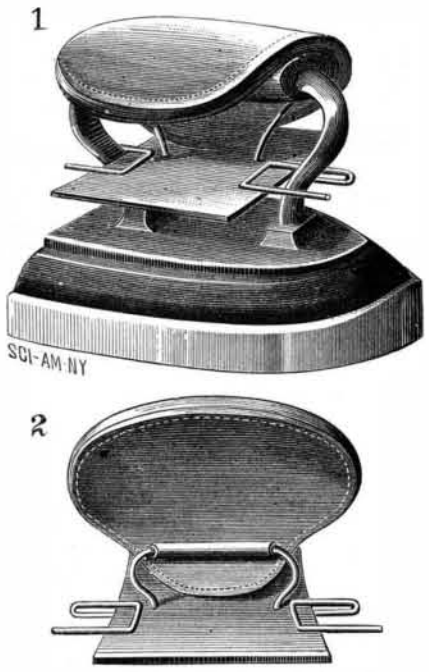
SAD-IRON HOLDER.

The annoyance resulting from the heat the hand encounters when grasping the old-style sadiron has led to the introduction of many devices tending to obviate this. One of the best and most recent has been patented by Mr. John O'Neil, 242 Dorchester St., South Boston, Mass.

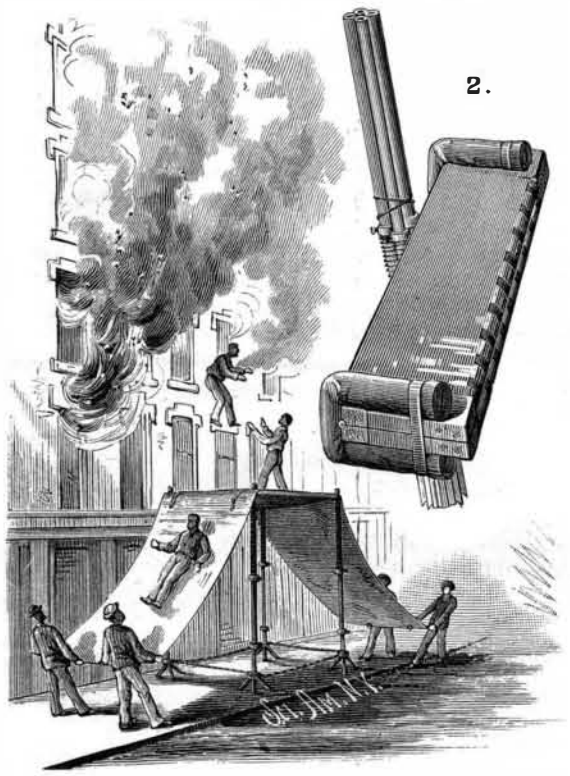
The body of the holder consists of a pad of convenient shape to be taken in the hand, and is made, preferably, of asbestos cloth covered with ordinary woolen cloth, although any good non-conductor may be used in its construction. Beneath the holder is a metallic shield disposed horizontally between the handle and the body of the iron. A wire passes through one side of the holder, which is there narrowed and extended so that when grasped by the hand it will fold under the wire and permit the hand to go in over the shield. The ends of this wire pass through holes in the shield, and are then bent so as to pass on each side of the handle of the iron, as shown in the engravings. The holes in the shield are enlarged, so that it is free to rock on the wire as on a journal. It will readily be seen that the shield and holder may be easily detached from the iron.



O'NEIL'S SAD-IRON HOLDER.

IMPROVED FIRE ESCAPE.

The simple and efficient fire escape shown in the annexed engraving is the invention of Mr. Henry B. Church, of Grand Rapids, Mich. A stout blanket, attached to a folding frame and provided at its ends with aprons of some strong textile material, is supported upon four standards by spiral springs surrounding the standards and resting on adjustable collars. The standards are telescopic, the upper part being made of iron pipe and movable on the rod forming the lower part. A set screw passing through a collar at the lower end of the pipe clamps the pipe in any desired position on the rod. The standards have folding legs, and are held in proper relation to each other by chains. The aprons are provided with handles, by means of which they may be held in an inclined position, as shown in Fig. 1.



CHURCH'S FIRE ESCAPE.

A person escaping from a burning building jumps into the blanket, which yields with the impact of his body and arrests his downward motion without injury to himself or the apparatus. Descent is made from the blanket by sliding down the aprons, as shown in the engraving. Fig. 1 shows the fire escape in use, and Fig. 2 shows it folded.

Oil from Sunflower Seeds.

The sunflower has long been grown for its oil seeds in Russia and India, and the cultivation has been more recently taken up in Germany and Italy. The plant grows readily in most soils, but prefers light, rich, calcareous land, unshaded by trees. In Russia the seed is drilled into lines 18 inches apart, and the plants are thinned out to 30 inches apart in the rows, thus giving about 11,000 plants in an acre. The quantity of seed required for an acre is four to six pounds, and the sowing takes place in September–October, the crop being ready to harvest in February. In England it is recommended to be planted 6 inches apart and 1 inch deep, and to be earthed up when 1 foot high, requiring no subsequent attention. The yield of seed is much increased by topping the plants, and the best fertilizer is old mortar. Each plant produces about 1,000 seeds, chiefly on the main head.

Experimental culture in France gave a return of 1,778 pounds of seed, yielding 15 per cent of oil (275 pounds), and 80 per cent of cake, from an acre; but the product varies considerably according to soil, climate, and cultivation, and the average may be roundly stated at 50 bushels of seed from an acre, and 1 gallon of oil from 1 bushel of seed. The percentage of oil to seed ranges from 16 to 28; and that of husk to kernel from 41 to 60.

The Italian cultivation is confined to the neighborhood of Piove and Conegliano, in Venetia. In Russia the plant is most extensively grown in Kielce and Podolia, and the district of Birutch, in Voronej; the production of seed is now estimated at 8,000,000 poods (of 36 pounds), from an area of 80,000 dessatines (of 13,067 square yards). In Tartary and China it is cultivated in immense quantities, but no actual statistics are available. In India (Mysore) 1 acre of land gives 11½ cwt. of seed, which yields 45 gallons of oil, which is there compared with ground nut oil, and applied to the same uses. The Russian seed is expressed on the spot, and the oil is largely employed for adulterating olive oil. The purified oil is considered equal to olive and almond oil for table use. The chief industrial applications of the oil are for woolen dressing, lighting, and candle and soap making; for the last mentioned purpose it is superior to most oils. It is pale yellow in color, thicker than hempseed oil, of 0·926 specific gravity at 15°, dries slowly, becomes turbid at ordinary temperatures, and solidifies at —16° C.—*Drug Reporter.*

A Musical Electrical Wheel.

An experiment by Prof. H. S. Carhart is as follows: A disk of sheet iron was pierced with two circles of quarter-inch holes concentric with the disk, the number of holes in the two circles being thirty-two and sixty-four respectively. On one side of the disk was placed a horseshoe magnet with its poles very near the rows of holes; on the other side were arranged two corresponding induction bobbins. The circuit was completed through a telephone and either bobbin at pleasure. Upon rotating the disk rapidly, a clear musical sound was produced in the telephone, the pitch rising with the rapidity of rotation. Moreover, the bobbin opposite the circle of sixty-four holes gave the octave above the other, and each gave a note of the same pitch as was produced by blowing a stream of air through the corresponding holes.

Curious Properties of Iron and Steel.

It is well known to electricians that the best steel makes the best permanent magnet. But the magnetism of steel depends on how hot or how cold the metal is. For example, steel loses its magnetism if subjected to a temperature of 100° below zero; it also loses its magnetism when heated to yellow heat; that is, between red and white heats. Soft iron, when heated red hot, is not attracted by a magnet.

IMPROVEMENT IN DUST-PANS.

It is with some difficulty that an ordinary dust-pan is held by one hand while the dust is swept upon it by the other. Every housekeeper knows this, and the wonder is that the simple and efficient device shown in the engraving was not invented before.

This improvement enables the sweeper to hold the dust-pan by hand or foot; but the user will not be slow in making a choice as to which way is preferable. Holding the dust-pan by foot enables the sweeper to stand upright, a position which permits of readily gathering all of the dust in the vicinity of the pan, using the broom with both hands.

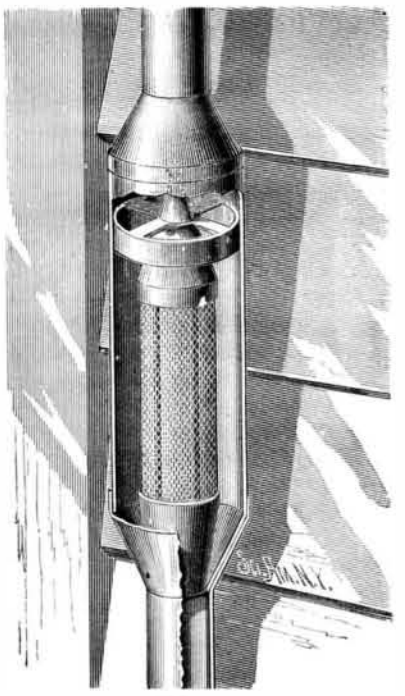
This dust-pan is made of the usual size and shape, and with the patented appliance is arranged so that the pressure of the foot causes it to adhere closely to the floor, so that the dust is swept and retained upon the pan instead of passing underneath it. It can be moved easily around the floor with the foot, the dust remaining on the pan. There is no solder used in its construction, consequently there is nothing to prevent it outlasting the ordinary dust-pan.

A frame corresponding nearly to the shape of the dust-pan is formed of band iron and secured to opposite sides of the pan, and at the back it is attached to a foot piece provided with a rest, which touches the floor, and has a horizontal arm extending toward, and secured to, the back of the dust-pan. The engraving shows so well the manner of using this device that no further description will be required.

This useful invention has been patented by Mr. William M. Valentine, of Glen Cove, L. I., who will furnish any further information that may be desired.

IMPROVED FILTER.

This filter, or strainer, may be attached to rain water conductors, so that the water from the roof will have to pass through the filter before entering the cistern, and by this means be relieved from bugs or other obnoxious matter which lodges in a dead water receptacle, so that the flowing water does not come in contact with them. The case is formed of sheet metal and has a transverse section about twice that of the conductor. To the lower end is fitted a nipple by a suitably shaped reducer, and to the upper end is fitted another nipple by a reducer to which is attached a third nipple fitting closely but detachably in the upper end of the tube so that the filter may be opened and closed when required. Within the tube is arranged a short section of wire gauze tube of about the same size as the conductor, and ribbed inside with wires to prevent its collapsing. To the lower end of the wire tube is attached a slightly tapered nipple which forms a tight but detachable connection with the lower end of the case. The upper end of the wire tube has a taper cap which closes the end to the water, and which is centered in a spider frame that holds the upper end of the tube in position. Between the lower nipple on the wire tube and the case is an annular pocket in which all matter separated from the water by the gauze falls. The filter may be connected to any part of the conductor or to the cover of the cistern.



JAMES IMPROVED FILTER.

The invention has been patented by Mr. Samuel James, of Lebanon, Missouri.

VALENTINE'S IMPROVED DUST-PAN.

Amber Dressing for Silk Goods.

Thummel, of Berlin, dissolves one pound of amber in two pounds of chloroform and applies this solution to the silk with a sponge or brush. The goods are next dried in a drying chamber and the chloroform recovered. They are then passed between rollers heated from within, which imparts to them a remarkable softness and elasticity.

Pain as a Storm Indicator.

The friends of Captain Robert Catlin, United States Army, are aware that he has for some years been serving as an animated barometer, to determine problems with reference to the relations of pain to weather, suggested by that eminent specialist in nervous disorders, S. Weir Mitchell, M.D., of Philadelphia. Captain Catlin has just published a report on his case, which was read before the College of Physicians of Philadelphia, June 6, 1883. In an introduction to this Dr. Mitchell specifies some of the circumstances which peculiarly fitted Captain Catlin for the service he has undertaken in the cause of medical science. In the first place, he is the victim of traumatic neuralgia, resulting from the loss of his foot, crushed in battle by a round shot, in August, 1864. Aside from the pain resulting from this mutilation, and which has been felt at intervals ever since in the lost foot, the observer is in admirable health; "his attacks are so definite as to coming and going as to create little difficulty in this direction, and from a former position as instructor in certain scientific branches at West Point he is well qualified by training to pursue this difficult study." "I may add," says Dr. Mitchell, "that I never knew any man more free from unwholesome attention to his own ailments;" and we may add that we never knew of a man who bore his burden of pain with more cheerful resignation and philosophy.

That this burden is by no means a light one is shown by the fact that the total amount of pain for the eight years ending on January 1, 1883, was 12,944 hours, or nearly one fifth of the time. This is Captain Catlin's calculation, but as he is free from pain during sleep, the proportion of pain during his waking hours is more nearly one-quarter. The winter months, it appears, hold the advantage as pain producers, and the proportion while the sun was north of the equator was 6,783 hours against 6,161 hours while it was south of the equator. March has the lead among the months, January being a close second, and November, December, May, February, April, August, October, September, July, and June following in this order. The average duration of pain was found to be greatest in February, 20·8 hours, the average for the whole time being 18 97 hours. February is one of the coldest, if not the coldest, of months, and contains probably the greatest barometric fluctuations of any month in the year; low temperature and high barometer producing pain, and extreme barometric undulations extending its duration.

As the result of the observation of sixty well defined storms, through ten consecutive months, it appears that storms announce their coming by the twitching of Capt. Catlin's nerves when the storm center is at an average distance of 680 miles, ranging from 200 to 1,200 miles. "Storms from the Pacific are felt the farthest off, very soon after crossing the Rocky Mountains. Those which move along the coast from the Gulf of Mexico are associated with neuralgia not quite so intense, and are not felt as a rule until within the average neuralgia distance." Should the pain be on a day of intermitting rain, it takes on an additional activity just before the increasing shower, and continues twenty to forty minutes; this will sometimes happen four or five times in twelve hours. Each little increment of pain seems to bear about the same relation to the showers as the main attack bears to the storm. Eating a meal hastens an attack and intensifies it when on. Eating, for example, at 8 A.M. brings on at 9 A.M. an attack not due until 10 o'clock. There is an ebb tide of pain just preceding meals, and storms coming within range during the early and the middle sleeping hours do not ordinarily arouse their victim, but delay their attack until sleep becomes less profound, thus following the ordinary rule that a victim of pain does not experience an attack until after a brief release from the influence of the anæsthetic sleep. Intense auroral periods are also believed to produce the pain.

As to treatment, Capt. Catlin says: "There has been no treatment in a medical way of late. I have had good health, take a great deal of exercise, but in a rather irregular way; my appetite is always good and I sleep well, except when the disturbance of neuralgia interferes. Physical exercise, nutritious food (have found milk most fattening of all), and light, agreeable occupations are, I found, the best regimen for a neuralgic subject."

Diagrams illustrating the relation between neuralgic pains and the barometer accompany this brochure, which, in the opinion of that competent authority, Dr. Mitchell, constitutes a most valuable contribution to the strict science of medicine. It is unfortunate that any officer should be subject to such an experience as Capt. Catlin has had for nearly twenty years; it is fortunate that, finding no escape from it, he should have the patience and zeal for science which have prompted him to make his own experience available for the benefit of other sufferers.—*Army and Navy Journal.*

PYRETHRUM, OR CHRYSANTHEMUM CORYMBOSUM.

This is a robust herbaceous plant with elegantly cut foliage and white and yellow flower heads, known also in gardens as *Pyrethrum corymbosum.* Under cultivation it grows about 4 feet high, and probably higher in rich soil. It is as hardy and persistent as the allied species, *C. Parthenium,* syn. *Pyrethrum parthenium,* of which the Golden Feather is a variety. In a wild state it grows from 1 to 3 feet high, and it is a common plant in Central and Southern Europe, ranging from Portugal to Switzerland, Austria, and Turkey. Our illustration, which is from the *Gardener's Chronicle,* was taken from a plant in the herbaceous ground at Kew, where we recently noticed it as the best and most effective of its near allies.

THE INSECT POWDER FAMILY.—CHRYSANTHEMUM CORYMBOSUM: FLOWERS WHITE.

The insecticide and insectifuge qualities of the dried and finely powdered flowerheads of different species of *Pyrethrum* and the harmlessness of the powder to man, to other animals, and to plants, have long since been known. Used against various household pests, under the names "Persian insect powder" or "Dalmatian insect powder," it has hitherto been put up in small bottles or packages and sold at high prices. The so-called Persian powder is made from the flowers of *Pyrethrum carneum* and *P. roseum,* while that from *P. cinerariæfolium,* a native of Dalmatia, Herzegovina, and Montenegro, is more generally known as Dalmatian powder. Some interesting experiments made during the past year on different insects by Mr. William Saunders, of London, Ontario, show that the use of this powder may be satisfactorily extended beyond the household, while a series made by Professor Riley in the summer of 1878, with the same powder on the cotton worm, showed it to have striking destructive powers, the slightest puff of the powder causing certain death and the almost instant dropping of the worm from the plant. Repeated on a still more extensive scale the present year at Columbus, Texas, the powder proved equally satisfactory in the field.

Here, then, we have a remedy far exceeding any other so far known in efficacy, and harmlessness to man and plant, and the only question has been to reduce its cost. Mr. Milco, a native of Dalmatia, has been cultivating the *P. cinerariæfolium* in California in constantly increasing area for the past three years, and deserves great credit for his efforts in introducing it. The insect powders made from the California grown flowers have proved to be very effective. In SCIENTIFIC AMERICAN SUPPLEMENT No. 218 will be found an interesting and instructive article on the subject of insect powders.

Construction of Induction Machines.

Dr. St. Doubrava contributes the following note upon the principle and construction of induction machines to the *Journal* of the Vienna Electrical Exhibition: In 1831 Faraday enunciated the following general law: "When a conductor moves in a magnetic field in such a manner as to cut the lines of magnetic force, a current exists in the conductor; when it moves parallel to the lines of force, there will be no current." In induction machines the space between the magnetic poles is generally understood by "magnetic field." When one pole is positive and the other negative, the lines of magnetic force run parallel to the line joining these poles, thus $+ P \equiv - P$; but between like poles the lines of force are perpendicular to the line joining the poles, thus $+ P \parallel + P$.

Upon this general law Faraday constructed his first magneto-electrical machine, as a laboratory experiment. It consisted of a copper disk revolving between the poles of a powerful steel magnet, or electro magnet. The axis was connected by a conductor with the periphery. The direction of the current was either from axis to periphery, or the reverse, according to the direction of rotation and the polarity of the magnet. In all induction machines subsequently constructed, up to the Pacinotti-Gramme and Hefner-Alteneck machines, spools of wire (helices) were made to approach and recede from the magnetic poles, so that they were alternately in and out of the magnetic field, causing a considerable loss of power.

The Faraday disk embraces the fundamental principle of all induction machines for constant currents. To prevent the opposite currents in different parts of the disk from neutralizing each other, it is constructed in radial segments, which are isolated from each other. The periphery of two opposite segments of the same disk may be joined by a wire, while the circuit may be completed by sliding contact with the axis.

Two such disks can be arranged upon the same axis in such a manner that currents may be set up in opposite directions in the radial segments corresponding in position, when both disks rotate in the same direction. By connecting the peripheral and axial end of every radial portion, we obtain the principle of the ring inductor of Pacinotti and Gramme, in which the two external side surfaces of the wire windings correspond to the two disks. The iron core of the inductor increases the intensity of the magnetic field.

Native Woods for Decorative Purposes.

A writer in the *Railroad Gazette* gives some ideas about our native woods and their uses that may be of value to our mechanics. He says that white wood is valuable because it remains where put, notwithstanding the fact that its surface is perhaps as easily affected by water as almost any wood. In Virginia there are tracts formerly known as the "Wild Lands," in which much fine forest remains, tracts where the tulip poplar, or the white wood, shows trees that will square two feet for sixty feet of length, and where the beech, oak, the hickory, and the sugar maple have never been touched. One of the finest tracts of the much used cherry tree is found along the eastern edge of the outcroppings of the coal measures of the northern part of this region. Those who have been accustomed to see miserable, caterpillar-eaten specimens of this tree, would be surprised by the splendid trees found growing in these forests—trees three and four feet over the stump and sixty feet upward before reaching a limb.

Carrier Ravens.

Successful experiments have lately been made at Coblentz in the training of ravens as carrier birds in place of pigeons. The latter are more subject to the attack of birds of prey than ravens. The trained ravens were made to fly a distance of forty miles, and their performances gave much satisfaction.