vent the outflow of the gas generated in the retort, substantially as herein described and explained. 3rd. The retorts inclining downwards from their feed end, and combined with some suitable feed contrivance (preferably that described in the preceding claim) and also combined with some suitable means for conveying away the gas thus produced, substantially as herein described and explained.

No. 29,997. Conversion of Crude or Pig Iron into Malleable Iron or Steel and Apparatus Therefor. (*Conversion de la fonte en gueuse, en barres de fer ou d'acier malléables, et appareil pour cet objet.*)

Gustave L. Robert, Stenay, France, 18th October, 1888; 5 years.

Claim.—1st. In the conversion of crude or pig iron into malleable iron or steel, introducing the blast in such a manner as to cause it to impinge upon the surface of the liquid metal, so that the reactions take place at or near the said surface, substantially as and for the purpose hereinbefore described. 2nd. In the conversion of crude or pig iron into malleable iron or steel, introducing the blast in such a manner as to cause it to impinge upon the surface of the liquid metal in a tangential direction, so as to impart a regular circular or gyratory motion to the said metal, substantially as and for the purpose hereinbefore described. 3rd. In combination with a vessel for the conversion of crude or pig iron into malleable iron or steel, the employment of tuyeres arranged to cause the blast to act on the surface of the metal, and means for regulating the height of the liquid metal relatively to the said tuyeres, as and for the purpose substantially as hereinbefore described. 4th. In a vessel for the conversion of crude or pig iron into malleable iron or steel, the arrangement of the flat side or surface P, with a series of tuyeres arranged in the same plane and directing the blast on to the surface of the metal, substantially as hereinbefore described and illustrated in the accompanying drawings. 5th. The combination of a converting vessel, having a flat side P, provided with tuyeres arranged at different angles with the said side, and receiving air under pressure from a common supply box C, and means for regulating the level of the liquid metal relatively to the mouths of the tuyeres by tilting or swinging the vessel on a horizontal axis, so as to cause the blast to act on the surface of the said metal, substantially as hereinbefore described, with reference to the accompanying drawings.

No. 29,998. Urinal. (*Urinal.*)

James A. Wills, Philadelphia, Penn., U. S., 18th October, 1888; 5 years.

Claim.—1st. A urinal, consisting of a trough A, having its rear upper wall perforated, in combination with an air chamber over the same, and one or more vent pipes I connecting said air chamber with a draft flue D, said parts being constructed and arranged to operate substantially as shown and described. 2nd. In combination with a trough or urinal, the perforated partition below the same, with one or more vent pipes arranged to draw the air and odors from underneath the urinal into the air space in rear of said partition, and from thence into a draft flue D, substantially as described 3rd. The combination in an urinal, of a trough A, having its rear upwardly extending wall perforated, an air chamber arranged to receive the air and odors drawn through said perforations, and one or more pipes connecting said air chamber to a draft flue, the area or capacity of said pipe or pipes being equal to or greater than the combined area of said perforations, for the purpose of securing a uniform current of air to intercept and convey away the odors through the entire extent of said trough.

No. 29,999. Folding Lobster Trap for Catching Lobsters. (*Trappe pliante pour prendre le homard.*)

Andrew Flick, Halifax, Nova Scotia, 18th October, 1888; 5 years.

Claim.—"Flick's improved folding lobster trap," to be used for lobster or other fishing, having a base strip B, on the opposite sides of which are hinged the net supporting frames A, A, the combination therewith of a centrally located post D, end looped arms *d*, *d* extending inwardly from said frames A, A, and connected therewith to a clevis E, arms extend outwards on opposite sides of clevis E and carries levers *e*, *e*, which pivot on said arms, enabling said levers to move in a lateral direction, the lower end of clevis E being of tubular form and fitted to receive upper end of central post D, openings being made in sides of clevis E, to allow lower ends of levers *e*, *e*, to move freely, a spring *a* fitted on clevis E, keeps levers *e*, *e*, extended and locks them in position, whereby through the rods *d*, *d*, the frames A, A, are distended, and to be unlocked therefrom by the opening of said levers *e*, *e*, when the clevis E is drawn upon, substantially as and for the purpose as hereinbefore set forth.

No. 30,000. Lock Stitch Sewing Machine. (*Machine à coudre à point d'arrêt.*)

John Jackson, Gravelly Hill, and Patrick A. Martin, Birmingham, Warwick, Eng., 18th October, 1888; 5 years.

Claim.—1st. The method of forming the lock stitch by means of the vibrating and reciprocating needle driven by a crank, and so arranged as to sweep the contact surface of the shuttle or spool and case and thereby form a loop, which engages the lower thread issuing from the shuttle, substantially as hereinbefore described and shown on the drawings. 2nd. In combination with sewing machines of the description aforesaid, the method of supporting the material to be sewn against the presser foot *k*, by means of the spring plate *l*, substantially as hereinbefore described and shown on the drawings. 3rd. In combination with sewing machines, as aforesaid, the novel form of shuttle, consisting of the spool and spool case held in position, by means of a plate and spring, substantially as hereinbefore described and shown on the drawings. 4th. The method of refilling the spool by mounting the same upon the arm *xx* of the spring *x*, and rotating the same by contact with the rubber tire fitted to the wheel *t*, substantially as hereinbefore described and shown on the drawings. 5th. The general construction, combination and arrangement of the several and respective parts, together forming our improvements in lock stitch sewing machines, substantially as hereinbefore described and shown on the drawings.

No. 30,001. Construction of Gas Holders. (*Construction des gazomètres.*)

William Gadd, Manchester, Eng., 18th October, 1888; 5 years.

Claim.—1st. The construction of tanks or wells for gas holders, or the outer lift or lifts of such holders when telescopic, or both, with helical, spiral, or inclined rails, grooves, or recesses, built into or attached to the wall or face thereof, with the object of carrying the holder or one or more lifts thereof, as the case may be, by means of tangential rollers, sliding pieces, or mechanical equivalents attached to the lower rim or curb, or other convenient part of such holder lift, or lifts, for the purpose and in manner substantially as shown and described. 2nd. The construction of gas holders, single or telescopic, with tangential or angle radial rollers or both, or sliding pieces, or mechanical equivalents attached to the bottom curb or ring of such holder, or one or more lifts thereof, or both, as the case may be, with the object of causing the same to ride and rise and fall upon or within helical spiral or inclined rails, recesses or grooves, built into, forming part of, or attached to the wall of the tank or well, or outer lift, or both, for the purpose and in manner substantially as herein shown and described. 3rd. The construction and employment for gas storing or holding purposes, of holders and tanks or walls of the special character, substantially as herein shown and described.

No. 30,002. Vessel for Transporting Breakable Goods. (*Boîte pour transporter les objets fragiles.*)

Lina Sloan, Wausau, Wis., U.S., 18th October, 1888; 5 years.

Claim.—A transporting vessel, comprising a casing, a bail to said casing, a support for the casing, including a base of greater diameter than the casing and standards, and an interior vessel moving loosely within the casing mounted on springs, resting on the base, with its bottom normally below the bottom edge of the casing, and said interior vessel provided with apertures at top and bottom for tying cords, all substantially as shown and described and for the purpose specified.

No. 30,003. Internal Combustion Thermo-Dynamic Motor. (*Moteur thermo-dynamique à combustion intérieure.*)

James Hargreaves, Farnworth, Eng., 18th October, 1888; 5 years.

Claim.—1st. In internal combustion thermo-dynamic motors, the combination of a combustion chamber, provided with water jacket, a working cylinder extending from such chamber, a regenerator chamber provided with water jacket and a hearth arranged between such chamber and said combustion chamber, a superheating chamber and a saturating chamber communicating with each other, ways provided with valves connecting said superheating chamber with said regenerating chamber, and thereby all the aforesaid chambers in sequence, air pump operated from piston in said working cylinder and pipe connection between such pump and said saturating chamber valves connected with said air pump, steam generator and valve and air pump, with engine for operating it, water and fuel pumps, with pipe connections to sources of supply, injectors, with pipe connections between the aforesaid water jackets and aforesaid steam generator, pipe connections between said water jackets and piston of aforesaid working cylinder, and connection between rod of such piston and driving mechanism of motor, all substantially as shown and described. 2nd. In internal combustion thermo-dynamic motors, the combination of a combustion chamber, a regenerator chamber, superheating and saturating chambers arranged and connected in sequence, substantially as and for the purposes described. 3rd. In internal combustion thermo dynamic motors, the combination, with the combustion chamber and regenerator chamber, of water jacket surrounding such chambers. 4th. In internal combustion thermo-dynamic motors, having combustion regenerator, superheating and saturating chambers arranged and connected in sequence, a steam generator and air pump, with engine for operating same, connected with and arranged to supply air and steam to said saturating and superheating chambers, for the purposes described.

No. 30,004. Astronomical Apparatus. (*Appareil astronomique.*)

Earle L. Rugg, San Francisco, Cal., U.S., 18th October, 1888; 5 years.

Claim.—1st. In an apparatus illustrating the phenomena of day and night, the oval box *k*, having a cover *f*, which is divided and marked to represent and illustrate the zodiac, the ball *d* representing the sun, the envelope of light *g*, having the rod *h* and guides *j*, said rod passing through the centre of the ball *d*, in combination with the ball *a* representing the earth, and revolving freely upon the inclined spindle attached to the pedestal *c*, substantially as and for the purpose set forth. 2nd. The combination, in a teaching apparatus, of the oval box having a projecting top and bottom, the ball *d*, the envelope of light *g*, having the rod *h*, the globe *a*, the pedestal *c* having an inclined spindle *b*, substantially as and for the purpose described.

No. 30,005. Furnace for Burning Hydro-Carbon Fuels, and Steam Generator Therefor. (*Foyer à hydro-carbures et générateur de vapeur pour cet objet.*)

James H. Bullard, Springfield, Mass., U. S., 18th October, 1888; 5 years.

Claim.—1st. In a combination, a steam boiler, an air compressor,