The ribbon-fish is one of the most beautiful and interesting of its kind, and up to this time was generally supposed to have been unknown in American waters. The writer has seen several dead specimens, and one live specimen at Santa Catalina Island, but all were very small. Doubtless such come inshore after storms in winter, though the specimens observed were found in summer. The large one taken at Newport came ashore in February after a severe storm, which strewed the beach with numbers of fish strange to the inhabitants, including several small ribbon-fishes.

The ribbon-fish is a deep-sea form. As it attains a large size, it doubtless has been seen and chronicled as a sea serpent. Its appearance is remarkable. The fish is literally like a ribbon. Those handled by the writer were beautiful diaphanous creatures, clear and jellylike. The color was silver, tinted with blue and splashed with black tigerlike stripes. The forehead is very high, and from the top of the head rise a series of dorsal spines, eight in number (*Regalicus Russelli*), a vivid coral in color, and when erect resemble pompons, or a red mane, giving the fish a most fantastic appearance. The fin continues the entire length of the body, and just below the pectoral fins extend two long rays which represent the ventral fins. The head is long and oblong; the teeth absent; the body ribbonlike, that is, flat, gradually tapering to the tail.

The history of this rare fish is extremely interesting. While fairly well known in other localities, it was not reported in American waters until the writer observed the Santa Catalina specimens and wrote to Dr. G. Brown Goode regarding them several years ago; other finds have been so rare that it is believed that all are known. Goode and Bean say: "Within the past one hundred and fifty years individuals have visited the shores of Norway, Finmark, the Faroe Islands, Scotland, Ireland, England, France, Mediterranean, Bermuda, the Cape of Good Hope, Hindostan, and New Zealand." Gunther reports forty-four, seen by naturalists, and doubtless others have been observed and not reported. The exact size to which *Regalicus* attains is not known, but specimens ranging up to sixty feet in length have been examined, and may be considered, so far as known, giants of the tribe. Goode and Bean, referring to a specimen twenty feet in length, state, "and it is more than probable that they grow much larger, and that many of the creatures popularly identified with the sea serpent are only large animals of this type." In 1860 an individual seventeen feet in length went ashore in Hungry Bay, Bermuda. The giant of the tribe is chronicled by Dr. Andrew Wilson, of the University of Glasgow, who states that Lord Norbury engaged the smack "Sovereign," Capt. Baillie, of Hull, to trawl for him in the Frith of Forth, and among other fishes they one day hauled up an oar-fish, which when stretched upon the deck of the smack, which was of 40-ton burden, was larger than the vessel, or sixty feet in length; and some of the men stated that they had seen much larger specimens. Lord Norbury did not realize the value of the catch, and as it was an interference to the work, he ordered the men to throw it over. This fish at the surface, with its waving red plumes, would fully have realized the ideal "sea serpent."

The royal yacht "Astern" once reported having seen a remarkable sea monster near Sicily, which in all probability was a ribbon-fish. The writer has never doubted that some remarkably large animal had been observed in Massachusetts Bay after receiving the following letter from one of the most intelligent men in Essex County, and has thought this "sea serpent" a *Regalicus* approximating the one observed by Lord Norbury. The letter is as follows:

"Lynn, Mass., June 26, 1881.

"Mr. C. F. Holder:

"Dear Sir: Yours of the 24th instant came duly to hand, and, in reply to that part of it relating to the account given by myself of a strange fish, serpent, or some marine animal called a sea serpent, I have to say that I saw him in a pleasant, calm summer morning of August, 1819, from Long Beach, now Nahant.

"At this time he was about a quarter of a mile away; but the water was so smooth that I could plainly see his head and the motion of his body, but not distinctly enough to give a good description of him. Later in the day I saw him again off 'Red Rock.' He then passed along one hundred feet from where I stood, with head about two feet out of the water, and his speed was about the ordinary of a common steamer. What I saw of his length was from fifty to sixty feet. It was very difficult to count the bunches, or humps (not fins), upon his back, as by the undulating motion they did not all appear at once. This accounts in part for the varied descriptions given of him by different parties. His appearance on the surface of the water was occasional, and but for a short time. The color of the skin was dark, differing but little from the water or the back of any common fish. This is the best description I can give of him from my own observation. And I saw the monster just as truly, although not quite so clearly, as I ever saw anything.

"This matter has been treated by many as a hoax, fish story, or a seaside phenomenon, to bring trade and profit to the watering-places; but notwithstanding all this, there is no doubt in my mind that some kind of an uncommon and strange rover in the form of a snake or serpent, called an ichthyosaurus, plesiosaurus, or some other long-named marine animal, has been seen by hundreds of men and boys in our own, if not in other waters. And five persons besides myself—Amos Lawrence, Samuel Cabot, and James Prince, of Boston, Benjamin F. Newhall, of Saugus, and John Marston, of Swampscott—bore public testimony of seeing him at the time. Yours truly,

"Nathan D. Chase."

A Forty-Thousand Volt Power Transmission.

BY EMILE GUARINI.

The Oerlikon Construction Works, at Oerlikon, near Zurich, Switzerland, have recently received an order which commands attention as much on account of its importance as because of its special character. The order in question rests upon the utilization of the water power of the River Caffare and the transformation of that power into electric energy.

The Caffare River rises in the Alps on the border between Italy and the Tyrol, and falls into the Chiese River. The installation is calculated to deliver a total of 15,000 horse power to turbines disposed in two generating stations.

The upper station, the building of which will be undertaken at some later period, will furnish 5,000 horse power, while the lower station, which is to be situated upon Italian territory, near the town of Bagolino, will be commenced within a few days. It is expected to deliver 10,000 horse power. When the two stations are finished, they will work in parallel, and the tension at the terminals of the three-phase current generators will be 9,000 volts, with a frequency of 42. This tension will be raised by transformers to 40,000 volts for transmission over the main line. The current, at this high tension, will be carried to Brescia, about 25 miles distant, and there a part will be used to feed the reducing transformers, a part for electric lighting in the province of Brescia, and the rest will be sold to the large electro-chemical establishments there. At the lower hydro-electric station the estimated flow of water is about 876 gallons a second, which, with a fall of 833 feet, is calcualted to deliver 10,160 effective horse power at the turbines.

To lead this water to the penstocks it will be necessary to build a canal 14,760 feet long, which will pass through four tunnels, one of which will measure 7,544 feet in length.

Five groups or power units will be installed at the lower hydro-electric station, each having a capacity of 2,500 horse power. Each unit is to consist of a turbine, making 350 revolutions a minute and connected direct with a three-phase current dynamo. At a convenient spot in the main building, near the above-mentioned units, will be installed two smaller turbines of 160 horse power, each making 600 revolutions a minute; their function will be to run the exciters, one each, to which they will be also directly connected. Since one exciter is sufficient to energize four of the power units, the plant will thus be provided with one large generator and one exciter as a reserve in case of accident.

Five transformers each will also be provided to raise the tension to 40,000 volts. At the point of consumption this current must again be reduced by five other transformers to a tension suitable for distribution.

This power plant is the more interesting since it is the first plant of the kind in Europe to make use of a tension of 40,000 volts as well as of transformers of a capacity exceeding 2,000 kilowatts.

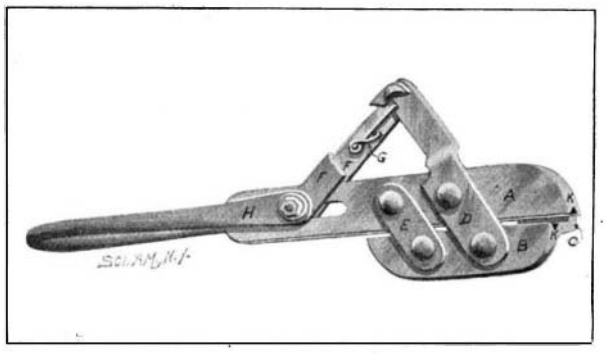
The Current Supplement.

The current Supplement, No. 1440, opens with an illustrated article by Emile Guarini on the power plant of the Metropolitan Street Railway of Paris. Dr. Franz Meyer reviews the history and commercial development of the Schroeder contact process of sulphuric acid manufacture. Of technical interest are articles on "An Unrecorded Property of Clay," "The Coloring of Metals," and "The Preservation of Wood." The English correspondent of the Scientific American describes the Hattersley automatic loom. In a very full and well-illustrated article, the magnetic observatories of the United States Coast and Geodetic Survey are excellently described. Prof. J. Reynolds Green discusses vegetable physiology. An article on impurities and purification of acetylene will probably be found of value.

The large fleet of United States sailing vessels which hitherto has been employed in the petroleum oil deep sea trade has recently almost completely been driven out of the field by the subsidized French sailing craft.

WIRE GRIP FOR LINEMEN.

Our illustration shows a simple form of wire grip for the use of linemen in stringing electric wires. Provision is made, in connection with the grip, of a simple device for holding a length of wire while twisting its ends around the wire held in the grip. The grip comprises a fixed jaw *A* and a movable jaw *B*. The jaw *B* is movable at all times in parallelism with the fixed jaw by reason of its double pivotal connection therewith through the lever *B* and the link *E*. To the outer end of the lever *B* are pivoted the links *F* which extend to a bolt movable in a slot formed in the outer end of the fixed jaw. Secured to this bolt is a loop *H* to which a draw-rope or strap may be attached. A spring *G* arranged between the

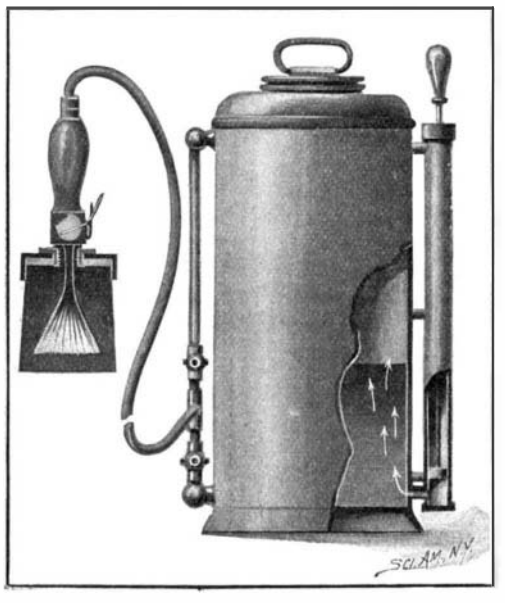


WIRE GRIP FOR LINEMEN.

links *F*, and engaging the upper end of the lever *D*, serves to normally close the jaws sufficiently tight to frictionally engage a wire which is held in the V-shaped slots *K*. When, however, strain is put upon the device the jaws will be drawn tightly together through the medium of the lever and the links connecting with the loop *H*. On one side of the jaw *B* is a keeper *C* for the wire which is designed to have its end turned around a wire engaged by the jaws. In operation, the main wire is clamped between the jaws and then the wire which is to be twisted around the main wire is placed in the L-shaped keeper *C*, thereupon, with the ordinary tool, the end of the wire may be twisted around the main wire. The keeper *C* will prevent the wire engaged therein from swinging outward. Our readers will recognize as commendable features of this device the extreme simplicity of its construction, the provision of the useful retainer for the wire which is to be twisted about the main wire, and the peculiar arrangement of the jaws, which, by reason of their parallel movement, present a gripping surface throughout their entire length. Mr. James C. Logue, of Haze Hill, Canada, is the inventor of this improved wire grip.

A FOUNTAIN PAINTING APPARATUS.

The time consumed by a painter in dipping his brush into a paint bucket and removing any excess of paint taken up thereby is greater than might at first appear, and any device which would do away with this irksome detail would surprisingly increase the amount of work that a painter could accomplish in a given time. Such a device has been invented by Mr. John Grahn, of Stoughton, Wis., and an illustration of the apparatus is shown herewith. The apparatus comprises a reservoir for the paint, which is led to the brush through a flexible tube by air pressure. The air

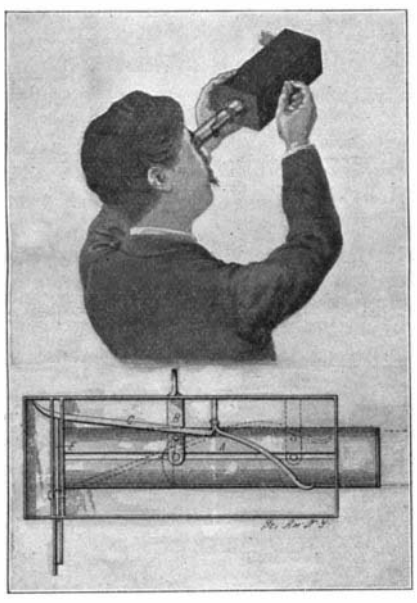


A FOUNTAIN PAINTING APPARATUS.

pressure in the reservoir is attained by means of a hand pump at the side, as shown in section in our engraving. The pump connects with the bottom of the reservoir, and forces the air through the paint to an air space at the top. A vertical tube mounted outside of the reservoir connects at the top and at the bottom with the interior of the same. This tube is provided with two valves, and secured to a nipple between these valves is a flexible tube, which at its lower end connects with a fixed tube in the brush handle. A valve located at the base of the handle is provided with a thumb piece, which by means of a leaf spring is normally held in such position as to close the fixed tube. The lower end of the handle is formed with a threaded stem, onto which the brush proper is screwed. The stem is also provided with an internal thread adapted to receive a short tube to which is secured what is called the "distributer." The distributer consists of fan-shaped canvas web made double, and between the folds of which cords are placed. The webs are sewed together between the cords in such manner as to form channels through which the paint can freely flow to the bristles. The distributer is necessary only for use in connection with flat brushes. When brushes of the type known among painters as "dagger stripers" are used, the distributer may be dispensed with and the paint fed to the bristles through a small nipple threaded onto the stem of the handle. In use the painter can accurately control the flow of paint through the brush by depressing the thumb piece on the thumb handle. After the painting is done the lower valve of the reservoir is closed and the upper one opened to admit a flow of compressed air through the tube and brush, discharging all paint therefrom.

A NOVEL PICTURE EXHIBITOR.

We illustrate herewith a toy picture exhibitor for which a patent has recently been procured by Mr.

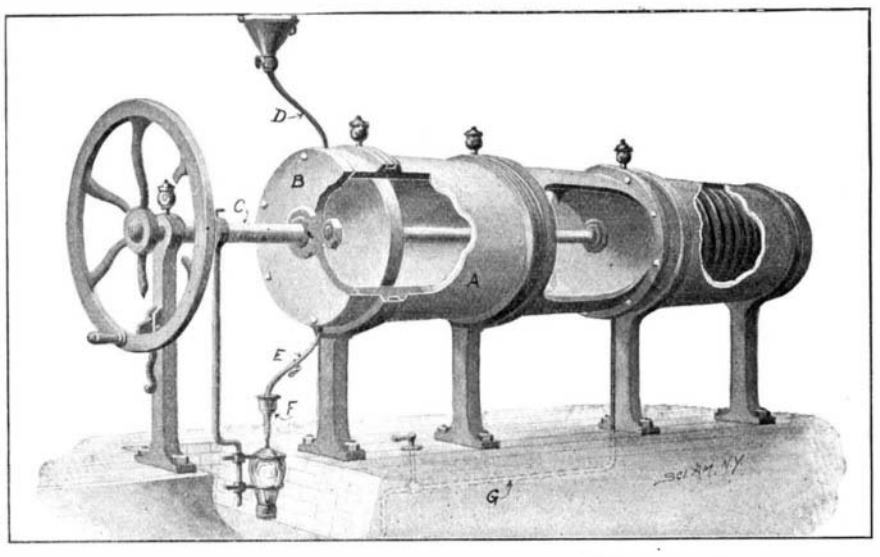


A NOVEL PICTURE EXHIBITOR.

Ulysses L. Berger, of 1332 11th Street, N. W., Washington, D. C. The principal feature of the apparatus lies in the provision of simple means for producing the effect of a moving panorama. A brief description of the construction of this apparatus will enable one to readily understand the method of producing this effect. The picture exhibitor comprises a box provided with two partitions at one end, which are separated by a narrow space in which the transparency to be exhibited may be received. A tube extends from the inner partition lengthwise of the box, and projects through the opposite end. A shorter extension tube is adapted to slide within the main tube. An arm *B*, which projects through a slot in one side of the box, serves as a means for sliding the lens in the tube *A*, being connected to this lens by a pin extending through a slot in the tube. Lying above tube *A*, and hinged to a bracket at one side of the box, is a lever *C*, which is adapted to be operated by engagement with a pin *D* on the arm *B*. The longer end of this lever projects through slots in the partitions referred to above, and rests against the picture when it is introduced into the box. Projecting from the side of the box at the point where the picture is introduced is a sliding support or guide, which affords a ready means for inserting the picture in position. Light is admitted to the transparency through coincident openings in the center of the partitions and the end wall of the box. In use the picture is first inserted and the extension tube drawn out, then the apparatus is held to the eye as shown in our illustration. On sliding the lens back and forth in the tube the figures in the transparency will be correspondingly enlarged or diminished in size, giving the effect of an advancing or receding panorama. When the lens is moved further back beyond the pivot of lever *C*, the pin *D* will engage the shorter arm of the lever, swinging it about to the position shown in dotted lines. This causes the longer arm to move the transparency *E* across the field of vision and out onto the sliding support at the side of the box. Thus the effect of a sidewise movement is added to the effects above mentioned.

VACUUM PUMP FOR BULBS OF ELECTRIC LAMPS.

A new form of vacuum pump for exhausting the air from the bulbs of incandescent electric lamps has been provided by the recent invention of Mr. Rudolph A. Steeb, of Roselle, N. J. The pump is provided with two cylinders, one of which is fixed and the other mounted to rotate. The revoluble section is shown at *A* in our illustration. A piston rod runs through both cylinders, and is provided with two pistons, one in each cylinder; the pistons are normally held in forward position by means of a spiral spring in the fixed cylinder. The cylinder head *B* of the revoluble section is secured to a shaft *C*, which is provided at its outer end with a hand wheel, by which the operator can turn the cylinder *A*. Connecting with the cylinder *A* at its forward end is a tube *D*, provided at its upper end with a funnel. A similar pipe *E* leads from the cylinder in the opposite direction, terminating in a coupling *F*. The coupling connects with the tube extending integrally from the bulb in which the vacuum is to be produced; the bulb is supported in holders adjustably secured to a rod mounted on the shaft *C*. In operation the hand wheel is turned to bring the parts in the position illustrated, then mercury is poured into the funnel, and passing into the cylinder through the pipe *D*, it thence forces its way through pipe *E* into the electric lamp bulb. The air in the bulb slowly bubbles out during this operation, and after the bulb is completely filled, a valve on the pipe *D* is closed. Then the hand wheel is given a half turn, reversing the positions of the funnel and the bulb, that is, bringing the bulb to the top. The motive agent is now admitted to the fixed cylinder through pipe *G*, which forces back the pistons, producing a vacuum in the cylinder *A*, and drawing the mercury out of the bulb. The valve on pipe *E* is now closed, and the bulb sealed by melting and closing the tube extension thereon. A new bulb may then be placed into position, and the hand wheel is again operated to bring the bulb to its lowest position. The three-way valve on pipe *G* is then turned to permit the escape of the motive fluid. This permits the pistons to move forward under action of the spiral spring, forcing the mercury into the new bulb, after which the operation is repeated as described above. A spring catch which engages the hand wheel serves to firmly hold the parts in their two positions.



PRODUCING THE VACUUM IN ELECTRIC LAMP BULBS.

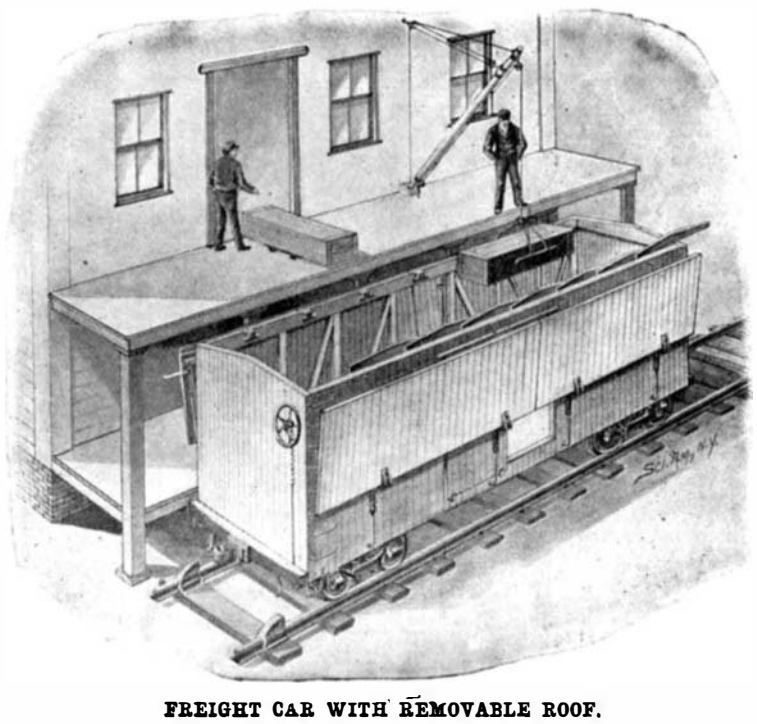
FREIGHT CAR WITH REMOVABLE ROOF.

The ordinary covered freight car—a huge closed box with a narrow door in the center of each side through which every piece of freighted merchandise must be twice handled—can hardly be said to have kept pace with modern requirements. In many cases articles which need protection from the weather have to be loaded onto flat or open cars, because they are too large to pass through the car doors or are too cumbersome to be carried therein; for, obviously, a crane or the like cannot be readily used in loading a covered car, and consequently the work must all be done manually. Another objectionable feature of the ordinary box car lies in the difficulty of completely filling the upper part of the car, and in subsequently unloading the car without dropping and injuring the merchandise. Aside from these, other difficulties will readily suggest themselves to all those acquainted with freight handling.

With this brief summary of present conditions in mind, we will more readily appreciate the advantages offered by the car with removable roof which is illustrated herewith. The car roof comprises a number of sections or doors, which meet at the center line of the car, and which at their outer edges are bolted to hinged brackets, mounted to slide on vertical guide rods at the side of the car. By this arrangement, when the doors are swung open, the brackets slide down the guide rods, drawing the doors with them, and a cam on the hinge causes the doors to assume a position close to the side of the car. Spiral springs on the guide rods prevent jarring of the hinges when the roof sections are being lowered. The roof-supporting beams are hinged to one side of the car and can be swung parallel with that side so as not to interfere with the loading or unloading of the car, but normally the beams lie transversely across the car and their free ends are hooked into sockets on the opposite side. This construction relieves the side strain against the walls of the car.

In order to prevent rain and moisture from entering the car at the joints of the roof sections, the sections are provided with weather-strips and as an extra precaution the cross-beams on which they rest are channeled so as to catch the water and conduct it out of the car. The center longitudinal joints of the roof sections are protected by runways secured to the sections at one side and fitting over weather-strips on the meeting sections. A simple locking-device holds the roof sections firmly together. The device may be unlocked by the manipulation of a lever at the end of the car. A patent for this improved type of freight car has recently been obtained by Mr. H. Addison Johnston, of Ingersoll, Canada.

Dr. George Cohen, an Allegheny inventor, has recently announced the perfection of an invention on which he has been working for some time past, and which promises to overcome the defects of the railroad block system by means of electricity. A company was formed some time ago to develop his invention, and it has been agreed to increase the capital stock to three million dollars and put the device on the market after it has been thoroughly covered with patents. Dr. Cohen is about to sail for Europe with the object of securing these patents, and on his return the details of the invention will be made public. He has announced, however, that his perfected invention will protect a train from almost any character of accident. A broken rail, for instance, will be the means of throwing the system into operation, and a train moving along in the vicinity of the danger will be stopped automatically. This invention was demonstrated some time ago in the presence of a number of railroad men, and at that time it was pronounced to be a remarkable device, but since then the doctor has spent a great deal of time in further improving it.



FREIGHT CAR WITH REMOVABLE ROOF.