spring tooth of a cultivator, substantially as and for the purpose specified. 2nd. A curved plate A fitted onto the back of the spring tooth B between the jaws formed by the saddle D, in combination with a bolt C and cross block E, arranged substantially as and for the purpose specified.

No. 29,782. Central Station Heating System.

(Système de chauffage les gares centrales.)

The National Heating Company, New York, N. Y. (assignee of Arthur W. Abbott, Closter, N. J., and Frank C. F. Konak, New York, N.Y.) U.S., 30th August, 1888: 5 years.

Claim.—1st. In a heating system, the combination of a superheater, a supply main, a force pump, an expansion joint or coupling provided with a double-acting check valve, and means for conducting water for the supply main into a house or other building, and utilizing the same for heating purposes. 2nd. In a heating system, the combination of a superheater, a supply main, a force pump, a supply pipe leading from said main, a box or housing N, a movable coupler or T head attached to said supply pipe located in said box or housing, and branch pipes leading from said coupler to the building to be heated, substantially as shown and described. 3rd. In a heating system, the combination of a superheater, a supply main, a force pump, a supply pipe, a box or housing into which said supply pipe extends, a coupler attached to said pipe within said housing, and a branch pipe or pipes leading from said coupler into the house or houses to be heated, substantially as shown and described. 4th. In a heating system, the combination of a heater, a supply main, a force pump, a supply pipe, a housing into which said supply pipe extends, a coupler within said housing, a branch pipe or pipes attached to said coupler and extending out of said housing into a building or buildings to be heated, a regulator and converter and a radiator or radiators, substantially as shown and described. 5th. In a heating system, the combination, with a heater supply main and a force pump, of a box or housing located beneath the sidewalk, said box being provided with ways or bearings, and a block n^{11} resting thereon, a supply pipe extending from the said main into said housing, a coupling attached to said supply pipe and resting movably upon the block n^{11}, and branch supply pipes communicating with said coupling and extending into the house or houses to be heated, substantially as shown and described. 6th. In a hot water heating system, the combination of a superheater, a supply main, a force pump, a box or housing, provided with side openings N, as shown, a supply pipe leading from the main into said housing, a coupler and branch supply pipes leading from said coupler through said openings into the building to be heated, substantially as shown and described. 7th. In a hot water heating system, the combination of a heater, a supply main, a force pump, a box or housing provided with side openings N^1, and ways or brackets n, as shown, of a block at n^{11} resting on side ways, a coupler resting on said block, a supply pipe connecting the main and coupler, and branch supply pipes leading from said coupler into the building or buildings to be heated through the openings N^1, substantially as shown and described. 8th. In a hot water and steam heating system, the combination of a heater, a supply main, a force pump, a housing N provided with ways or brackets n, a block n^{11}, having a longitudinally concaved upper surface, a coupler c^{11}, having a convexed lower surface resting on said block, a supply pipe connecting the main and coupler, and a branch pipe or pipes leading from the coupler to the building or buildings to be heated, substantially as shown and described. 9th. In a hot water circulating system, the combination of a superheater, a supply main and force pump, an automatic check valve located in the supply main, a return main, a return water tank and pump for forcing the water from the tank into the heaters, substantially as shown and described. 10th. In a central station heating system, the combination of a heater, a supply and return main, a bracket at M, having an upper and lower opening, and a removable cap and revoluble supports in said openings, whereby the mains are permitted to move freely in the direction of their lengths, substantially as shown and described. 11th. In a central station heating system, the combination of a heater, a supply and a return main, a bracket M having upper and lower openings, a removable cap for the upper opening and removable supports for the mains in said openings, said bracket being secured firmly to its supports, whereby said mains are held in place and their free longitudinal movement provided for, substantially as shown and described. 12th. In a hot water circulating system, the combination of a superheater, a supply main, a force pump, thereby, a return main, a supply pipe, a box or housing, a movable coupling within said box, a branch supply pipe leading from said movable coupling to the house to be heated, a branch return pipe leading from the house to the side box and provided with a movable coupling therein, and a return pipe leading from said coupling to the return main, substantially as shown and described. 13th. In a hot water circulating system, the combination of a superheater, supply, and return mains, a force pump, supply and return pipes, branch supply and return pipes, and a box or housing within which the supply and return pipes and branch supply and branch return pipes connect, substantially as shown and described. 14th. In a hot water circulating system, the combination of a heater, force pump, supply and return pipes, a housing within which the supply and return pipes connect with branch supply and return pipes, a regulator and converter, a radiator or radiators, a condense water tank and connecting pipes, substantially as shown and described. 15th. In a hot water circulating system, the combination of a heater, supply, and return mains provided with expansion joints, force pumps, supply and return pipes, movable couplings, a housing containing the couplings, branch supply and return pipes, a regulator and converter and radiators and connecting pipes, substantially as shown and described. 16th. The combination of the heater, the supply and return mains and the branch supply and branch return mains, a coupler formed in a single piece having two longitudinal and two transverse bores, and means to permit of the longitudinal expansion and contraction of the supply mains, substantially as shown and described. 17th. The combination of the heater, the supply and return mains, the branch supply and branch return mains, and a coupler formed in a single piece, provided with two longitudinal and two transverse bores, and means to permit of the longitudinal expansion of the supply and return mains and the branch supply and branch return mains, substantially as shown and described. 18th. In a hot water and steam heating system, the combination, with the supply main, of an automatic pressure regulator, provided with a steam or converting chamber, said chamber being surrounded by a hot water chamber, the supply main, hot water chamber, the regulator and steam or converting chamber being in communication with each other, substantially as shown and described. 19th. In a hot water heating system, an automatic pressure regulator provided with a steam or converting chamber, said chamber being partially enclosed by a hot water chamber, the hot water chamber regulator and steam or converting chamber being in communication, substantially as shown and described. 20th. An automatic differential fluid pressure regulator, consisting of a casing or casting, having an upper chamber provided with an auxiliary chamber O^{11}, a chamber OH below the auxiliary chamber and separated therefrom by a partition having a central opening n which is a valve seat in combination with a piston provided with the stem s^1, to which is attached the valve s^{11} and a weighted lever S^{11}, substantially as shown and described. 21st. An automatic differential fluid pressure regulator, consisting of a casing having upper and lower chambers, an auxiliary chamber formed in the bottom of the upper chamber, and separated from the lower chamber by a perforated partition, in combination with an elastic piston R^{111}, provided with the valved stem s^1 and the weighted lever S^{11}, and a connection between the piston and lever, substantially as shown and described. 22nd. An automatic differential fluid pressure regulator, consisting of a casing provided with chambers R^{11}, O^{11}, O^{111}, a piston R^{111}, provided with a valved stem s^1 and a weighted lever S^{11}, in combination with a converter R, provided with the chamber R^1, and a pipe or passage communicating with the chamber O^{11} of the regulator, as shown and described. 23rd. An automatic differential fluid pressure regulator, consisting of a casing having the chambers R^{111}, O^{11} and O^{111}, and a removable top, in combination with a piston situated in chamber O^{111}, provided with the valve stem S^1 and a weighted lever S^{111} in chamber R^{111} connected with said piston, substantially as shown and described. 24th. In a heating system, the combination of a superheater, a supply main, a force pump, expansion joints or couplings, a supply pipe, a housing N, branch pipes leading from said supply pipe to different houses, a converter and regulator, with which the branch supply pipes communicate, and a radiator connected with the converter, substantially as shown and described. 25th. In a heating system, the combination of a heater, a supply main, a force pump, a supply pipe leading from the supply main, a movable coupling c^{11}, pipes leading from said coupling to a regulator and converter, a regulator and converter and radiators, substantially as shown and described. 26th. In a hot water heating system, the combination of a heater, a supply main, a force pump, a supply pipe, a box or housing, constructed as shown and described, a movable coupler attached to said supply pipe within the housing, a branch pipe or pipes connected with said coupler, a regulator and converter, and a radiator or radiators, the supply mains and pipes being provided with expansion and movable joints and couplings, as shown and described.

No. 29,783. Tube Cutter. (*Découpoir de tube.*)

Daniel F. Attwood (assignee of James R. Vance), Geneva, N. Y., U.S., 30th August, 1888; 5 years.

Claim.—1st. A tube cutter, composed of the mandrel A, provided with a diagonal channel a, and a cutter c sustained adjustably longitudinally in said channel to cut the tube inside of the boiler substantially as shown. 2nd. A tube-cutter, consisting of a mandrel adapted to enter into the tube to be cut, a collar on the mandrel abutting against the end of the tube, a channel extending diagonally through the mandrel from the outer side of the said collar to the inner side thereof, and a cutter sustained adjustably longitudinally to said channel, substantially as described and shown. 3rd. In combination with the mandrel A, having the channel a extending diagonally through it, the cutter c, extending longitudinally through said channel and a clamp on the mandrel engaging the shank of the cutter, and holding the same in its position, as set forth. 4th. The combination of the mandrel A, provided with the oblique channel a, the cutter c extending through said channel and having its shank serrated, and the eccentric e pivoted to the mandrel and having a serrated face engaging the said shank of the cutter, substantially as described and shown.