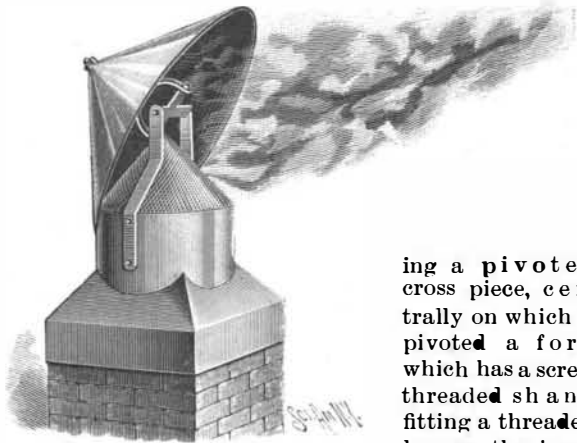


**A CHIMNEY COWL OR VENTILATOR.**

An inexpensive and simple device, for attachment to chimneys, air shafts, etc., is shown in the illustration, and has been patented by Mr. Milo H. Ingalls, of North Granville, N. Y. The cap is adjustable, so that it may be held at any desired distance from the flue top, and it is immediately responsive to the direction of even a light wind, thereby preventing any down draught and increasing the up draught, while keeping out rain, snow, etc. On opposite sides of the flue are inwardly and upwardly extending side arms support-

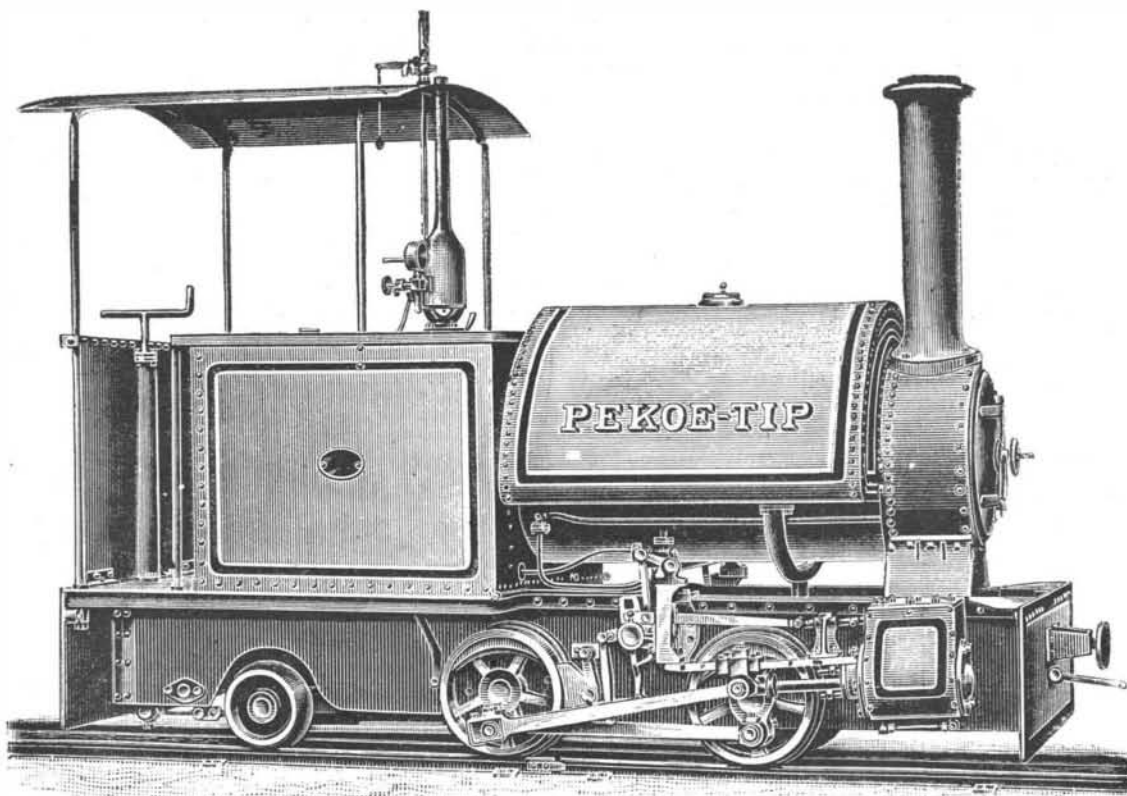


INGALLS' CHIMNEY COWL OR VENTILATOR.

ing a pivoted cross piece, centrally on which is pivoted a fork which has a screw threaded shank fitting a threaded lug on the inner side and at the apex of the conical cap. Above the cap is a nut, holding the cap in place, while its supports form a universal joint permitting it to turn in any direction. The upper end of the flue is preferably provided with a conical spark arrester made of wire screening, and fastened to the flue by means of a bushing. Great advantages are claimed for this improvement as a ventilator for buildings, air shafts, passenger cars, etc., as well as in its employment as a chimney cowl.

**A TWO FOOT GAUGE LOCOMOTIVE.**

We illustrate from the Engineer, London, below, a little locomotive constructed by Messrs. W. G. Bagnall, Limited, Stafford. The dimensions are as follows: Cylinders—diameter, 5½ inches; stroke, 9 inches; wheels, four-coupled—diameter, 2 feet; centers, 3 feet; wheels, bogie, diameter, 1 foot; total wheel base, 6 feet; boiler, Siemens steel; firebox, Siemens steel, circular; tubes, steel, 1½ inches diameter; heating surface—tubes, 80 square feet; firebox, 10 square feet; total, 90 square feet; grate area, 3.28 square feet; fuel capacity, 7 cubic feet; water capacity, 140 gal-



NARROW GAUGE LOCOMOTIVE.

lons. The engine is made for a 2 foot gauge, and is fitted with Baguley's patent valve gear.

**Facts About Fatigue.**

Dr. Tissie, a well-known French physician, has been studying the subject of excessive physical culture. He points out, in Science Siftings, that there is a similarity between the nervous fatigue which follows violent and prolonged exercise and certain hypnotic states. All fatigue is in the nerves; the muscles simply lose their power. In violent and prolonged physical exercise the waste of the body is rapid and extreme, and at the end its victim is in a state of poisoning from the accumulation of waste products in his system not yet thrown off. He is like a patient recovering from some disease. The muscular overstrain in the case is like

that which results from such nervous shocks as are sometimes produced by violent emotions or by dreadful dreams. Dr. Tissie made a special study of the case of a runner in a "go-as-you-please" race which continued twenty-four hours. The first effect of the nervous exhaustion was a feeling of great fatigue, followed by loss of interest and disgust. Next came phenomena of illusion or hallucination, of double personality, loss of memory, and great need of sleep. The doctor claims that the real aim of every trainer for the ring is to produce an automatic state in the one who is to take part in the contest of physical strength. His whole science is to transform the man he trains into a being that will keep on automatically. Something of this occurs in all overstrain from prolonged physical exercise. The plodding action which results is akin to the constant repetition of the same word, over and over, until it becomes a fixed idea in the mind. The doctor's conclusions are that the abuse of athletic sports is an evil; that the players lose character and tend to retrograde from intellectual volition to a habitual automatism. Just as moderate exercise is good, so these intensive exercises are bad.

**The Tea Industry in Japan.**

The United States consul at Nagasaki says that in that Ken tea cultivation is conducted as follows:

On inclined ground the tea is planted in furrows, but on level ground the plants are grown separately. The space between each row is about three and a half feet. On the hillsides it is planted in rows, but on the plains and near the houses it is grown in circular patches. After the first and second leaves are picked the branches are cut with shears. The object in cutting is mostly to make the plant round or semicircular. Formerly the plant was cut down to the ground every three years. The ground is cultivated three or four times in the spring, summer, and autumn. The grasses are cut and manure applied twice a year—in spring and in autumn. For manure, night soil, green weeds, accumulated soil, oil cakes, and fish are used. These manures are used only for plants near people's residences; for those on the hillsides, weeding is performed twice a year, in spring and in autumn, and the weeds are used as manure.

The season for gathering first tea buds or leaves begins on the first or second of May; but in some localities first leaves are gathered about the 20th of May. Second buds or leaves are generally allowed to grow, unless the market price is very high, or the first leaves gathered are found much smaller than usual. In the vicinity of Omura and Hirado, however, they gather both first and second leaves. In picking leaves for the

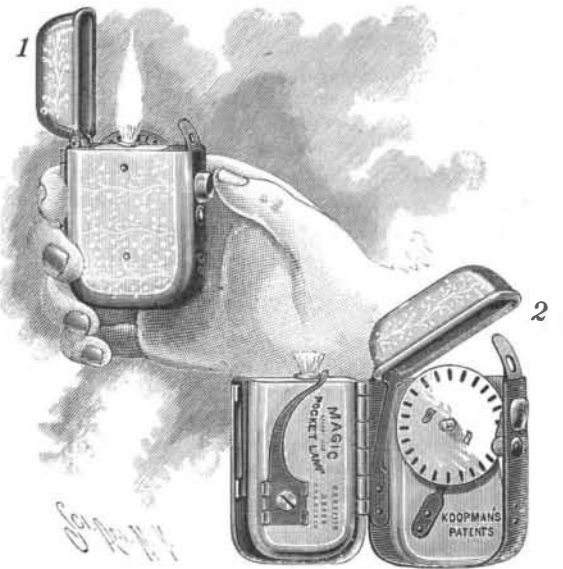
best tea, three tender leaves are picked together; for the middle and lower classes of tea, five leaves are picked at once; and for the lowest, all the young leaves are gathered. In picking leaves women are usually employed. The average quantity of the three leaves picked by a woman is from ten to thirteen catties a day (a catty is equivalent to 1.31 pounds avoirdupois). The manufacture was formerly conducted in two ways, namely, by drying in the iron pan, or in the sun, then drying in paper utensils was introduced, and more recently, drying in bamboo baskets came into vogue. The method of drying in the iron pan is still extensively used.

For manufacturing black tea, the Indian method was formerly followed, but at present the Chinese method is adopted. For sorting tea leaves heated in paper

utensils, round and square sieves are used, and for rolling utensils, either case or bag is used. Night soil, oil cake, dried fish, green grass, and weeds are considered the best manure for tea plants. The hours of labor are from 5 in the morning until 6 in the evening. The daily product per man is as follows: With the iron pan, about thirty catties; with the paper utensil, about twenty catties; with the bamboo basket, about forty-five catties. The women are employed only at steaming the tea leaves, and are paid only half the rate of the payment to the men. When the season arrives, the workmen are hired daily, the farmers helping each other. In Omura, contracts are made beforehand by advancing money about January or February.

**A POCKET LAMP AND CIGAR LIGHTER.**

The convenience of having in one's pocket a small self-lighting lamp which is always ready for use, and which takes up no more room than an ordinary match box, is afforded by the "Magic" pocket lamp and cigar lighter, shown in the illustration, and which has been put on the market by the Magic Introduction Company, of No. 371 Broadway, New York City. The



A POCKET LAMP AND CIGAR LIGHTER.

case is an ornamental one, silver or nickel plated, and by pressing with the thumb upon a spring button, the cover flies open and a wick protruding from a little oil reservoir is lighted. When the spring is only partially pressed in, the cover opens without lighting the wick, but the stronger pressure upon the spring causes also the simultaneous revolution of a lighting disk, whose edges are marked with small deposits of match composition, the passage of one of which under a spring finger lights the wick. The relative positions of the lighting disk, the igniting finger, and the wick may be seen with the case open, as shown in Fig. 2. With a complete outfit a small bottle of oil is furnished, with a filler and a number of extra lighting disks, all in a small package, but any good oil can be used instead of that furnished by the company, very little oil being ordinarily required, only just sufficient for the saturation of the wick, thus avoiding any possibility of soiling the clothing. The lighting disk is reversible for use on both sides, and is readily replaced by a new one when its supply of fulminates is exhausted. That this is an eminently practical device, quite dissimilar from the numerous failures which have been put forth in this field, is well attested by the fact that more than half a million of them have already been sold, and the demand continues.

**The Philosophy of Skating.**

Considerable time and ingenuity has been expended this year in the effort to produce a form of skate which will combine lightness and convenience of arrangement with great speed. The scientific principle involved in this work is far more complex than is generally supposed, and makes a very interesting study. Speed in skating is of course attained by the proper application of every particle of motive power. When the skater strikes out with his foot he does not, however, as is generally supposed, obtain momentum from the broadside pressure of the skate on the ice. The momentum is gained by a gradual and tapering pressure which commences at the head of the skate, since it is here that the freshest and strongest force is applied. It will be seen that the momentum is increased, therefore, by the pressure exerted steadily and firmly outward from the heel of the skate to the extreme toe. The proper way to attain great speed is to strike out each foot as close to the other as possible, to continue the stroke up to the toe, and when once the extreme motive power is passed, to get the other foot in position as quickly as possible. The prime factors in producing speed, it will be seen, are the full pressure on the ice and the rapid movement of the legs. Working upon this theory, a long heavy skate has been manufactured, with a blade which extends several inches beyond the foothold.