion, fatigue and cold. A sudden fit of violent exertion will convert the positive into the negative charge, and from this we must infer that nutrition is constantly generating positive electricity, while exertion generates the negative. The juices of the flesh or muscle are constantly acid while the blood circulating through the arteries or veins, is alkaline An acid and alkali with a membrane between them, are capable of causing a current, the acid being positive and the alkali negative, so that the blood would from this cause have a negative charge and the flesh a positive charge

The effects of electricity on the animal system is not much understood. Electric shocks have been successfully applied for paralysis. If from what has been discovered, the body generates a surplus of positive, and the earth negative electricity, and an absence of the positive is injurious to the system, we have a strong argument for having some non conducting substance between the feet and the earth. This is surely the reason why wet feet are so injurious to health, at least to those who wear shoes, &c. while to the savage who goes barefoot a thick horny non-conducting substance is formed on the soles of his feet, that seems to say, "what art cannot achieve, nature can."

Method of Preventing the Oxidation of Iron.

We are indebted to our excellent exchange, the London Patent Journal, for the following curious article by M. F. L. Alamand, read before the St. Petersburg Academy of Science.

"This composition, of a metallic nature, preserves iron and steel from oxidation, by entering into the pores without in any degree affecting their external appearance, or leaving the least blemish; so that steel instruments (including razors,) fire arms, &c., retain their polish, and are in some degree better fitted for use, after having been subjected to the metallic application. Articles, either plain or chased, appear superior to platina, and retain, after the application, all the hieroglyphics characters, figures, letters and other engravings or cuttings, which were there previously.

COMPOSITION OF THE MATERIAL.

Pure Malacca tin	120
Silver filings	4
Yellow tincal	12
Purified bismuth	12
Purified zinc	12
Regulus of antimony	4
Nitre	11
Salt of Persicaria	1

METHOD OF PURIFYING THE METALS.

The tin ought to be melted separately eighteen times. Each melting should remain about twenty minutes exposed to the action of caloric, and the impurities which arise on the surface should be carefully removed; it is thrown afterwards into a ley formed of vine twigs and persicaria (herb) in equal proportions. The bismuth, the regulus of antimony, and the zinc, are also melted separately, but they only require it twice, and they are carefully run into an ingot mould, so that all impurities may remain at the bottom of the crucible. The tincal does not require any purification.

MIXTURE OF THE DIFFERENT SUBSTANCES.

The tin is the first material that is melted; the silver is afterwards added to it in small quantities, and in a few minutes afterwards the tincal; then the bismuth of the zinc in succession. As soon as it is ascertained by the flames that the alloy is effected, the two kinds of salt are thrown in together, and are left to burn with vigor, and the alloy is stirred with an iron rod; after which it is carefully skimmed and poured into a vessel, to be made use of for the metallic application.

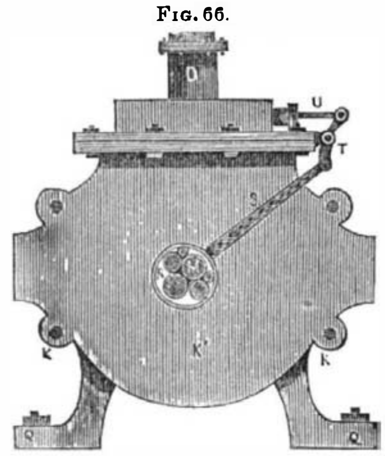
METHOD OF APPLYING THE SUBSTANCE.

Before the piece of iron or steel is dipped in the recipient which contains the metallic mass already liquified, its surface must be rubbed well with a composition of sal ammoniac and cream of tartar, in the proportion of five per cent of tartar to the sal ammoniac; the iron must then be dipped in the melted alloy, where it must remain only for a few seconds, and till it is perceived to be covered with a certain quantity of the metal. It is next placed in a wooden box of its own size, and in which there has been previously put a small quantity of sal ammoniac and cream of tartar in the proportions already indicated. It is again rubbed with a handful of tow, and a small quantity of the powder is put on the surface In the course of this operation the steel loses its color and assumes that of silver. When this is done it is again plunged into the metallic mass for a few seconds, and when it is taken out it is again lightly rubbed with the tow to remove any superfluous particles The article being perfectly clean and shining, it is plunged into a basin of cold water, into which there has been poured a bottle of spirits of wine of 40° of strength, in the proportion of half per cent. After having withdrawn it from the water, the article is rubbed as carefully with some fine sand that has been moistened, to remove the spots of smoke; it is at last rubbed a second time with dry sand, then with linen, and finally with leather. After all these operations, which require great celerity in the execution, the iron will remain impervious to oxygen, and by care it will preserve all its whiteness.

History of the Rotary Engine.

Prepared expressly for the Scientific American.

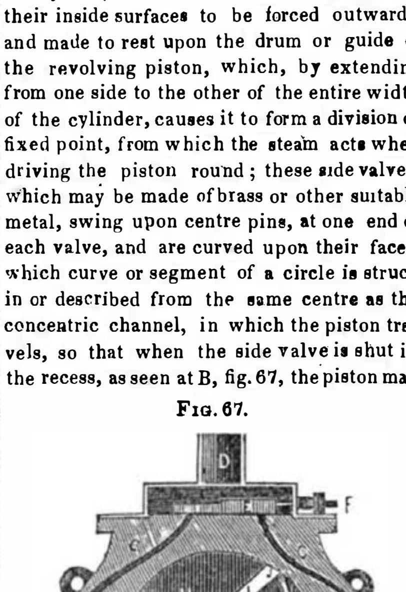
FIG. 66.



PIERRET'S ROTARY.

This rotary is the invention of Joseph Pierret, engineer, London. Fig. 65 is a front elevation, and fig. 67 a vertical section, the same letters applying in both cases to similar corresponding parts. A A, is the cylinder or concentric chamber of the engine, cast in metal and bored in the ordinary manner, so as to render it perfectly fit and smooth for the action of the piston within it to revolve upon its face, and work steam tight; B B, are two valves, which fit into recesses on each side, as shown in the engraving at fig. 67, and caused by the pressure of the steam acting upon their inside surfaces to be forced outwards, and made to rest upon the drum or guide of the revolving piston, which, by extending from one side to the other of the entire width of the cylinder, causes it to form a division or fixed point, from which the steam acts when driving the piston round; these side valves, which may be made of brass or other suitable metal, swing upon centre pins, at one end of each valve, and are curved upon their faces, which curve or segment of a circle is struck in or described from the same centre as the concentric channel, in which the piston travels, so that when the side valve is shut in the recess, as seen at B, fig. 67, the piston may

FIG. 67.



be enabled to pass by and receive the pressure of steam on one side thereof, by reason of such valve aforesaid alternately causing a fixed point for the steam to act against, and a free passage to the motion of the piston; C C, are two steam pipes or passages, cast in the sides of the cylinder and curved in such a manner that their upper ends are inserted in and made flush with the bottom of the slide jacket, whilst their lower ends enter into and supply with steam the openings at the back of the valves B B; D D, is the main steam or throttle pipe, communicating with the boiler, as heretofore. By this arrangement it will be seen that steam entering through the pipe D, will fill the chamber G G, and descend through the passage C, into the recess at the back of the valve B, and cause it to take the position shown in fig. 67, when the expansion of the steam acting within the chamber H, produces the rotation of the piston, and the requisite rotary motion. E, is the steam slide of usual construction, having a slide motion rod F F, attached to and passing through a stuffing box or gland, on the outside of the slide jacket, to the end of which a forked lever head is fixed and mounted upon a bracket bearing, an eccentric arm is then brought in connection with it, which receives motion from the main shaft, and by the action of which the slide is made to traverse the jacket from end to end, and alternately open and close the steam ports C C. as each operation may require. H, is one of the side plates of the engine, bolted to the cylinder by the projecting metal ears K K; I, is a brass surface bar forming the metallic packing, and kept to its work by the pressure of a spring behind it; J, is also another angular piece for the same purpose; L, is a metal ring, embracing the cylindrical part of the piston, the object of which is to ensure the piston's moving steam-tight at each end against the sides of the cylinder, instead of employing other means as heretofore; M M, is the main or driving shaft, which passes through the centre of the piston and is keyed thereto; N N, are two holes or apertures through which the steam escapes from the cylinder; these eduction ports are to be so placed that when the steam is exerting a pressure on one side of the piston, the other side thereof shall be quite free to the action of the said pressure on the other, and so on, thereby causing an uniform rotary motion direct to the propelling-shaft: O O, are the two axles on which the side-valves, B B, hereinbefore described, work; P P, are the two recesses for the reception of the valves as shown; Q Q, are legs cast to the body of the engine, for the purpose of bolting the same to any suitable standard mountings, necessary for the nature of the work, and the situation of the engine.

Argentiferous Galena.

Large bodies of this valuable mineral are found in Arkansas. Silver mines also exist in that State, some of which were worked by the Spaniards prior to the year 1800. Gold mines appear recently to have been found, and Iron to an endless extent. The present workings of Argentiferous Galena are on the estate of the "South Western and Arkansas Mining Company," situate about ten miles from Little Rock. The ore is said to be exceedingly rich. The highest assays have exhibited as much as 140 pounds of silver to the ton of ore. The lowest assays are about 33 oz. The average of silver to a ton of ore is supposed to be about 120 oz.—a presumption founded on the price offered for the ore in England. The importance of even the lowest assay (33 oz.) can be estimated from the fact that, in England, it is considered worth separating for 3 oz.