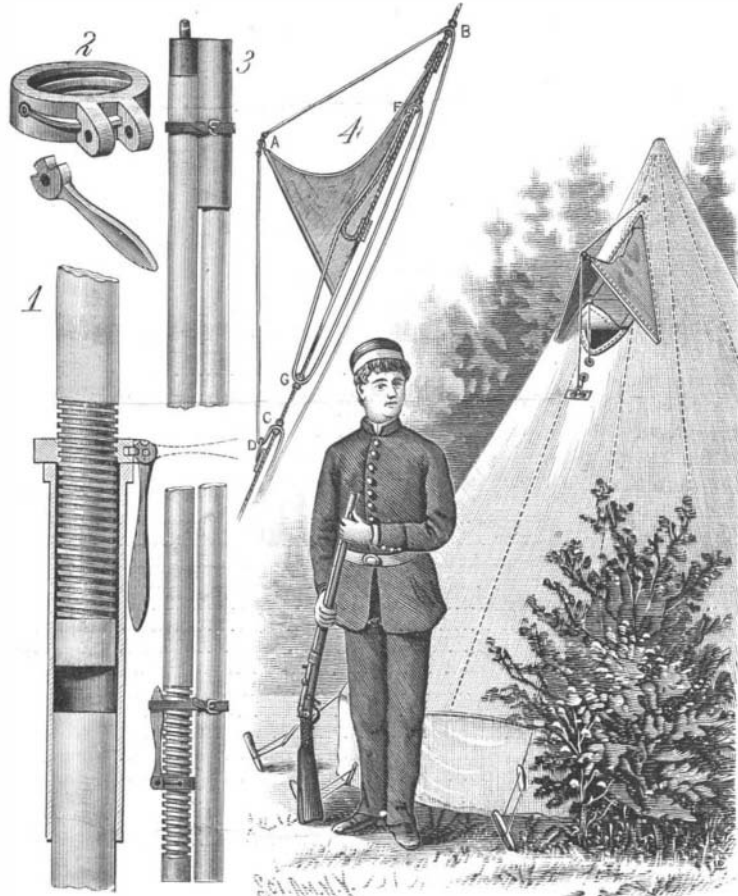


CONNECTION HANGER FOR ELECTROTYPING APPARATUS.

The body of the hanger is formed of a broad, flat strip of suitable conducting material, as copper, bent to form a hook at its upper end, which is received on a rod extending across the top of the depositing vat or trough of the electrotyping apparatus. The middle part of the strip is enlarged to form a rectangular plate, at the back of which is secured a similar plate carrying the sustaining hooks. These two plates are separated by an insulating plate, and the outer face of the conducting plate is also insulated by a plate, as shown in the sectional view. The four plates are held together by rivets, so insulated as not to make connection between the conducting and sustaining plates. The sustaining plate is provided with hooked arms, on which the moulding case is supported. Upon the upper supporting

hook is sweated or otherwise secured a second hook, having a sharpened point, so that when the hanger with the attached mould is removed from the vat or restored thereto, the time card on the sharp pointed hook will not be displaced. This construction of the hanger does away with the plating of the moulding case and the forming of electrical connections between



LEWIS' TENT POLE AND VENTILATOR.

caused to travel the wire to its opposite destination. The money is carried in a cup attached by bayonet connections to a rim secured to the under surface of the frame.

This invention has been patented by Mr. Joseph Starr, of 26 State Street, New London, Conn., who will furnish any further information.

LEWIS TENT POLE AND VENTILATOR.

Those who have used tents have had a full sense of the troubles which this invention is designed to overcome. If the halyards of a tent slacken, or if the canvas becomes loose, the tightening and readjusting have hitherto been done from the outside. In stormy weather, or on a cold rainy night, it is far from pleasant to huddle on some wraps and spend a long five minutes tying and untying ropes that seem never to adjust themselves to the requirements. The tent pole shown in our cut furnishes the means of tightening up the tent from the interior. The upper section of the pole telescopes into the lower, carries a screw, and by means of a nut bearing on the top of the lower section of the pole, it can be raised or lowered as required. A jointed handle is pivoted to the nut, and is held by a spring in a position at right angles to the pole, or parallel with it. This keeps it stationary in either the working position or out of the way, as desired. Another invention in the same line is also presented in the illustration. It consists of two movable hoods that can be opened or closed from the interior of the tent. The inner one, by an endless cord, can be opened or shut or kept partially open as desired, while the exterior hood acts as an awning to exclude the sun or rain. These improvements have been patented by Mr. Patrick Lewis. Further particulars can be had from Mr. Geo. Irvine, of 92 St. Peter Street, Quebec, Canada.

Practical Method of Thawing Earth.

It is often necessary to make excavations for pipes in very cold weather, under which conditions the operation is difficult. The trouble due to frost can only be remedied by thawing out the surface.

The *Electricita* says that quicklime has been tried with success. The surface where the excavation is to begin is covered with alternate layers of lime and snow. The lime becomes slaked, and heats the soil so effectually that after ten or fifteen hours it can be dug up with the greatest ease, even where the cold is excessive. It goes without saying that where there is no snow, water can be used. This makes the process a little more complicated, but is just as efficacious.

As in the generality of cases urgency exists, the digging up of pipes being necessitated by some case of repairs, this method is restricted in its application to those cases in which the delay of a day or a night is not inadmissible.

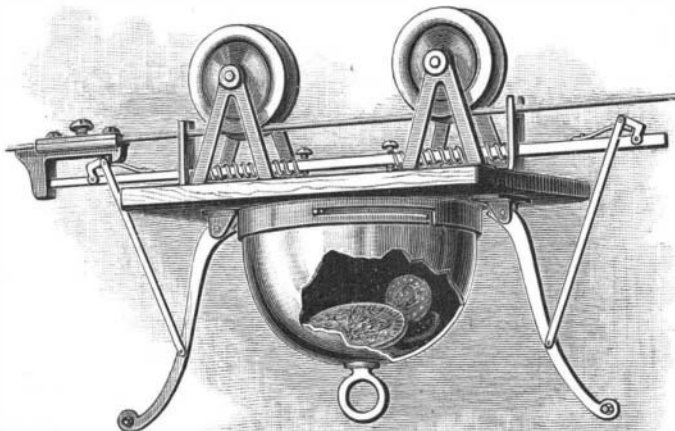
In the opinion of the editor of the *American Druggist*, the supply of the natural oil of wintergreen or birch will soon cease to be of any commercial importance, since the artificial product (salicylate of methyl), to which reference was made recently in these columns, is now being prepared of such good and uniform quality that it will undoubtedly replace the natural oil. Moreover, the artificial article can be produced at a cost below that at which the natural oil can be distilled profitably. Here is a chance for Congress to repress the improvement, as in the oleomargarine case.

the conducting and sustaining hooks, and provides means for the convenient handling of the mould.

This invention has been patented by Mr. Otto S. Fertig, of 40 King Street, New York City.

IMPROVED CASH CARRIER.

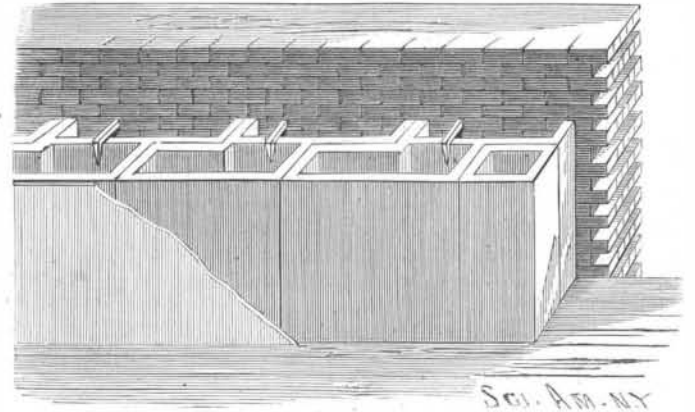
The cash carrier herewith shown is simple in construction and practical in operation, and requires no extra motion to disconnect it from the stop blocks, while the car, owing to suitable buffers, can receive no injury from coming in contact with the stop blocks. To the upper surface of the car are secured uprights, in which are journaled the axles of grooved wheels running upon the overhead wire or track. In other uprights is held a rod on which are placed two coiled springs, so arranged that the rod acts as a double buffer to the carrier, each of its ends being adapted to strike a stop block, two of which are attached to the wire, one at each end. Near each end of the bar is a pawl, acted upon by a spring which lifts its free end so it will automatically engage with a lip formed on the stop block for holding the car stationary when it reaches either end of its trip. The pawls are disconnected and the car started by means of levers pivoted to the frame and connected with the pawls. When either of the levers is grasped for shoving the car along upon the wire, a slight downward pressure upon it will free the pawl from the lip, thus freeing the car, which, by a slight forward movement of the hand, may be



STARR'S IMPROVED CASH CARRIER.

DOUBLE AIR CHAMBER FURRING TILE.

The accompanying engraving represents a double air chamber furring tile which has been recently patented by Mr. Thomas W. Snell, of 174 Howe Street, Chicago, Ill. For convenience in manufacturing, two tiles are formed together and are then separated after baking, the finished tile being of the shape clearly shown in the engraving. The flanged sides of the tiles are placed against the walls of the building, the tiles of each tier being fastened to the wall by hooks driven

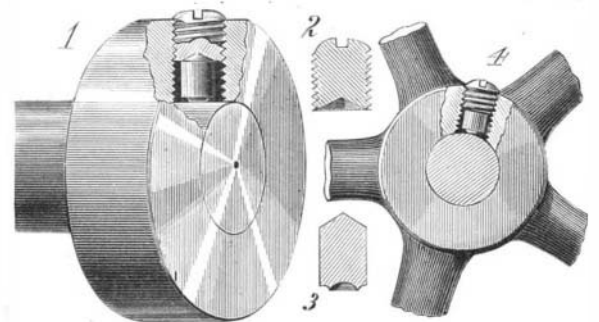


SNELL'S DOUBLE AIR CHAMBER FURRING TILE.

into the joints between the layers of brick. The tiles in each tier are so arranged as to form zigzag vertical joints. It will be observed that the tiles interlock with one another. This gives the furring great strength, while the peculiar form of the tile provides double air spaces, which effectually exclude all dampness. The outer surface of the tiles is plastered. This improved tile may be made of any suitable material, such as burnt clay, cement, or plaster of Paris.

SAFETY SET SCREW FOR COLLARS AND PULLEYS.

The ordinary mode of fastening collars and small sized pulleys on rotating shafts has been by means of one or a number of set screws—although it is well known that this is a most dangerous device, as the protruding head of the set screw will, as the collar rapidly revolves, inevitably entangle anything that



ROCHOW'S SAFETY SET SCREW FOR COLLARS AND PULLEYS.

comes in contact with it, and carry it around the shaft, and thus very often break belts, and, much worse, often endanger human life. It therefore seems strange that hardly any attempt in the way of invention has been made to obviate that dangerous contrivance; certainly no attempt has been made at all to substitute for it a safe method of fastening collars or hubs to shafts. The annexed illustrations show such a substitute, and its adaptation on a collar and on a hub of a pulley.

The set screw heretofore used is replaced by two pieces, a short screw, Fig. 2, flush with the circumference of the collar or hub, and which is slotted on top, so that it can be set up by a screw driver, and which is countersunk on the inside where the second piece, Fig. 3, a small steel plug, fits into the countersink, and is forced against the shaft by the screw. The surface of the steel plug is serrated on the side toward the shaft, and the collar is made so that there is a clearance all around the steel plug. When this screw is set up snugly against this steel plug, so that the serrated surface of the latter is somewhat embedded into the shaft, then the plug acts like a pawl and toggle in any direction on which a strain might be brought against the collar or hub, and the greater the strain, the more will the plug embed itself in the shaft, and the tighter it will hold the object to the shaft. By means of this simple device, a collar or hub can be fastened to a shaft much firmer than by a mere set screw, and there being no projection beyond the periphery, all danger is obviated.

This invention has been patented by Mr. F. Rochow, of Bridge and Plymouth Streets, Brooklyn, N. Y.

FARMERS who raise turkeys in Lehigh County, Pa., drive them to market as they would sheep. Sometimes flocks of two hundred are thus driven along the public roads.

Natural History Notes.

Raising Diatoms from Spores.—Owing to the very peculiar beauty and variety of their forms and the external markings of their indestructible siliceous skeletons, no organisms have received so much attention from microscopists as diatoms. "Appearing everywhere with the first-born of life, and wherever matter is found in a condition fit for their development and nourishment, these marvelous, indestructible organisms have been preserved and brought down to us, in forms unchanged, from the remotest periods of our globe's history." Their claims to a place among animals was once very warmly urged by naturalists, but the discovery, by Mr. Ralfs, of the formation of spores by conjugation in several of the genera effectually put an end to the controversy, and decided their right to a place in the vegetable kingdom. Some further light has recently been thrown on the subject of the development of these algæ, by Dr. Samuel Lockwood, who, in a paper in the December number of the *Journal of the New York Microscopical Society*, gives an interesting account of a series of experiments, extending over several years, in raising several species in his laboratory. The following is a resume of these experiments, in the author's own words:

"1. My experiment of December, 1882, the results of which I have confirmed by so many observations made since, demonstrates that diatoms originate in spores, or seed-like bodies.

2. These spores are exceedingly minute, passing easily through filter paper.

3. They are probably resting spores, not motile, and may be held in suspension awhile like the mineral matter in turbid water.

4. The viability of these spores is remarkable. The diatoms raised in the first series of experiments were from spores whose life force had lain dormant in total darkness for thirteen or fourteen years; those in the second series, for sixteen years.

5. The viability of some genera is greater than that of others. This is notable of *Navicula* in these experiments, and is consonant with the numerical lead of this genus in forms or so-called species.

6. Owing to the environment becoming abnormal, development may be rapid and erratic to a surprising degree, but upon aberrant and asymmetrical lines. Suppressed at some points, the life energy is precociously active at others.

7. Diatoms have embryonal stages or forms, with silicate fronds.

8. As to kind and quantity, the crops are capricious, and vary without apparent reasons.

9. As to the parentage or begetters of the spores in my experiments: They were not generated in the vessel which contained the water, but were begotten of sporangial mother cells in [Raritan] Bay."

Effect of the Electric Light upon Plants.—A citizen of Davenport, Iowa, whose garden is situated at about one hundred feet from an electric light tower, has remarked that his lilies close at sunset, but open again a few minutes after the arc lamps have been lighted. It has been observed at Detroit, too, that the foliage of the trees exposed to the rays of the electric light is much more luxuriant than that of such trees as are not.

Storms Foretold by Insects.—A French exchange states that upon the approach of a storm, the summit of the Puy-de-Dome is visited in succession by hosts of gnats, winged ants, and swallows. It is well known that the latter are attracted by the ants, but whence the ants and knats come is a mystery. The insects often arrive in such numbers as to cover the floors of the observatory, where they are crushed by the million.

The Botanic Gardens of the World.—According to a report of the Montreal Horticultural Society, there are 197 botanical gardens in the entire world, and they are thus distributed: France and her colonies, 25; England and Ireland, 12; the English colonies, 27; Germany, 34; Italy, 23; Russia and Siberia, 17; Austria and Hungary, 13; Scandinavia, 7; Belgium, and Holland and colonies, Spain and colonies, and the United States, 5 each; Portugal and Switzerland, 3 each; Denmark and Roumania, 2 each; Brazil, Chili, Ecuador, Egypt, Greece, Guatemala, Japan, Peru, and Servia, 1 each. The list may be completed by mentioning the gardens of Geneva and Louvain, and a few that have recently been organized in English India. At least half of the gardens mentioned above are kept up by the government, 18 per cent by universities, sometimes in conjunction with the general or city government, 11 per cent by cities alone, and 5 per cent by private donations. Out of the same number 94 per cent are always open to the public, 70 per cent are open to visitors on Sunday only, and 73 per cent publish reports, or contribute in some such way to scientific research.

A Living Pop Gun.—In the Eastern seas, from Ceylon to Japan, there abounds a little fish, belonging to the genus *Chaetodon*, which secures its prey by means of an instrument like the blow-pipe used by boys for projecting peas and putty. The nose of this fish is a

sort of beak, through which it has the power of propelling a drop of water with force enough to bring down a fly. Its aim is very accurate, and it rarely misses its object. The unsuspecting victim sits on a weed or tuft of grass near the water; the fish cautiously approaches, stealthily projects its tube from the water, takes a sure aim, and lets fly, when down drops the insect, to be swallowed by its captor.

Treatment of Silver Ores in Mexico.

Consul Winslow, of Guerrero, says that in the neighborhood of all the mines in Mexico there are *haciendas de beneficio*, or works for extracting the silver from the ore. These buildings are generally about 300 feet long, and at the back there is a courtyard. In front there is generally a large doorway for entrance, where nobody is allowed to enter without previous permission. The *hacienda* is managed by an administrator, who has his officials and clerks, and directs the establishment. The peons, or workmen, gain from three shillings to four shillings a day, and are paid off at the end of each week. The ore as it is brought from the mine is in large pieces, and these are piled up in the courtyard in a huge pile. They are in the first place put into an inclosed box, and pounded to pieces by immense wooden pounders, armed at the end with iron pestles, which are lifted up by arms connected with an axle, which is turned by mules. The end of these arms fit into a notch in the pestles, and lift them up a certain distance, and then the end of the arm slips out of the notch, and the iron pestle falls down with an immense force upon the mineral, and crushes it into small pieces. These fall down upon a sieve made of hide, and the smaller pieces fall down through the holes in the sieve, and the larger pieces are thrown back under the pestles to be again crushed. There are several of these pestles in a straight line, connected with the same axle, and they are lifted up alternately. After the ore is pounded to pieces in the mortars, it passes to the mills, which consist of a round vat placed on a level with the floor, where the metal is ground up into a fine mud, water being added, by means of three heavy and hard granite stones, of an oblong shape, which are tied to the arms, connected with a revolving axle turned by a mule, which walks round in a circle blindfolded.

Into holes made in the stones sticks are introduced, and these are connected by means of ropes or chains to the revolving arms. There are several of these circular vats, all situated in a line in a long room, each worked by a mule blindfolded. These are called *tahones*, and the crest pole in the middle the *peon*, with two arms of wood, from which are suspended the heavy stones, called *metapiles* or crushers. From here the ore, which has the appearance of mud, is thrown out into the courtyard, which has a floor well made of hard cement or stone, and here are added quicksilver and salt in a liquid state, or *caldo* as it is called. It is thus left in the open air, exposed to the heat of the sun, some twenty or thirty days, and is stirred up every day or two by the feet of men and horses, who walk round in a circle until the quicksilver and the salt are well incorporated with the ore. When this process is completed, the mud thus washed is called *torta de lama*.

After the ore is thus worked or brought to a proper state, it goes to the *lavadero*, or washing-place, which is a round vat made of wood and stone, where the silver is separated from the earth, and here is where the *tortas de lama* are taken from the yard, and here remains, after the mud is washed out, what is called the *plata pina*, or amalgamated silver. This amalgam is then put into stout canvas bags, and submitted to a heavy pressure to get rid of the mercury, and afterward it goes to the furnace, where the silver is purified of all foreign substances. There is an additional process which is pursued with certain kinds of ores.

After the mineral has been exposed to the sun in the *patio*, or courtyard, it is transferred to the *planillo*, which is an inclined plane in the open air, having a solid stone floor about sixty feet long and twenty feet wide. At the foot of this sit a number of nearly naked men, who are engaged in throwing water gradually on the mass of mud by means of pieces of ox horn, so that the mud flows off, and runs outside the yard into a ditch, and the silver, with some mud, is left at the foot of the inclined plane. After this process, the greater part of the mud has been removed, and only a small portion remains, which contains the silver. This mud is then taken to a room on the second floor, where it is placed in the *criso*, a large round iron boiler, with fire underneath; water is added, and it is stirred up by means of revolving arms worked by a mule, and the remaining mud flows off, only a small portion remaining. The rest of the process consists in removing the remaining substance to the amalgamating room, where quicksilver is added, which unites with the silver in the mud, and this is further washed, and only the quicksilver is left united with the silver. This is further purified in the furnace, and the silver runs off into moulds, and is then sent to the mint at San Luis Potosi to be coined.

There are different kinds of ores—one which is merely exposed to the fire of a furnace, and this is called *fundicion*, and another of the *patio* or yard. One kind of ore goes to the *patio*, and from there to the *lavadero*, and another goes to the *planillo*, and from there to the *criso*. The white and green silvers are put through the process of the *patio* and the *criso*; the bronzes, and those containing lead, and those mixed with other minerals, are extracted by the *patio* and the furnace. The processes used for extracting the silver are very primitive. From three hundred pounds of crude metal only three to eight ounces are extracted. Some of the richer ores, after being ground up, are mixed as before with mercury and salt, and then made into *tortas* or piles, some six feet in diameter, and an Indian, bare legged, commences in the middle and walks round regularly, placing one foot before the other by a peculiar movement, and leaves not a single particle unstamped, and this is kept up all day, the object being to unite the crude mercury with the silver. These men are paid at the rate of about one shilling and sixpence a day.

There are three different kinds of silver ore extracted from the mines, according to the description of the metal with which they are combined, although there are other varieties. There is the *plata blanca*, or white silver, which is the purest and rarest. In this variety the silver can be seen resting on the surface of the stone. There is also the *plata verde*, or green silver, and in this variety the silver is united with copper, and the veins of blue and green in the ore are the silver with the copper. *Las bronzes* contain silver, but in a less quantity, united with iron which looks like brass or gold. *Plomosos*, where the silver is united with lead, is frequently met with at the mines situated in Nuevo Leon, such as Ballecilla, Cerralvo, and Villadama. All the different kinds of silver are called *azogues*, or quicksilvers, and there are also *caliches*, or chalks, which are rich in silver and very common in places.

Metric System.

The following lists, prepared by Mr. James Jackson, archivist of the Geographical Society of Paris, give the present status of the metric system:

COUNTRIES IN WHICH THE SYSTEM IS OBLIGATORY BY LAW.

	Population.
Argentine Republic.....	2,830,000
Austria and Hungary.....	37,786,346
Belgium.....	5,530,009
Bolivia.....	1,957,352
Brazil.....	9,883,622
Chili.....	2,199,180
Colombia.....	4,000,000
Denmark.....	1,969,039
Ecuador.....	946,033
France and colonies.....	46,843,000
Germany.....	45,234,061
Greece.....	1,979,303
Italy.....	28,459,451
Mexico.....	10,046,872
Netherlands.....	4,172,971
Norway.....	1,806,900
Paraguay.....	346,048
Peru.....	2,699,945
Portugal.....	4,160,315
Roumania.....	5,073,000
Spain.....	16,634,345
Sweden.....	4,579,115
Switzerland.....	2,846,102
	241,973,011

COUNTRIES IN WHICH THE SYSTEM IS OPTIONAL BY LAW.

	Population.
Dominion of Canada.....	4,324,810
Great Britain and Ireland.....	35,241,482
Persia.....	7,653,600
United States.....	50,419,933
	97,639,825

COUNTRIES IN WHICH THE SYSTEM IS OFTEN USED WITHOUT HAVING LEGAL VALUE.

	Population.
Egypt.....	6,820,000
English India.....	198,755,993
Russia.....	100,372,553
Turkey.....	24,804,350
Uruguay.....	438,245
Venezuela.....	2,075,245
	393,266,386

—La Nature.

Gas Motor Patents.

The Gas-motoren-fabrik Deutz, of Deutz, Germany, who own the "Otto" patents in Germany, and attracted of late attention by the large sizes of Otto engines furnished to city water works and electric light stations, have just obtained a decision in their favor in their suit against Moritz Hille, of Dresden, a manufacturer, and several of his clients and users of infringing engines. The decision establishes the infringement by the defendants, and orders them to discontinue the manufacture and use of the machines; also to account for damages. The Hille engine used the well-known Otto four-stroke cycle, and it is against its use that also other suits still pending against Kortling Bros. and Buss, Sombart & Co. are directed. In these cases a decision may soon be expected.