

THE RED FIRE FISH.

The singularly weird-looking fish shown in our engraving* is a native of the Indian Ocean, and the race is represented in all parts of the tropical seas of the eastern hemisphere, on the coasts of Africa, India, Ceylon, New Guinea, and Australia. It is much prized as food by the natives of Ceylon, the flesh being firm, white, and nutritious. The color of the fish is a pinky brown, barred with darker brown, and the head is redder than the body. The pectoral and dorsal fins are very large, and crossed with black bars; the ventral fin is black, spotted with white; and the other fins and the tail are light brown, spotted with black. There are nine or ten species of this genus, and the usual size is seven or eight inches in length. The singular development of the dorsal and pectoral fins has given rise to an idea, in the minds of some naturalists, that they were used for the purpose of flying. This, however, is now known to be a mistake, as the rays of bone which carry the membrane which joins them are not sufficiently supported by the osseous system proper, and are therefore too weak for such use. Indeed the purpose of this abnormal form is unknown, and it adds one to the many thousands of curious problems which make comparative anatomy, especially of fishes, so fascinating a study.

The Cingalese have a belief that the thorny prickles of this fish inflict incurable wounds; but although this is an error, the fire fish is a formidable antagonist, and one which bathers and swimmers near his habitat will do well to keep clear of. The skeleton of this fish is one of the most remarkable known to Science its organization being very complex; and it will well repay investigation by those who can obtain a specimen.

THE FILAMENTOUS GURNARD.

The family of fishes known as *triglida* or gurnards are in many ways remarkable. Their colors are generally beautiful and often singularly brilliant; and their forms are various, some of them being almost repulsive. They are not strong swimmers, and therefore remain mostly in deep water; but some of them have large pectoral fins which enable them to leap from the water, and endure the air for a brief space. The mouth is mostly large, and the aspect is frequently repulsive.

The filamentous gurnard* (*pelor filamentosum*) is an instance of the capriciousness of Nature, being one of the strangest and most eccentric forms to be found in the annals of ichthyology; the head appears to be crushed out of shape, and is hung with scraps of depending skin. The body is armed with formidable looking spines, which are not suggestive of any purpose but that of self-defence. This gurnard is found in large numbers on the shores of the Mauritius. Its color is a light grayish brown, mottled with a dark shade of the same hue, and it is minutely spotted with white dots. Its usual food consists of crustaceans and molluscs, but pieces of cuttle fish have been found in its stomach. Possibly, the dreaded octopus has here found an enemy dangerous to meddle with, and one whose voracious appetite and defiant digestion may make him terrible in attack.

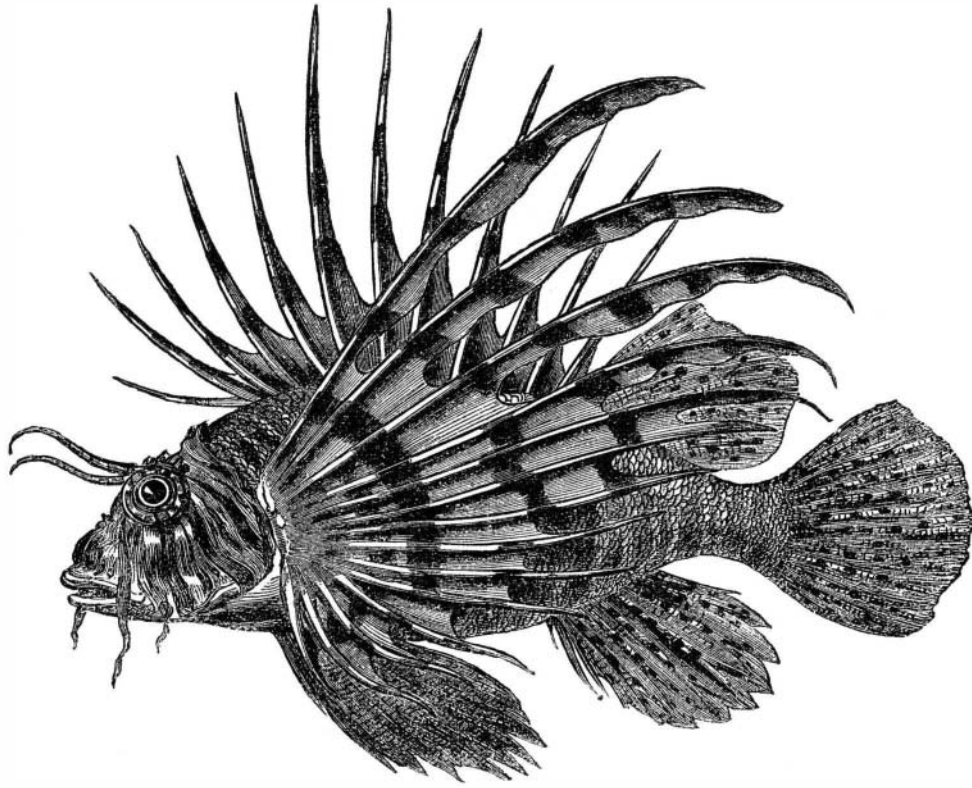
Sham Coffee.

We learn from a statement in the *Journal of the Chemical Society* that sham coffee is manufactured from tough dough, squeezed into little molds and baked until the color becomes dark enough to deceive the eye. Real coffee berries, when small and worthless, are improved in color by rolling them about with leaden bullets in a cask. The green berries, too, are treated by a coloring matter. In coffee sold ready ground, the difficulty of detecting adulterations is greatly increased; beans, beet root, carrots, and carrot-like roots are roasted and mixed in large quantities with the genuine article. In the south of Europe, especially in the provinces of Austria, figs are roasted in enormous quantities and sold as coffee.

The British Ironclad Fleet.

A discussion recently took place in the House of Lords, relative to the constitution of the ironclad fleet. Lord Dun-sany moved for statistics as to the draft of water of the present sea-going ironclad vessels, especially with regard to their capability of passing through the Suez canal; and he called attention to the necessity of adequate dock accommodation for these large and heavy ships. He also stated that Italy is now having built some 100-ton guns, and armor plates of 22 inches thickness (as described in our last issue) are now being rolled for the same government. Attention was called

to the Russian circular ironclad, already described and illustrated in these columns. On behalf of the government, it was stated that the recently built vessels, of all calibers, were especially constructed with a view to their passage through the Suez canal. Ample dock accommodation is already provided at Portsmouth, and additional docks are to be constructed at Devonport and in Ireland. It was suggested in the course of the discussion that, looking to the

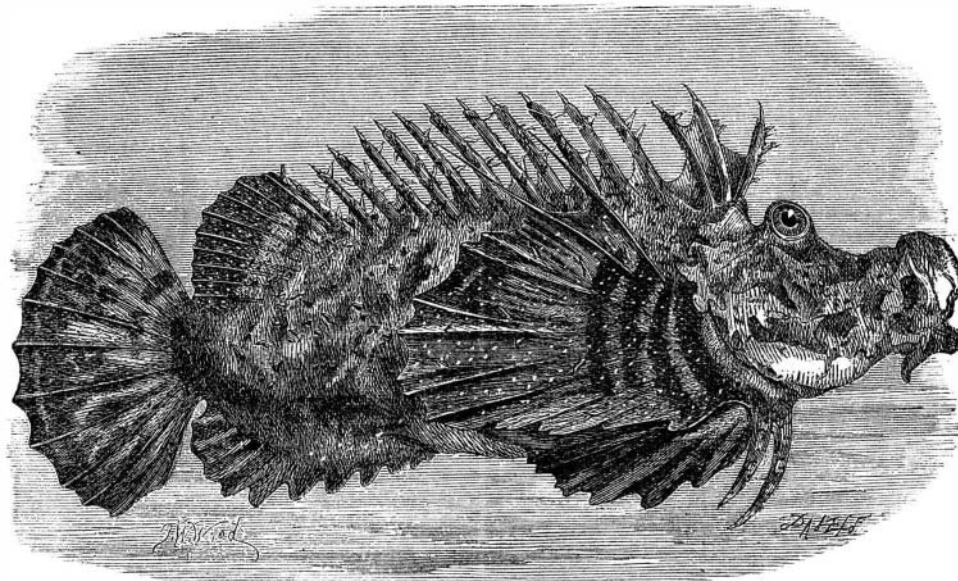


THE RED FIRE FISH.—(PTEROIS VOLITANS.)

dangers of accidental collision of vessels fitted with rams, movable rams, to be used only in time of war, should be constructed.

Horse Power and Fuel Equivalent of Storms.

The *Bulletin of the American Iron and Steel Association* says: "One of the most severe wind storms prevailed throughout a large portion of our country the week before last, extending probably 500 miles. It is stated that it exerted a pressure of 30 lbs. per square foot, or $\frac{1}{2}$ lb. per square inch, and traveled at the rate of sixty six miles per



THE FILAMENTOUS GURNARD—(PELOR FILAMENTOSUM.)

hour. It is interesting to estimate the force of such a storm, and the resulting figures are truly startling. There are in a square mile 27,878,400 square feet, or 4,014,489,600 square inches. Assuming that the pressure of the storm was exerted for a half mile of vertical height, we have for each mile in width of the track of the storm an area of 2,007,244,800 square inches, upon which the storm acted with a pressure of $\frac{1}{2}$ lb., and with a speed of 5,800 feet per minute. To find horse power we have the formula:

$$\frac{\text{Area in inches} \times \text{pressure in lbs.} \times \text{speed in feet per minute.}}{33,000}$$

And our calculation becomes:

$$\frac{2,007,244,800 \text{ square inches} \times \frac{1}{2} \text{ lb pressure} \times 5,800 \text{ feet.}}{33,000}$$

which gives, as a result, 70,557,700 horse power developed for each mile of breadth of the track of the storm. To produce the same horse power, with improved engines consuming but 2 lbs. of coal per hour per horse power, would require 63,000 gross tons of coal. Assuming, as above, the track of the storm to be 500 miles wide, the hourly consumption of coal to generate an equal power would be at least 31,500,000 gross tons, or one and a quarter times the annual product of the entire anthracite coal region.

OWING to the large demand for WRINKLES AND RECIPES, the publisher has been obliged to issue a third edition. See advertisement on another page.

Steam Domes on Boilers.

Mr. Thomas Hoge, of Waynesburgh, Pa., in commenting on our answer on this subject on page 171, current volume, states that, after many years' experience with boilers of all kinds, he is unable to find any practical appreciable advantage in the use of steam domes.

"Small-necked cast iron domes, so much used on portable boilers," he states, "are of no use so far as dryness of steam is concerned, even admitting that large-bottomed ones are; and domes are generally placed in about the worst place on the boiler to secure dry steam. Steam should always be taken from the back end of the boiler, or at the furthest possible place from where the most of the steam is generated.

' My experience and reading have led me to have less faith in the steam generating power of flues and to have more in that of the fire box or of the two or three rings of boiler immediately over the fire, in stationary boilers. The greatest amount of ebullition taking place from the fire box, there evidently will be the greatest amount of foam, spray, or water in other form, carried up with the steam, its upward current there being greatest; and the dome being gradually set right over this point, water goes directly into it with the current of steam; and if the neck or entrance to the dome is small (making in effect only a large swell in the steam pipe) the current of steam will there (in the neck) be so strong that no particle of water can ever descend through it while steam is being rapidly used, the only time when priming occurs. I believe that, usually, three fourths of the steam made in a boiler is made in the first third or half of the boiler. If, instead of drawing it off here, it were allowed to pass slowly back to the back end, and there enter the steam pipe, we should, in effect, convert nearly all the steam space along the top of the boiler into a steam dome "

The Use of Glass by the Chinese.

At the last session of the Commercial Geographic Commission, of France, held in Paris, M. Edward Rénard, a former delegate of the Department of Agriculture and Commerce for the extreme Eastern countries, made the following interesting communication: "The product of manufacture which I submit to the Commission is as little known among us as is the process employed in its manufacture, which requires great dexterity. The specimen I exhibit consists of a thin layer of colored glass, which appears to have been cast over a sheet of lead. Its production is a branch of industry which flourishes in many parts of the great and industrious city of Canton, and is practised in many places, even in the streets and in front of the houses, on a small scale.

" While in India and Burmah I was often surprised at the lustrous appearance of the domes on the Buddhist temples, which were covered with curved plates, colored violet, green, etc., or white and yellow, looking like bright silver and gold; and at a distance showing, with surprising brilliancy, a light having the appearance of an electric light, especially when seen from the sea. I was also often surprised to see the Chinese glassblowers, whose labor is ill paid, and who, notwithstanding this, show very remarkable results in their exercise of this curious industry, and who make these brilliant and multi-colored plates while exposed to wind and weather.

" A few days ago, I sent specimens of this singular product to M. Robert, the able director of the Sévres porcelain works, and also to the savant M. Clemendot, whose thirty years service in the direction of our principal glass manufactories has made him the most competent man now in this line. I am confident that, thanks to these men and their investigations, we will be able in a short time to see the effects of such reflected lights in the ornamentation of kiosks and domes of various buildings, in the manufacture of reflectors for headlights, coast lighthouses, street lamps, and several other useful and practical purposes."

Ancient Trademarks.

Examples of the practice of using trademarks, to show the workmanship of various manufactures, have been discovered at Herculaneum, such signs having been in vogue among bakers and others. In modern times similar tokens have been adopted in textile and various other fabrics. The trademark is a recognized part of the system of commerce, by which a guarantee is given to the purchaser, and a legitimate protection afforded to the manufacturer. It is upon the uniform good quality of manufactured commodities that any foreign trade depends for its continuance; and (as the *Textile Manufacturer*, a London journal, says) it is in such cases that the use of trademarks is most useful.

*The engravings are selected from the Rev. J. G. Wood's "Illustrated Natural History."

The New York Academy of Sciences.

The chemical section of this society met on March 27, Professor A. R. Leeds in the chair.

Mr. C. Chamberlain exhibited several magnificent specimens of

AMAZON STONE,

from the collection of Professor A. E. Foote, of St. Louis, Mo., who is now in Philadelphia preparing to exhibit the minerals of the New World to our foreign guests at the Centennial. Amazon stone is a variety of orthoclase or potassa felspar, of a bright verdigris green color, and quite rare. These specimens were brought by Professor Foote from Pike's Peak, Col. The crystals were remarkably large and perfect, while the color was unusually brilliant. The same gentleman exhibited a crystal of beryl found by himself in 56th street in this city. Also a perfect crystal of datholite, $\frac{3}{4}$ inch long, from Bergen tunnel, and a specimen of petzite or telluride of silver, brought from Colorado by Professor Foote.

Dr. H. Endemann exhibited and described a new form of apparatus for the

QUANTITATIVE DETERMINATION OF ACETIC ACID

in crude acetate of lime. It consisted of four glass flasks connected by glass tubes, the first and last being provided with safety tubes. The first flask is filled with water; the substance to be analysed is placed in the second flask along with a sufficient quantity of phosphoric or sulphuric acid. The third and fourth flasks, which are at some distance from the second, and at a lower level, contain a known volume of a standard soda solution. A gentle heat is applied to No. 2, steam is generated in No. 1 and passed into No. 2, and drives out all the acetic acid, which distills over into No. 3 and is absorbed by the soda. The distillation is complete in 15 minutes, and it is only necessary to triturate the soda solution with the standard acid to ascertain how much of it was neutralized by the acetic acid, and then from this to calculate the quantity of acetic acid.

Dr. Elwyn Waller, E. M., read a paper on

MILK AND THE LACTOMETER,

in which were embraced most of the facts contained in the editorial on "Milk and its Adulterations" in our issue of April 1. Dr. Waller has analysed a large number of samples of milk for the Board of Health, and in almost every case found that the only adulterant employed was water. The speaker detailed his experience, and gave figures to prove the unreliability of the method, once strongly advocated by a city chemist, which was to shake the milk with a given volume of caustic potash, add acetic acid, heat, allow to cool, and read off the amount of coagulum formed, from which the quality of the milk is calculated by means of tables prepared for the purpose.

An animated debate took place at the close of the paper, between Drs. Waller, Doremus, Falks and others, during which the hour for adjournment arrived, and further discussion was postponed till Monday evening, April 10, at which time Mr. Mott's paper, on a comparison of the milk of the African and Caucasian races, will also be discussed.

The Odors of Coal Oil.

The refinement of crude petroleum is extensively carried on in the vicinity of Hunter's Point, N. Y., a locality situated opposite the center of New York city, directly across the East river. The distance of the oil works is a little over a mile in a direct line from this metropolis. For a long time the inhabitants of the northerly portion of the city have complained of bad health, due, as they allege, to foul odors that swept across the river from these works. A bill is now before the legislature, intended to effect an abatement of the nuisance. Professor Charles F. Chandler, President of the Board of Health, a well known chemist, is of opinion that, at a trifling expense, chemistry can furnish means for the removal of the odor, if persons complained of will only take the trouble of using them. That the men at work in these factories do not mind the smell does not prove that sensitive women, young children, feeble convalescents, and prostrate invalids do not suffer from it. In a civilized community, the principal, as it is the most beneficent, purpose of law is to protect and help those whose struggle for existence is hard. As for the objection that persons living near the factories do not complain of the smell, it is well known that such odors ascend perhaps one hundred feet from their source before they begin to diffuse themselves; and that great condensation or compression of odors often lessens their power—a bag of musk, for example, is not nearly so fragrant as it is in the handkerchief that has lain beside it.

The cause of this nuisance, said Professor Chandler, is simple enough. Crude petroleum is a liquid of dark, greenish brown color, and of an offensive odor, and must be refined before it is suitable for household use. The process of refining is threefold: First, the lighter oils, which are dangerously inflammable, and the heavier oils, which are not inflammable enough, are distilled; secondly, the product remaining after distillation is agitated with sulphuric acid in order to remove a portion of its color, and all its disagreeable odor; thirdly, the oil thus refined is again agitated with an alkali, either caustic soda or ammonia, in order to neutralize all traces of the sulphuric acid. After the second of these processes there is left a dark, tarry sediment called sludge acid, of an exceedingly disagreeable odor, and it is of this odor that the people of a large part of the city are now complaining.

The effects of inhaling it, said Professor Chandler, are not different from those following the inhaling of any odor which produces or tends to produce nausea. The appetite is impaired, and the general tone of the system injured. It can

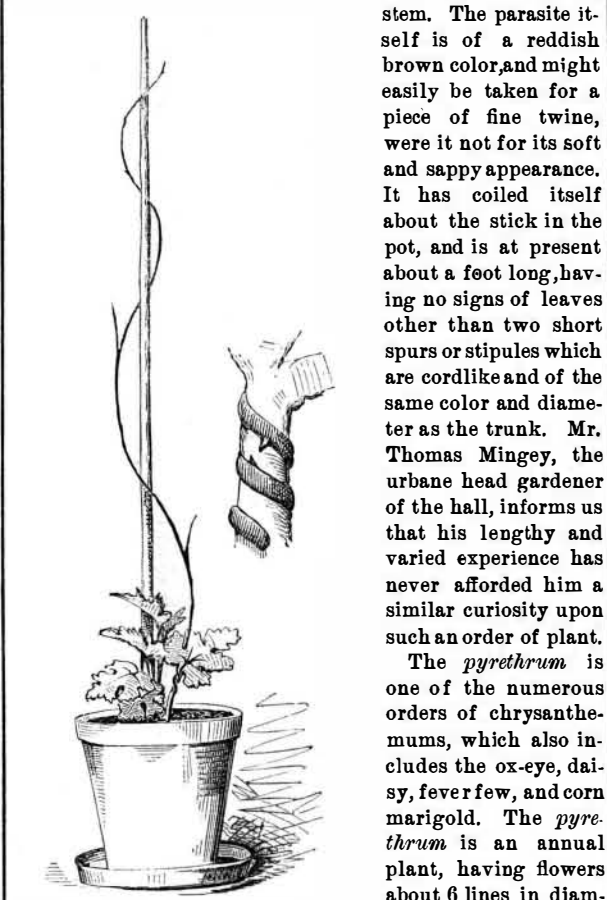
rarely be proved that any particular odor causes any particular disease. But the body becomes degenerated, and the scale is turned against convalescence.

It is not quite certain whether the nuisance originates with the petroleum factory or with the fertilizer factory near it. The sludge acid which is made in the former is sold to the latter, where it is poured over spent bone black and other refuse animal matter in order to produce various sorts of artificial fertilizers. "In any case," said Professor Chandler, "either party can entirely prevent the disagreeable odor, were they so inclined."

[For the Scientific American.]

THE HORTICULTURAL HALL AT THE CENTENNIAL EXHIBITION.

The interior of Horticultural Hall greets the artistic eye very pleasantly, and promises to be, so far as architectural beauty is concerned, one of the most attractive parts of the Centennial Exhibition. The four forcing houses, two on the north and two on the south side, are already partially stocked with trees, shrubs, ferns, and plants, the smallest plant among which is most notable for its rarity. It is a parasite which has attached itself to the petiole on a *pyrethrum*. Our engraving represents the plant and parasite, the latter having two coils wound closely around the petiole or stem just below the leaf, sustaining itself by several small spurs with which it has pierced the petiole, and which are plainly visible from the semi-transparent nature of the stem. The parasite itself is of a reddish brown color, and might easily be taken for a piece of fine twine, were it not for its soft and sappy appearance. It has coiled itself about the stick in the pot, and is at present about a foot long, having no signs of leaves other than two short spurs or stipules which are cordlike and of the same color and diameter as the trunk. Mr. Thomas Minge, the urbane head gardener of the hall, informs us that his lengthy and varied experience has never afforded him a similar curiosity upon such an order of plant.



The *pyrethrum* is one of the numerous orders of chrysanthemums, which also includes the ox-eye, daisy, feverfew, and corn marigold. The *pyrethrum* is an annual plant, having flowers about 6 lines in diameter, with a white ray: others of the same class, however, vary from a golden yellow to the various shades of red. It is indigenous to Europe, Asia, and North Africa; it was introduced into England as a medicinal herb, and has become naturalized in some parts of that country. It runs from one to three feet high, with leaves pennately divided into broad-lobed segments.

The parasite is, we think, of the genus *cuscuta*, or, as it is called in England, "dodder," of which there are in that country five native species, which grow upon hops, flax, and nettles. They appropriate the sap of the plants on which they live, and frequently kill them. They belong to the second order of the fourth class.

Botany affords us no more interesting order of plants than the parasites. In tropical climates, they grow in great profusion, and attain large proportions; in cold climates, the classes are few and the sizes diminutive. Among the most remarkable is the genus *epidendrum* (in the 20th class, *gynandria*, of Linnæus) one species of which, called *flos aeris*, or flower of the air, is found in abundance in the East Indies beyond the river Ganges, and it grows and even blossoms in the air, when hung up, without attaching itself to any solid body. The perfume of the flowers is so delightful that the inhabitants suspend it from the ceilings of their rooms, where it will vegetate for years.

Mirbel, the French botanist, says that in North America there are parasitical trees which grow on other trees; the long roots of the *clusia rosea* (rose colored balsam), a parasite of this kind, descend from the summit of the trees upon which they grow to the ground, and then sometimes become engrafted into each other, and are then covered with the same bark, so as to form an immense case in which the trunk of the stranger tree, supporting the *clusia* in the air, is enclosed.

Among the other plants and trees already in Horticultural Hall is a fine specimen of *monstera deliciosa*, bearing a fruit similar in flavor to the pineapple. Nearly all other trees of its class bear poisonous fruit. A large mango tree is bearing fruit, which is a somewhat rare occurrence in a hot-house. A South American mahogany tree is noticeable for having an unusually clean stem. There is a very fine specimen of the camphor tree in one of the forcing houses on the south side of the hall. Joseph Lovering, of Philadel-

phia, exhibits a collection of orange and lemon trees, so full of fine fruit that the boughs bend from its weight. The lemon trees have ripe and green fruit in profusion, and of a size rarely seen upon them. The trees bearing them have also new blooms, side by side with the fruit. The gardener says that he never saw such fine specimens, even at Hampton Court in England.

Two excellent specimens of the *cybotium*, from the Sandwich Islands, are noteworthy, both for their size and healthy appearance. The mat-like bark contains a profusion of pockets filled with the delicate golden colored and silky fiber for which this tree is famous. One of the hot-houses on the north side of the hall is pervaded with the delicious perfume exhaled by four specimens of the *malvina odorata*, whose small, yellow, buttercup-like flowers gracefully hang their heads as if at their orisons.

Among the trees and plants most notable on account of their size are a cocoa tree, a cinchona or Peruvian bark tree, a camphor tree, an *araucaria Braziliensis*, a Japanese *mespilus japonica* (bearing an edible fruit), and a Dicksonia or tree fern.

JOSHUA ROSE.

THE government of Newfoundland has a characteristic emblem upon its postal stamps, a hungry-looking fish swimming in the sea, its mouth open, eyes expanded, anxiously searching for prey.

Recent American and Foreign Patents.**NEW CHEMICAL AND MISCELLANEOUS INVENTIONS.****IMPROVED ROWLOCK.**

Francesco Roseti, New York city.—This consists in combining a ball with the oar shaft, so that a ball and socket joint can be employed in the rowlocks. It also consists of a contrivance of the socket to turn the oar around to the line of the gunwale of the boat and to lock it in that position; also, to lock the oar in the socket, so as to hold it while not in use.

IMPROVED SKATE SHARPENER.

William H. Fisher, Selin's Grove, Pa., assignor of one half his right to Charles K. Fisher, same place.—This is a device for sharpening skate runners, which may be readily carried in the pocket. A fine crosscut steel file is placed in the body of the implement, and secured rigidly in position. The file is made flat on one side for sharpening flat runners, and convex on the other for sharpening runners with a groove or gutter. A second crosscut file of coarser grain serves to remove the rough edge, while the finer grained file gives the fine edge or finish to the runner. There is a suitable guide flange and adjustable gage.

IMPROVED BOOT JACK.

George W. Phenix, New Brunswick, N. J.—This boot jack is so constructed that it may readily be folded into a small compass, and conveniently carried in the pocket or in a traveling bag. It is formed of two hinged and one pivoted parts, constructed so, as when folded, as to give no additional thickness.

IMPROVED MACHINE FOR TRIMMING CIGARETTES.

Andrew Montes, New York city.—This invention consists of a spurred endless belt that feeds the cigarettes from a hopper to the revolving trimming knives at the sides of the belt, and then delivers them over an inclined end plane to a suitable receptacle.

IMPROVED SPRINKLING ATTACHMENT TO BAKING MACHINES.

Alexander Rannie, Palmyra, N. Y.—This consists of a nozzle, arranged over the way on which the pans pass into the oven, for moistening the cakes with fine spray as they pass along, the said nozzle being constructed with very fine perforations in the lower end.

IMPROVED CONNECTING POSTS FOR ELECTRICAL APPARATUS.

Jerome Kidder, New York city.—This consists of a sliding collar and a spring on the post under or over the conductor to be used instead of the ordinary binding screw for binding the conductor. The spring presses the collar against the conductor. This binder has the advantage of being operated quicker than the screw, and it cannot be detached and lost, as there is a nut on the top of the post which prevents it from coming off.

IMPROVED BOTTLE STOPPER.

Adolph Luthy, New York city.—This stopper is easily opened and closed, and is retained when in open position in such manner that it does not interfere with the pouring out of the contents of the bottle. It is applied by an eye to an extension of the wire neck band, and closed by a yoke that slides in a curved slot of the stopper cap piece. The yoke is centrally indented or bent, to carry the stopper in position.

IMPROVED TOY PISTOL.

Samuel D. Goodale and Dexter C. Goodale, Du Quoin, Ill.—This invention consists of a toy gun with a slotted barrel, that guides a piece of card paper propelled by the action of a spring hammer. Said hammer is attached to a slot at the breech of the barrel, retained by a catch, and released by a trigger. A practical application of the device may be made for the purpose of throwing messages on board of passing steamships, also to the delivery of important dispatches on board of passing railroad trains.

IMPROVED LAMP-LIGHTING DEVICE.

Frank L. Camm, Brooklyn, N. Y.—This invention consists of a tube fitted in the burner, so as to direct the match up to the wick when inserted from the bottom of the burner. It is provided at the upper end with teeth, across which the tip of the match is forced, so as to be fired by them.

REMEDY FOR DISEASES OF THE THROAT AND LUNGS.

Eileen Rohrer, Monmouth, Oregon.—This remedy is composed of tinctures of consumption root and mountain balm, prepared with sirup. It is claimed to be efficacious in the maladies mentioned.

IMPROVED STILT.

F. Beaumont, Jr., Dallas, Texas.—This invention relates to a means by which a boy's stilt may be quickly, easily, and securely fastened at different elevations on the standard, and consists in connecting with the standard a stirrup and sliding sleeve, that together form a lever by which a rapid and convenient adjustment is made.

IMPROVED INSTRUMENT FOR FILLING TEETH.

Carl D. Ludwig, Houston, Texas.—After inserting a cement filling in a tooth, this inventor proposes to harden it by the use of instruments made of talc, which are heated over an alcohol flame, and are applied to the filling as soon as it is set. This process is repeated and the filling is rubbed gently until it shows a dull polish on the surface, which polish is brightened by using a polisher of agate or polished steel. The filling is said to be complete and as hard as marble when the patient leaves the operator.