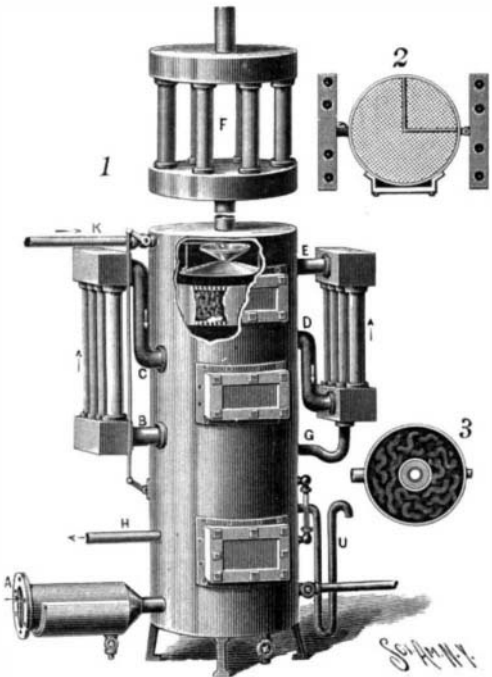


A FEED-WATER APPARATUS FOR BOILERS.

An invention patented by John S. Carter, of 483 Fargo Avenue, Buffalo, N. Y., provides an ingenious feed-water apparatus in which the exhaust steam from the engine is made to heat the feed-water, and is at the same time condensed and returned to the boiler. Means for purifying the feed-water and for separating the oil from the exhaust steam are also provided.

Fig. 1 is a perspective view of the apparatus, with parts broken away to show the interior construction. Figs. 2 and 3 are cross-sections through different parts of the device.

The apparatus is inclosed in a cylindrical casing, in the bottom of which is a chamber provided with a



CARTER'S FEED-WATER APPARATUS FOR BOILERS.

blow-out pipe. The exhaust steam enters this chamber through a drum, *A*, fitted with a stationary screw serving to impart a spiral movement to the steam, whereby the oil is centrifugally separated. Leading up from the bottom chamber is a pipe (shown in Fig. 3) perforated near its upper end and provided with a baffle-plate, causing the steam to pass horizontally into a feed-water heating chamber. From this chamber the steam passes through a pipe, *B*, into a condenser comprising two boxes and a number of vertical glass condensing tubes. From the condenser the steam passes down through the pipe, *C*, to a second feed-water heating chamber, from which it emerges by way of the pipe, *D*. After passing through a second set of condensers the steam enters a third feed-water heating chamber in the upper end of the casing, by way of the pipe, *E*. The water of condensation from the second condenser is returned to the first feed-water heating chamber by a trapped or return pipe, *G*. From the third feed-water heating chamber the steam passes through a third condenser, *F*, provided with a vertical outlet pipe. The steam in passing through the various compartments is condensed, and the water of condensation runs back into the casing to be employed as feed-water.

The feed-water is led into the apparatus by means of a pipe, *K*, discharging upon a baffle-plate, from which it passes in a spray to the third feed-water heating chamber and is heated by the steam entering the chamber. The several feed-water heating chambers are separated from one another by means of filtering partitions formed of upper and lower screens, between which filtering material is packed. The water delivered from the baffle-plate passes down through the several screens and filtering partitions in a spray, is heated by the steam passing through the chambers, and finally reaches a reservoir from which it is supplied to the boiler, heated and filtered, by the pipe, *H*. The supply of feed-water in the reservoir is automatically regulated by a float-lever connected by a link with a valve in the pipe, *K*. A water-gage and a trapped overflow pipe, *U*, are also provided for the reservoir. The upper filtering plates or screens, as shown in Fig. 2, are made in two or more sections to facilitate ready removal when cleaning.

PROF. ERNEST HAECKEL, the great German Darwin exponent, was recently thrown from his horse in Rome and seriously injured. He is now 65 years of age.

A SIMPLE DRIVING MECHANISM FOR GINS.

An improvement in cotton-gin driving mechanisms has been devised by Colbert W. Brown, of Leonard, Tex., by means of which the brush is driven practically by the same belt which drives the saws, so as to impart uniform motion to the machine. To the saw-shaft a band-wheel is secured, which is connected by a loose band with a power-wheel mounted below the usual table of the gin-casing. On the brush-shaft a pulley is fastened, connected by a band with a second pulley journaled in a horizontal, forked arm pivoted to a vertical arm swinging on the casing. In order to hold the second band in contact with the first band, a spring is connected at one end with the horizontal, forked arm and at the other end with a screw moving through a stud on the gin-casing, and receiving an adjusting-nut. The tension of the spring may be varied by means of the screw-rod and nut. From the vertical, swinging bar extends a shifting-rod, provided at its outer end with teeth engaging a detent-plate secured to the casing.

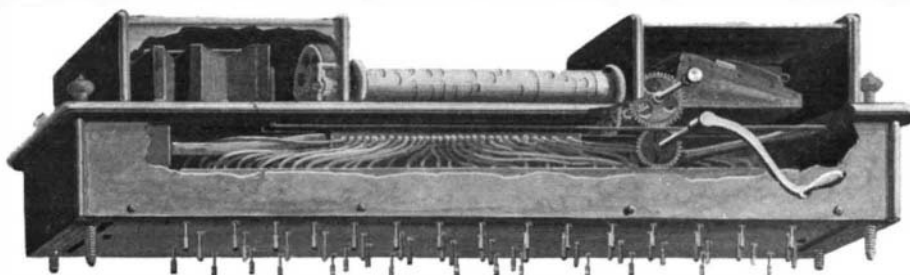
When the power-wheel is in motion, the shifting-rod is pulled out to bring the two bands into engagement, and is held in adjusted position by means of the detent-plate. When the first band has been sufficiently tightened, the band-wheel on the saw-shaft and the pulley on the brush-shaft will both be simultaneously rotated, thereby securing an evenness of motion which adds much to the efficiency of the gin.

THE "MAESTRO," A NEW PLAYING ATTACHMENT FOR ORGANS.

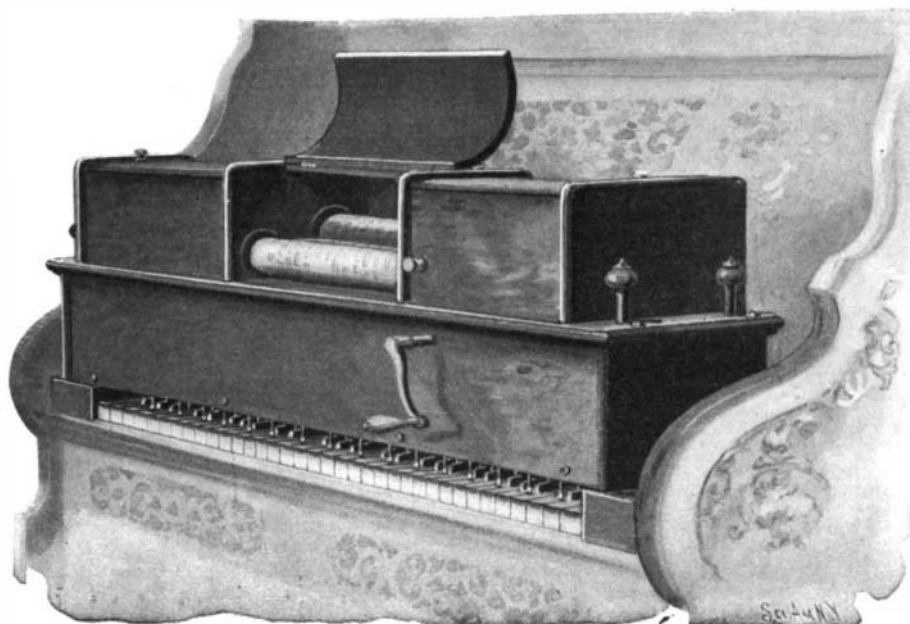
The "Maestro" is an instrument for correctly rendering, with the aid of an organ, the productions of great composers without necessarily having any knowledge of music. It is not very difficult to play on musical instruments, but it is most difficult to play well, and there are many who are fond of music who wish to gratify this taste without the expenditure of years of practice which have hitherto been necessary. To all such the "Maestro" will be a welcome boon. The instrument is rightly named, for it is, indeed, a "master player," rendering the most difficult music in an acceptable manner, and it also educates the musical taste of the public and helps the beginner who is anxious to become properly educated in music.

The instrument consists of a handsomely finished case, which fits over the keyboard of any organ, and all of the mechanism is contained in this case. It is built in the most substantial and workmanlike manner, in different sizes, in order to fit any standard organ. Brass sockets are attached to the extremities of the keyboard of the organ; screw pins secure the "Maestro" to it, making the alignment and adjustment perfect.

The instrument is manipulated by the turning of the crank shown on the right, but if desired a water or electric motor can be employed. The best results, however, are obtained by turning the crank by hand, as this gives control over the expression and the music is marked to guide the player, so that in no sense can it be called "machine music." The function of the crank is three-fold; first, it serves to wind the roll of music from the reel on to the feed roller; second, it winds up the spring by means of a pinion on the shaft



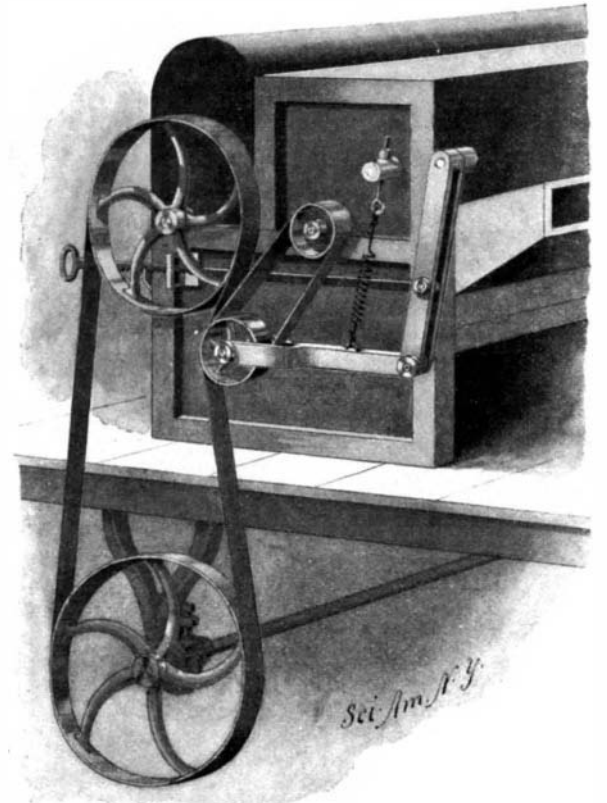
DETAIL OF THE PLAYING MECHANISM.



THE "MAESTRO," A SELF-PLAYING ATTACHMENT FOR ORGANS.

of the reel holder, the power stored serving to wind back the music on to its reel after it has been wound on the feed roller as played; and third, it serves to operate the bellows which exhaust the air from the plungers governing the keys.

The "tempo" is also controlled by the speed of the crank. The crank shaft terminates in a miter gear meshing with a similar and larger gear attached to the shaft of the feed roller, serving to actuate it to wind the music from the reel over the bridge which controls the plungers. The roll of music is inserted in the front



BROWN'S DRIVING MECHANISM FOR GINS.

of the instrument and is unrolled sufficiently to attach it to the feed roller, which winds it up as the music is played. When the piece is finished, the miter gears are thrown out of engagement by means of the pin shown just below the crank and the music is automatically wound on its reel by means of the spring shown on the left, which is wound up by the turning of the reel, the bearing of one end of which is square and adapted to enter a socket in the pinion shaft of the spring train. On the crank shaft is also a toothed wheel which meshes with another wheel to which a pitman is attached. The latter translates the rotary into rectilinear motion and operates the duplex bellows at the left end of the instrument through long sliding connecting rods. The bellows is connected with a reservoir bellows at the right end which serves to equalize the air vacuum.

The bridge consists of a hollow box whose top is perforated by a series of ports which are directly in the path of the dots and dashes in the music strip. A groove extends across the bridge and connects with each air duct by a small aperture; this groove is in turn connected with the vacuum chamber, which is placed at the bottom of the playing mechanism. The vacuum chamber at the bottom is common to all diaphragms which control the plungers. Every note is controlled by a rubber-covered plunger which slides through air-tight nipples and depresses the key, when the proper note is played by means of the music strip. The plungers are connected to diaphragms which move up and down in the body of the lower part of the playing mechanism. The top of each diaphragm is connected with a particular section of the bridge by a small rubber tube. The operation in brief is as follows: A vacuum is constantly kept up by the bellows keeping the plunger out of contact with the keys. This vacuum is constant while the paper passing over the bridge is unbroken, but the instant a perforation opens a port, air is admitted, and as we have already seen, there is also a vacuum at the bottom of the diaphragm by reason of the open passageway which is common to all the diaphragms. Consequently the pressure of air assisted by this vacuum forces the diaphragm down, sounding the proper keys. The mechanism is so simple that it is not likely to get out of order. The construction is very

ingenious and reflects great credit on the inventor, Mr. L. B. Doman, who has spent a number of years in perfecting the "Maestro."

The music can be obtained in great variety including selections from operas, classical music, dance music, songs, church music, hymns, etc., so that every taste can be satisfied. Original compositions or favorite arrangements can be specially made, if desired, the new method of perforating the roll of paper securing the best results, from a musical point of view, with a minimum of expense. The results which can be obtained with the "Maestro" are truly extraordinary, and with a little practice all the variations in tempo can be obtained with a facility and exactness which will satisfy even the critical musician. The field for the instrument is a large one. In the home it is sure to be in daily requisition, and the vast selection of music enables the player to suit each mood. The "Maestro" can be used in churches where no regular organist is employed or in weekly meetings, the most difficult church music as well as simple hymns being acceptably rendered by it. The instrument is made by the Maestro Company, of Elbridge, N. Y.

Death of a Famous Shipbuilder.

William H. Webb died October 30, at New York city. He was not only the most famous shipbuilder in America in the days when sailing vessels still held the bulk of carrying trade, but at the time of his death he was considered as an authority on the art of ship construction. His father had been a builder of sailing vessels in the days before the construction of Fulton's first steamboat, and the adoption of steam opened a new field for Mr. W. H. Webb. He was born in 1816 and entered his father's shipyard, which attained a national reputation during the war of 1812. The son soon began to show great knowledge of ship construction and he proved himself a born mathematician. He constructed the first steamship that ran between New York and Savannah, and New York and New Orleans, the first steamer for the Pacific Mail Steamship Company, and the first steamer to enter the Golden Gate was built by him. In 1859, he built a powerful screw frigate for the Russian government which was the fastest man-of-war known at the time. During the civil war he built several ironclads. He was also the designer and builder of the Fall River steamers "Bristol" and "Providence." In 1872 and 1873, he retired from active business, but has always taken a great interest in shipbuilding matters since that time. In 1889, he built the Webb Academy and Home for Shipbuilders to afford free and gratuitous aid, relief and support to the aged, indigent or unfortunate men who have been engaged in building hulls of ships, or marine engines, and also to provide young men with an education in the art of shipbuilding,

both theoretical and practical. This academy is situated at Fordham, and is a well-known landmark, and was described in the SCIENTIFIC AMERICAN for February 24, 1894.

Automobile News.

A Paris newspaper publishes some statistics which show that in a certain period only 1 death and 33 injuries were caused by automobiles, and during this time, 67 deaths and 745 injuries were caused by vehicles drawn by horses.

The greatest trouble with the pneumatic tire on heavy vehicles is not caused by puncturing, which accounts for only about seven per cent of the trouble, but results from the internal wear of the fibers of the tire, due to the weight. Some tires which have been examined show the fibers of the material reduced to a fine powder.

This year in Germany traction motors were used for the provisioning of columns, and although the roads through the Black Forest were very steep and in places very bad, the experiment was most successful. There were exceedingly few accidents and the motors effected a great saving in both men and horses. It appears to be perfectly adapted to a country traversed by numerous roads.

The police sergeant who has charge of the boiler inspection squad of New York city has sent a communication to the Board of Police Commissioners saying that he had been informed that a parade of automobiles was to take place and that several of these vehicles would be equipped with steam boilers. He wished to know if the boilers would have to be tested and if they must be in charge of duly licensed engineers. The commissioners considered it would be a violation of the law if the boilers were not tested and the men in charge were not duly licensed. It will be interesting to see the outcome of this matter. It will probably be decided that the horse power is too small to be considered.

A few days ago Mr. Winslow E. Buzby was arrested for attempting to drive an automobile through Central Park, New York city. Mr. Buzby's idea was to make a test case of his arrest, considering that automobiles were wrongly excluded from the park. He was promptly arrested and brought before a magistrate. He was discharged after a hearing, and announced his intention of again presenting himself at the park entrance in his automobile, and if he is again arrested he will bring a suit for heavy damages. Mr. Buzby is backed by the Automobile Club, which is fast becoming an influential organization. The Park Commissioner does not consider it was a test case, and does not recognize automobiles as pleasure carriages. It is a question of only a few weeks, or months, at most,

when the Park Commissioners will be forced to allow automobiles to enter the park, whether they wish it or not, and legislation can be easily obtained. Their attitude is extraordinary, in view of the fact that in Paris there are undoubtedly more automobiles in the Bois de Boulogne than there are horse-drawn vehicles.

The November Building Edition.

The November number of the Building Edition of the SCIENTIFIC AMERICAN is of great beauty. "The Castle of Vincigliata" is the subject of two large engravings showing the interior of a medieval castle which has been elaborately restored. "Some Formal Gardens of Newport" is by Miss Margaret La Farge and is accompanied by beautiful engravings showing some of the interesting features of the gardens of Newport's famous villas. "A Modern House of Learning at Springfield, Mass.," describes the new High School building of that city, which is a very handsome and well-equipped edifice for school work. The houses illustrated in this number are particularly attractive and are in great variety. The literary contents deal with the Hearst competition and Moore's Gothic Architecture.

The Current Supplement.

The current SUPPLEMENT, No. 1245, has a number of most interesting articles. "Count von Zeppelin's Dirigible Air-Ship" is the subject of the first-page engraving, showing the huge air vessel, which is 500 feet in length and is being built on a float on the Lake of Constance. This is the most ambitious attempt at aerial navigation which has ever been made. "Mechanical Science," by Sir William White, is a most interesting and important address. "Roquefort and Its Cheese" describes a unique industry. "Intarsia" describes the process of wood-inlaying. "Stream Measuring in the United States," by F. H. Newell, describes some of the important work which is being carried on by the Geological Survey. It is accompanied by a number of illustrations. "Mind and Morals in Animals" is an article by O'Neill Dault and is very interesting. "The New Automatic Pistol of the German Army" describes in detail the new weapon.

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RECENTLY PATENTED INVENTIONS.

Agricultural Implements.

PLOW.—FRANKLIN H. DAVES, El Reno, Oklahoma Territory. This plow is particularly adapted to localities where the rainfall is limited, and is designed to loosen and level the soil without turning under the crust of dry soil, as is done with the moldboard of the plow, so that when the grain is sown it will be placed directly in the moist soil. A scaling or surface share is provided having a vertical cutter at the landside so shaped that it will turn the soil away from the beam. Adjustable teeth at the rear of the share loosen the soil as it passes over the share and back into the furrow.

GRAIN-ROLLER.—EMANUEL BERG, Woodland, Cal. On the Pacific Coast standing crops are often destroyed by the severe storms which prevail during spring and summer. With the object of preventing the loss of the crops, this inventor has devised a simple machine which rolls the grain down without breaking it at the roots and without interfering with its growth. Thus leveled, the grain can ripen properly without injury by the storms mentioned.

Bicycle-Appliances.

BICYCLE-SUPPORTER.—HENRY VANDER WEYDE, 182 Regent Street, London, W., England. The appliance comprises a pair of levers on the lazy-tongs principle, normally contracted into a very small space, but capable of being projected down to the ground. The upper pair of levers is attached to the frame, the one lever by a pivotal, the other by a sliding connection. A coiled spring tends to extend the lazy-tongs, and a pawl and rack prevents the supporter from collapsing under the superposed weight. The lazy-tongs are independent as regards their relative amount of extension; but they are simultaneously operated by means of a cord, which permits the detent-pawls to slip over and engage or disengage the racks, so as to project or contract the lazy-tongs.

Engineering-Improvements.

VALVE.—LOUIS GASZ, Brooklyn, New York city. The valve is designed to govern the passage of steam to the steam-cylinder of a direct-acting steam-pump. The invention comprises a steam-cylinder on which an auxiliary cylinder is mounted, both cylinders having pistons. A main valve is operated by the auxiliary piston for governing ports between the two cylinders. An auxiliary valve in a valve-cylinder on one end of the auxiliary cylinder puts two ports leading from the valve-cylinder to the auxiliary piston-cylinder into communication, and has ports through its opposite ends and sides for connecting with ports leading from the auxiliary valve-cylinder to the opposite ends of the auxiliary piston. The auxiliary

valve is shifted by the action of the piston in the steam-cylinder and is prevented from rotating.

PUMP.—RICHARD LUHN, Haspe, Prussia, Germany. The invention is an improved *monte-jus*, that is to say, an automatic apparatus for raising liquids, which is adapted alternately to take in and eject a body of liquid by the action of a due and continued pressure of air or steam, which is intermittently admitted and cut off by an automatic valve and float mechanism. The apparatus is composed of a tank or main working-vessel and exterior float and valve attachments to the side and top of the tank, which attachments are of novel construction.

ROTARY ENGINE.—FERDINAND KRUEGER, Berlin, Germany. The rotary engine comprises a casing with an annular chamber at its periphery communicating with a radial chamber. Packing-chambers are located laterally of the radial chamber and receive packing-rings. An inlet leads into the annular chamber to admit the steam. Rigidly connected with the piston, revolving in the annular chamber, is a disk rotatable in the radial chamber. A packing surrounds the piston and is held against turning relatively thereto. Means are provided for controlling the admission and exhaust of the steam. Channels lead behind the piston packing-ring from the back or outer portion of the lateral chambers to the annular chamber, in close proximity to the steam inlet.

Mechanical Devices.

LINOTYPE-CASTING MACHINE.—HENRY J. DERBYSHIRE, Columbus, Ohio. This improved machine enables one or more lines of type of equal or different lengths to be cast at one time, dislodgment of the cast lines by the pot being prevented, in case the metal has become chilled. The machine has a mold-wheel carrying a mold provided with a slot, one wall of which is perpendicular to the plane of the wheel, while the opposite wall is inclined. A movable, wedge shaped mold-member fits into the slot and is provided on the face opposite its inclined face with ribs dividing the mold-cavity into a series of line-spaces.

Miscellaneous Inventions.

BASKET.—JOHN W. DOERFLINGER, Sandusky, Ohio. This basket for shipping perishable goods comprises splints interlocked at their middle portions to form the bottom of the basket, the free end of the splints being bent at right angles to the bottom portions to form sides. The splints are spaced for ventilating purposes, and are secured by their tops between inner and outer top bands. Handles at the upper ends of the splints form opposite sides and are held in place by the outer band. By the use of reinforcing strips the bottom is ventilated even though the basket rest on the ground.

SMELTING-FURNACE.—JOHN H. CANAVAN, Kirkland, Arizona Territory. The invention provides a furnace for smelting pyrites or other metallic ores, carbonaceous fuel not being required after the fire is once started. Within an outer shell or casing a cupola is arranged having a water jacket and a chimney. The outer shell and the walls of the cupola and chimney form walls of hot-air chambers open at the bottom. Forehearths are movable underneath the hot-air chambers, are surrounded by water-jackets, and are mounted on trucks. Tuyères extend into the cupola at opposite sides and communicate with air-blast pipes in the hot-air chambers. The upper end of the pipes communicate with air-boxes into which air is discharged.

BOX AND MEANS FOR HANDLING CEREALS.—JOHN WESTOVER, David City, Neb. The object of the invention is to provide boxes or packages for grain, which boxes readily fit into a wagon body. The arrangement for manipulating the boxes consists of an elevated track with a buffer-surface, upon which track a truck travels, carrying a hoisting-drum. A windlass on the track detachably engages the drum. The box used is provided with a drop-bottom and is connected with the hoist-ropes carried by the drum. The box has a locking latch, one member of which extends outward from the box, the outer portion of the latch being adapted for engagement with the buffer to release the drop bottom.

VEHICLE-HUB.—ELMER MCHUGH, Lambertville, N. J. The invention provides means whereby an elastic cushion forms part of the hub or constitutes a yielding bearing for the axle or a yielding connection between the inner surface of the hub and the axle. The cushion relieves the wheels from the jar incident to the usual mountings. The cushions may be solid or pneumatic and do not interfere with the ready removal of the hub.

APPARATUS FOR SEPARATING SULFUR FROM ORES.—JAMES B MCCABE, Buffalo, N. Y. The apparatus comprises a boiler adapted to contain a heated liquid and a perforated ore-cylinder mounted to revolve in the boiler and having hollow trunnions forming inlet and outlet. The outlet-trunnion extends nearly to the center of the cylinder and has a lateral outlet. The material passed into the cylinder can be subjected to a rolling motion by revolving the cylinder so that the material comes into contact with the heated water to cause a complete melting of all the sulfur in the ore.

COOK-STOVE.—MARGARET KENNEDY, Fredonia, Ill. The stove, although adapted both to baking and frying, may be so operated as to provide no more heat than is necessary to the work in hand, thus avoiding the heating of the oven when it is desired only to fry or boil. This end is attained by constructing the stove with two fire-boxes, over one of which the oven is ar-

ranged in a manner to gather from the fire-box all of its heat. Over the other fire-box removable lids are placed, so that food may be dried and boiled thereon.

SQUID.—HERBERT A. HOWARD, Huntington, N. Y. This squid for use in trolling for fish is of simple and inexpensive construction and has barbs adapted to be forced outward to engage in the jaws of a fish upon the fish's taking the squid. The barbs may be easily disengaged without the necessity of taking hold of the fish.

ACETYLENE-GAS GENERATOR.—GASTON A. HERVIEU, Nauterre, Seine, France. The apparatus comprises essentially a generator; a water-reservoir or tank, together with a gasometer-bell; an automatic distributor operated by the bell; a device for the carbide, placed within the generating receptacle; a receptacle for first receiving and then carrying off the residues left by the spent carbide; and a mechanism operated by the bell for ejecting the residues. These different parts, as a whole, operate in a well-defined manner, their essential characteristic being that they are absolutely automatic, both in the matter of feeding the carbide and evaporating the residues.

DEVICE FOR CONNECTING TUBES.—ALBERT FLORIN, Berlin, Germany. The invention provides a means whereby branch tubes can be easily connected with the main tube in gas or water conduits. For this purpose the end of the branch-tube to be connected is pressed directly against the main tube, which is provided with a suitable opening in the respective portion of its wall.

DOOR.—JOHN NASH, Dayton, Wash. The door is constructed in adjustable sections, which can be assembled exactly to fit the frame, thus enabling doors of all sizes to be constructed more easily and cheaply than heretofore. The door is strong and rigid; and the parts may be tightened together at any time to compensate for shrinkage.

Designs.

PUZZLE-BOARD.—JAMES M. MONTGOMERY, Manhattan, New York city. The puzzle-board represents an American flag, the stripes of which are provided with openings. The puzzle consists in rolling a ball so that it will pass through the openings and lodge in the field of stars.

BUCKLE-FRAME.—WALTER DOWNING, Keota, Iowa. The buckle-frame is especially intended for use on bridles, being adapted by means of its opposite studs and several loops for the connection of the throat-latch and crown billet.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.