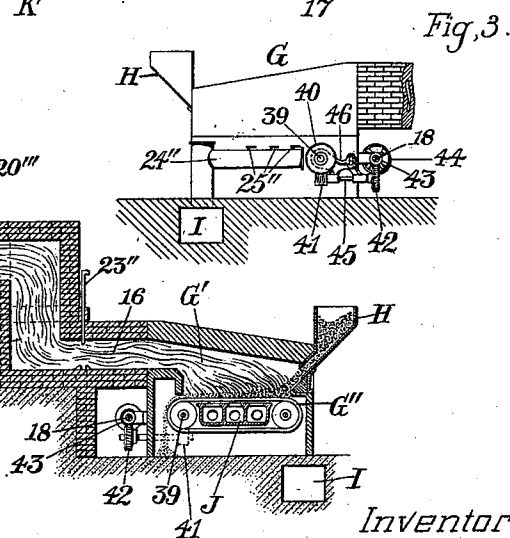
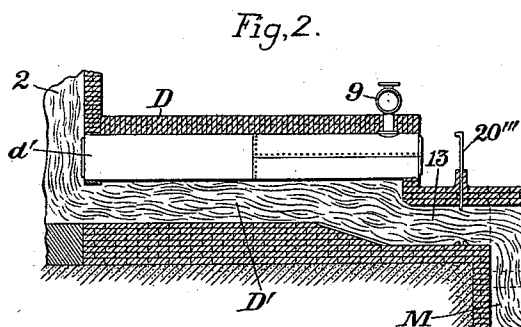
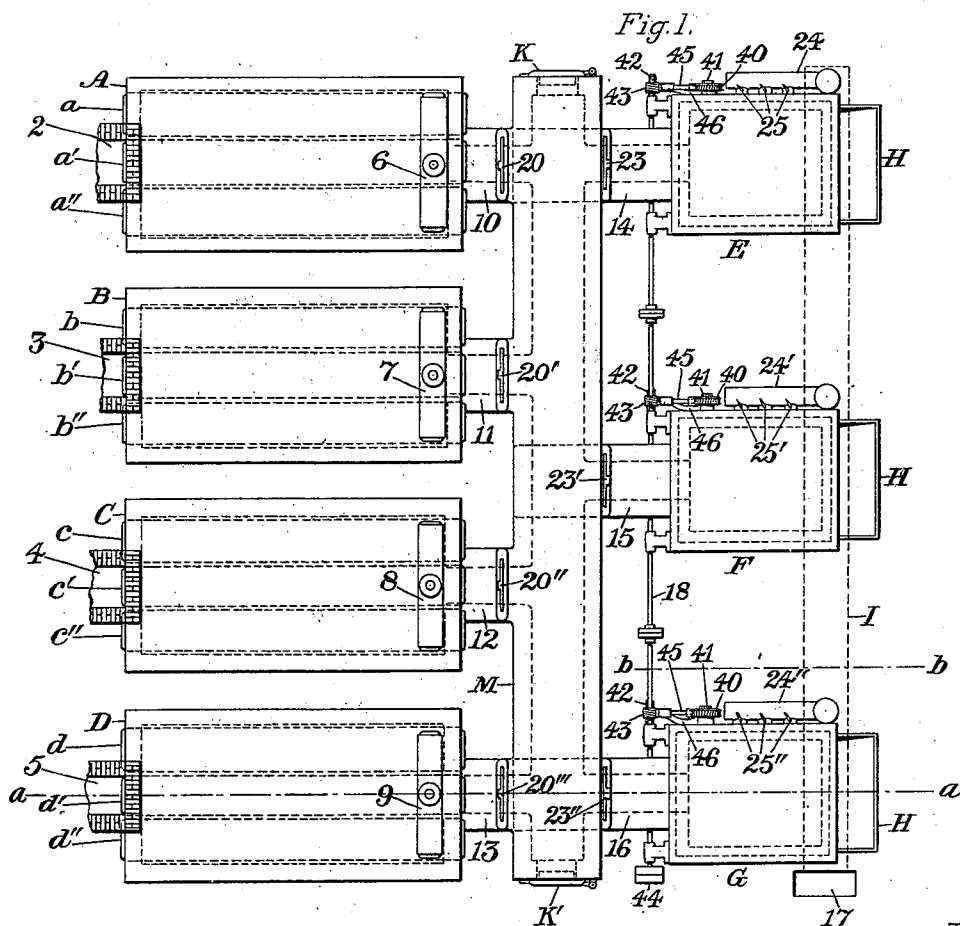


(No Model.)

E. B. COXE.  
HEATING PLANT.

No. 510,570.

Patented Dec. 12, 1893.



Witnesses:  
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Fred. J. Dole.

Inventor:  
Eckley B. Cox. By his Attorney.

F. H. Richards

# UNITED STATES PATENT OFFICE.

ECKLEY B. COXE, OF DRIFTON, PENNSYLVANIA.

## HEATING PLANT.

SPECIFICATION forming part of Letters Patent No. 510,570, dated December 12, 1893.

Application filed July 10, 1893. Serial No. 479,986. (No model.)

*To all whom it may concern:*

Be it known that I, ECKLEY B. COXE, a citizen of the United States, residing at Drifton, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Heating Plants, of which the following is a specification.

This invention relates to heating-plants; the object being to furnish a plant, or heating-apparatus, comprising a multiplicity of heat-generating furnaces combined in such manner with a multiplicity of heat-using furnaces that any one or more of the furnaces of one set may be used in connection with any one or more of the furnaces of the other set.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of a heating-plant embodying my present improvements. Fig. 2 is a vertical section in line *a a*, Fig. 1. Fig. 3 is a vertical section in line *b b*, Fig. 1, showing the heating-furnace *G* in elevation, as seen from the upper side thereof in Fig. 1.

Similar characters designate like parts in all the figures.

For illustrating the application of my present improvements to some particular purpose, I have shown a series of four heating-furnaces, designated in a general way by *A*, *B*, *C*, and *D*, each comprising a set of three steam-boilers, designated by *a*, *a'*, *a''*; *b*, *b'*, *b''*; *c*, *c'*, *c''* and *d*, *d'*, *d''*, respectively. The several boilers of the respective sets *A*, *B*, *C*, and *D* are shown provided with the usual steam-drums, 6, 7, 8, and 9, respectively. And the boiler-furnaces are shown provided at their farther ends (at the left-hand in Figs. 1 and 2) with the usual stacks or chimneys, designated by 2, 3, 4, and 5, respectively.

Heat is supplied to the several heating-chambers (one of which is designated by *D'* in Fig. 2) through the flues 10, 11, 12, and 13, respectively, which connect with the distributing-conduit *M*, which is shown extending along in front of the series of heat-using furnaces and located at an elevation somewhat below the connecting-flues 10, 11, 12 and 13. For shutting off communication between the distributing-conduit *M* and said flues, these are shown provided with vertical sliding gates, designated by 20, 20', 20'', and 20''', respectively; which gates, in practice, will usually be

made of fire-brick in the form of flat plates, suitable for withstanding the action of the heated gases. At the ends of the conduit *M*, this is shown furnished with doors, *K* and *K'*, through which access may be had thereto for cleaning or repairing the same.

The heat-generating furnaces for supplying the heated gases to the conduit *M* for distribution to the heat-using furnaces, are shown three in number, and designated in a general way by *E*, *F*, and *G*, respectively. These furnaces, in the preferred form thereof herein shown, are of the class described and claimed in my prior Letters Patent No. 499,716, to which reference may be had for a more particular description of the character and details of the same. The furnace-chambers (one of which is designated by *G'* in Fig. 2) are connected with the distributing-conduit *M* through a series of flues, 14, 15, and 16, respectively, which flues are shown provided with sliding gates, designated by 23, 23', and 23'', respectively, for closing the flues against the passage of heated gases; said gates will, in practice, be of a construction similar to the gates 20, &c., hereinbefore described.

The furnaces *E*, *F* and *G* being (as they may) of similar construction, a detailed description of one of them will suffice as a proper description for all. Within the walls or framework of the heat-generating furnace, this is shown provided (see Fig. 2) with the traveling-grate *G''* and the multiplex air-blast chamber *J*, which may be of the construction and mode of operation described in my aforesaid Letters Patent No. 499,716.

The furnace is provided with a fuel-supply, *H*, for delivering the fuel to the grate; and the air-blast chambers are supplied from the air-pipe 24, also after the manner more fully set forth in said prior Letters Patent.

As a means for actuating the traveling grate, one of the chain-wheel shafts thereof is provided with the worm-wheel 40, which is actuated by a worm 41 (Fig. 3) carried by a shaft that has another gear or wheel, 42, meshing with the driving-worm or pinion on the line-shaft 18. Said shaft 18 is supported in suitable bearings at proper points in the length thereof, and is shown provided at one end with a pair of pulleys, 44, whereby

it may be revolved at suitable speed for properly actuating the traveling grates of the furnace through the intermediate gearing described.

5 For supplying the air-pipes 24, and through these supplying the air-blast chambers of the furnace, my improved heating-plant is provided with an air-supply conduit, shown in end view at I, Figs. 2 and 3, and in plan view  
10 by dotted lines in Fig. 1. The air-pipes 24, 24', 24'' of the furnaces E, F, and G, respectively, are connected with and supplied from said conduit I, the conduit being supplied from some suitable source, as, for instance, a  
15 blower or air-compressor, through a suitable inlet-passage, as 17, leading from such air-supply apparatus (not shown) to said conduit I.

The air-supply pipes 24 are shown provided  
20 with gates or valves, indicated at 25, 25', and 25'', respectively, for controlling and cutting off the supply of air from the conduit I to the several furnaces respectively. And for stopping and starting the grate-mechanism of  
25 the furnaces, the intermediate shaft 45 is shown carried by a bracket, 46, which may be, as indicated in Fig. 3, adjustably fixed on the furnace-frame so that the worm-wheel 42 may be lowered and raised from and into  
30 mesh with the driving-worm 43 on the line-shaft 18. By means of this apparatus, the air-supply, and also the power for actuating the furnace-mechanism, may be controlled or cut off, as required for regulating the furnace  
35 for putting the same into use or out of use.

The operation of my improved heating-plant will be readily understood by comparison of the drawings and from the preceding description. When it is required to start up  
40 one or more of the furnaces, it is only necessary to properly supply the same with fuel, supply the air-blasts in suitable proportion by means of the air-valves described, and properly actuate the traveling grate by means  
45 of the driving-shafts and gearing; the main line being, it is understood, suitably revolved from some source of power, as, for instance, a suitable motor, not shown, belted to the driving-wheel 44 of said shaft. One of the  
50 furnaces, as, for instance, the furnace G, having been started as set forth and the fuel therein duly ignited, and the gate 23'' being raised as shown in Fig. 2, the heated gases pass from the furnace-chamber, through the  
55 flue 16, into the conduit M, and are there distributed to one or more, as the case may be, of the heat-using furnaces A, B, C and D, this being done by means of the aforesaid gates 20, 20', 20'' and 20'''. By means of the

organization here described, any one of the heat-generating furnaces may be thrown out of action for repair, renewal, or because not required for use; and the same may be done with respect of the several heat-using furnaces.

In practice, the conduit M may be made of durable fire-bricks covered externally with mineral-wool and other protecting materials, in a well-known manner, and thus constructed will be of relatively great durability, so as to  
seldom require any repairs.

Having thus described my invention, I claim—

1. In a heating-plant, the combination with a multiplicity of heat-using furnaces, and with a multiplicity of heat-generating furnaces, of an intermediate distributing-conduit, flues from said conduit to said furnaces respectively, and means for closing the flues one or more at a time, substantially as described and  
for the purpose specified.

2. In a heating-plant, the combination with a multiplicity of heat-using furnaces and a multiplicity of heat-generating furnaces, of a distributing-conduit intermediate to the two sets of furnaces, flues connecting the conduit with each of the furnaces, an air-supply conduit, and air-blast pipes from the air-supply conduit to the heat-generating furnaces respectively, substantially as described.

3. In a heating-plant of the class specified, the combination with the distributing-conduit and the connected heat-using furnaces, of a multiplicity of heat-generating furnaces having operative grate-mechanisms combined with air-blast chambers, valved pipes connecting said air-blast chambers with the air-supply conduit, a driving-shaft common to the several heat-generating furnaces, and independent driving apparatus connecting said shaft with the grate mechanisms of said furnaces respectively, substantially as described.

4. In a heating-plant, the combination with a multiplicity of traveling-grate furnaces, of a line-shaft extending to several of the furnaces and provided with a driving-gear or pinion for each of the furnaces, and a shiftable driving-mechanism, substantially as described, for each of the furnaces and connecting the grate-mechanism thereof with the respective driving-pinions, whereby any one or more of the furnace grate-mechanisms may be put in operation or thrown out of operation, substantially as described.

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