

No. 14,014. Improvements on Steam Apparatus for Supplying Heat and Power. (*Perfectionnements aux appareils à vapeur pour le chauffage et la force motrice.*)

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Claim.—1st. The combination, with a main or general steam supply pipe, a local distributing pipe, having no interior connecting with said supply pipe, and apparatus for transmitting heat from the contents of the former to the contents of the latter, operating to condense the steam of the supply in the act of transmission, of mechanism whereby the amount of heat transmitted may be varied at will, and a meter arranged to pass the water so condensed. 2nd. In a general steam heating system, the combination, with a street or main supply pipe connected with the steam space of a generator, of a local distributing pipe situated in a building to be heated, the contents or circulation of said local distributing pipe being separate from that of the main supply pipe, apparatus for transmitting heat from the contents of the main to the contents of the local pipe, operating to condense the supply-steam in the act of transmission, and a meter arranged to pass the water of condensation from the supply-steam. 3rd. The combination, with a steam supply pipe, a local distributing circuit and apparatus for transmitting heat from the former to the latter, of regulating mechanism adapted to be set at will to secure the transmission of any desired amount of heat from the steam of the supply pipe to the contents of the local distributing circuit, and also adapted to automatically maintain a practically constant pressure or heat in the local distribution of the degree required. 4th. In combination with the steam supply pipe, a closed local circuit, and apparatus for transmitting heat from the steam of the supply-pipe to the contents of the local circuit, a device or devices actuated by the heat of the local circuit to control the amount of heat transmitted to the contents of said local circuit from the steam of the main supply. 5th. In a general steam heating system, a main circuit comprising a steam generator, a steam supply pipe or pipes, a pipe or pipes for the return of water of condensation, and apparatus for forcing the water of condensation from the return pipe back to the generator, the pipes of said main circuit extending in proximity with each other, from the steam source of the building or buildings to be heated, and combined with local heating apparatus, either for steam or hot water, located in said building or buildings. 6th. In a steam heating system for large districts, the combination, with the main circuit containing a steam generator, a steam supply pipe, and a condense-water return pipe, said pipe being arranged in proximity throughout the heated district, and connected at the several buildings heated, of a local circuit situated in a building to be heated and adapted to be closed, so as to continually circulate its contents, means for transmitting heat from the main circuit to the local circuit, and means for measuring the amount of heat transmitted. 7th. The combination, with a steam generator, a steam supply pipe, and a condense-water return pipe belonging to a steam heating main circuit, said pipes being arranged in proximity throughout the heated district, and with a local heating apparatus, having a circulation distinct from that of the main circuit, of a transmitter placed at the junction of the main circuit, with the local heating apparatus, connected to receive, and operating to condense the steam from the supply main, and also connected to discharge the condense-water into the return main, and a meter arranged to pass the condense-water after it has left the transmitter and before it enters the return main. 8th. The combination, with a steam supply pipe, a local heating apparatus operating to condense the steam supplied and a meter arranged to pass the condense-water, of a pipe or passage *n7* conducting steam from said supply pipe to the meter or to the condense-water pipe leading to the meter, for the purpose of restoring to the condense-water the temperature and volume lost subsequently to condensation in its passage through the heating apparatus, and thereby securing accurate measurement of the heat supplied. 9th. In the measurement of heat supplied from steam to a heating apparatus, by metering the water of condensation, the method described, which consists in practically restoring the condense-water after it leaves the heating apparatus, and before it passes the meter, to its original temperature and volume at the instant of condensation. 10th. In combination with the generator *S* and the duplex system of mains *A B*, the tank *F* and the pump *P* connected between the return *S*, the pump *P* and the tank *F*, the latter directly furnishing water for the generator through said pump, mechanism adapted to automatically control the speed of the pump in accordance with the quantity of water in said tank. 12th. The combination, with the generator *S*, tank *F* and pump *P*, of the steam pump supply pipe *S1 S2* having the valve chamber *C* and valve *C2*, the latter being worked by the float *F2* within the tank *F*. 13th. In combination with the generator *S*, the tank *F*, the source of the water supply *W* having a pressure greater than that of the tank *F* and automatic mechanism controlling the passage of water from the tank to the generator, mechanism whereby the passage of water from the source *W* to the tank is controlled by the height of the water in the generator. 14th. The combination, with the tank *F*, generator *S*, pump *P* and automatic mechanism for regulating the speed of the pump, of the water source *W* connected with the tank through the pipe *W1 W2* and the float valve *U* in the said connecting pipe, said valve being controlled by the float *U2* in the chamber *U* connected with the generator in such a manner as to have a common water line therewith. 15th. The combination, with the steam supply main *A* and the return main *B*, of the main circuit, embracing the tank *F* and the generator *S*, a *d* the generator, the connecting pipe *A2* having the reducing valve *L* main, to maintain a desired difference in pressure between the tank and the supply *A* at the head of the main circuit. 16th. The combination, with the tank *F* and the supply *A* of the main circuit described, of

the pipe *A2* having the valve *L*, the diaphragm regulator *L2* of which the weight arm *I2* is arranged to bear on the valve rod *L* and in which the diaphragm is exposed on one side to the pressure of the tank, and on the other to that of the supply main *A* at a chosen point on said main. 17th. The main circuit of a general steam heating system, the supply main *A* and the return main *B* arranged one above the other in the box *X*. 18th. In combination with the mains *A B* arranged one above the other, the rollers *A2 B2* and the saddles *I I1* constructed and combined to retain the mains in proper relation, and at the same time permit longitudinal movement. 19th. In combination with the thick covering of the main pipe and the supporting roller, the interposed saddle *I* having the projections *i* which pass through the pipe covering and bear upon the pipe itself. 20th. In combination with the mains *A B* arranged one above the other, the saddles *I I1* of the lower pipe, extended about the pipe to afford mutual support to each other. 21st. The slip joint fitting *J* having the packing bulb *J1* provided with a curved chamber *J2* narrowed towards the central pipe passage, and with packing screw *J3*. 22nd. The combined slip and flexion joint fitting *J* having the packing bulb *J1* chambered at one end, and the spherical bulb *J6* at the other end, whereby the fitting is adapted to be combined with a suitable socket to make a flexion joint. 23rd. The combination, with the duplex main system, of the coupling *D* having the chambers *D1 D2* and adapted to receive the mains *A B* one above the other. 24th. The double chambered coupling *D* combined with the mains *A B* and adapted to afford communication between these mains by the plugged opening *D4*. 25th. The double chambered coupling *D* adapted to be connected flexibly with the mains *A B* at one or both ends, combined with said mains. 26th. In combination with the steam supply main and water return main *B*, the double chambered coupling *D* having its chambers connected by a pipe or passage *D5 D6 D7* provided with a valve controlled by a float in the steam chamber of the coupling, whereby the coupling may serve as a drip transfer, automatically discharging the water of condensation from the main *A* into the return *B*. 27th. In combination with the double chambered coupling *D* rigidly connecting the mains *A B*, the anchor bar *D11*. 28th. The double chambered coupling *D* provided with the hand hole *D9* opening into the lower chamber *D1*, combined with the mains *A B*. 29th. The duplex main pipe system, consisting of the supply main *A* and the return main *B* arranged parallel with each other and in proximity, said pipes being rigidly connected with each other at intervals, and provided with slip joints between the points of connection. 30th. In a system of general steam heat supply, the combination, with the supply main, of a supply branch leading from said main and extending around an entire square or block of buildings, whereby all the buildings in said square or block are supplied from a single connection with the main, said branch being arranged beneath the walk or buildings, so that the connections with the interior heating apparatus of the several buildings are accessible without opening the street. 31st. In combination with the supply main of a general steam heating system, two or more supply branches connected with said main, at the intersection of streets, and each leading to and around an adjacent square to serve as a general branch supply furnishing heat to all the buildings in the square heated from said system, said branches being arranged beneath the walk or buildings. 32nd. In combination with the general supply main having provision made at the intersection of streets for the connection of branches thereto, one or more branches connected with said main at said intersection, extending parallel with the main until opposite the square, and thence leading to and about the square beneath the walk or buildings. 33rd. In a general steam heating system, the apparatus comprising the tank trap *K*, transmitter *T*, meter *N* and connections for the admission and passage of steam into the transmitter through the tank trap, and the water of condensation from the transmitter through the meter and tank trap, said transmitter being adapted to be connected with a local distribution system. 34th. The analyzer *K1* combined with the supply pipe *A1*, transmitter *T* and meter *N*. 35th. In combination with the tank trap *K* connected to receive the pressure of the steam supply pipe *A1*, and also connected to receive the water of condensation from the transmitter *T* or the meter *N*, the discharge *B18* having the valve *K2* operated by a float and located beneath the water line of said tank. 36th. In combination with the transmitter *T* having the passage *r* in the main circuit through or contiguous to the chamber *T1* in the local circuit, the valve *G1* in the discharge pipe *B2* of the main circuit, governed by the pressure in the chamber *T1* so as to raise or lower the water of condensation in the passage *r* and thereby expose more or less of the surface of said passage to the steam of the main circuit. 37th. In combination with the local hot water circuit having a pipe extending a suitable distance above the highest radiator in the circuit, said pipe being either open at the top or provided with a valve, whereby it may be opened or closed, the transmitter *T* connected with said circuit, and also with the steam supply or return pipes, and the regulator *G* connecting, as indicated, with the transmitter and with the return steam pipe, whereby varying pressure in the local hot water circuit arising either from the varying column due to change of temperature therein, or from the confine *it* of its contents, operates to control the heating effect of the transmitter. 38th. In combination with the meter *N* receiving the discharge from the transmitter *T* and discharging into the tank *K*, the latter being subject to the pressure of the steam supply, the pipe or passage *n7* connecting the tops of said meter with the pipe *A5*, or other pipe or space having the pressure of the steam supply. 39th. In combination with the meter *N* connected at its top to receive steam from the steam supply pipe, the trap bend *n18* in the pipe *B3* discharging into the meter. 40th. In combination with the main steam supply, or with the main circuit, the local hot water circuit, combined with the compression tank *W4*, open pipe *n4* and cock *n5*. 41st. In combination with a general steam source and a transmitter connected therewith, an engine having its steam supply connected with the transmitter, a local heating circuit supplied from the exhaust of the engine, connected to force the water of condensation from the exhaust heating circuit mentioned back into the transmitter. 42nd. In combination with the transmitter *T* connected with the main circuit or steam supply and with the engine *O*, pump *P2* and tank *T4* respectively connected, the safety relief trap *H* connected with the tank *F4* and provided with a discharge pipe *k* arranged in the said trap. 43rd. In combination with the radiators *R1 R2* the supply pipe *a* and return pipe *b*, the connecting pipes *a3 a4* and the air valve *a5* on the return *b*.