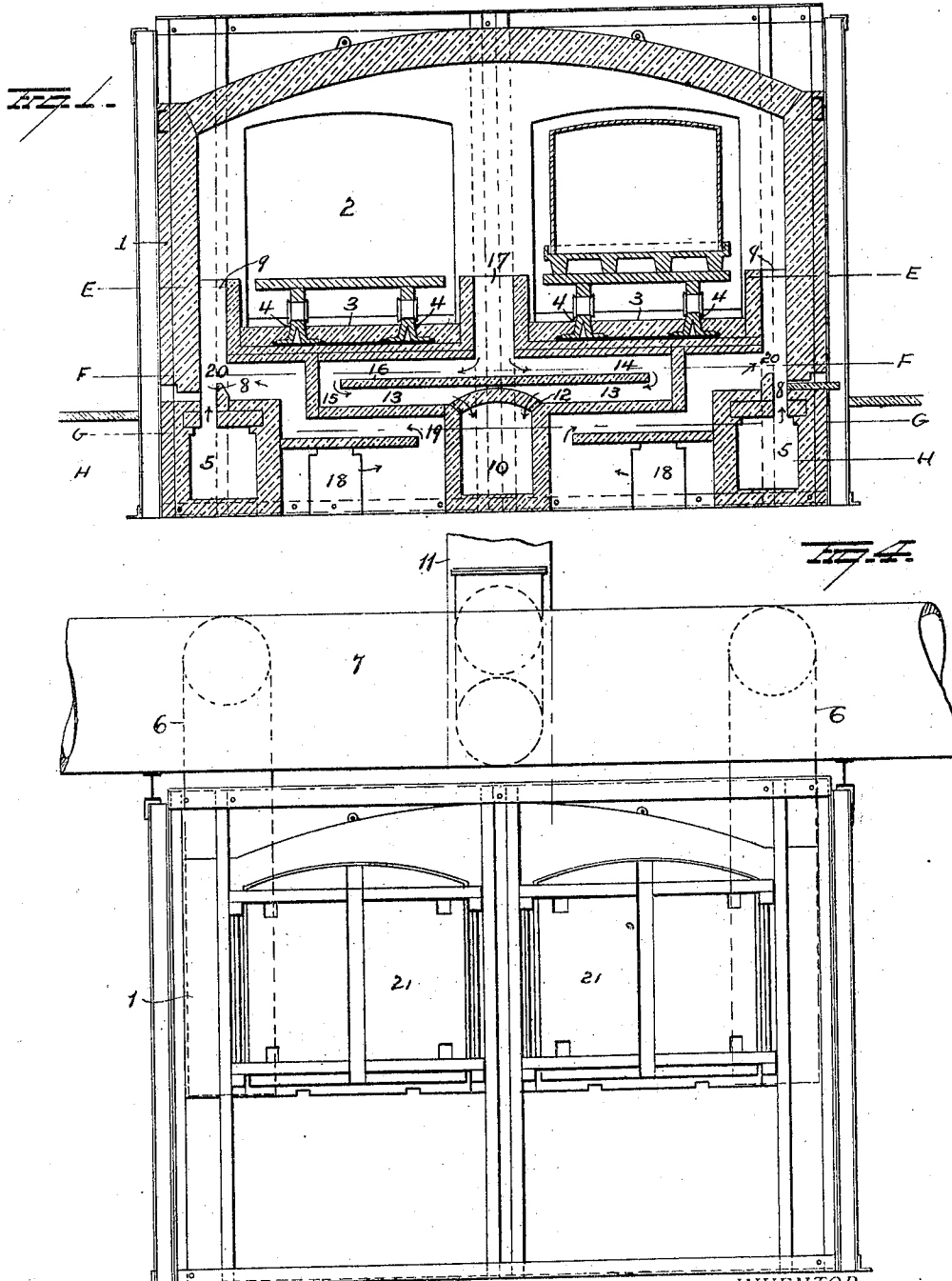


J. D. SWINDELL.
ANNEALING FURNACE.
APPLICATION FILED OCT. 26, 1909.

Patented June 7, 1910.

3 SHEETS—SHEET 1.

960,434.



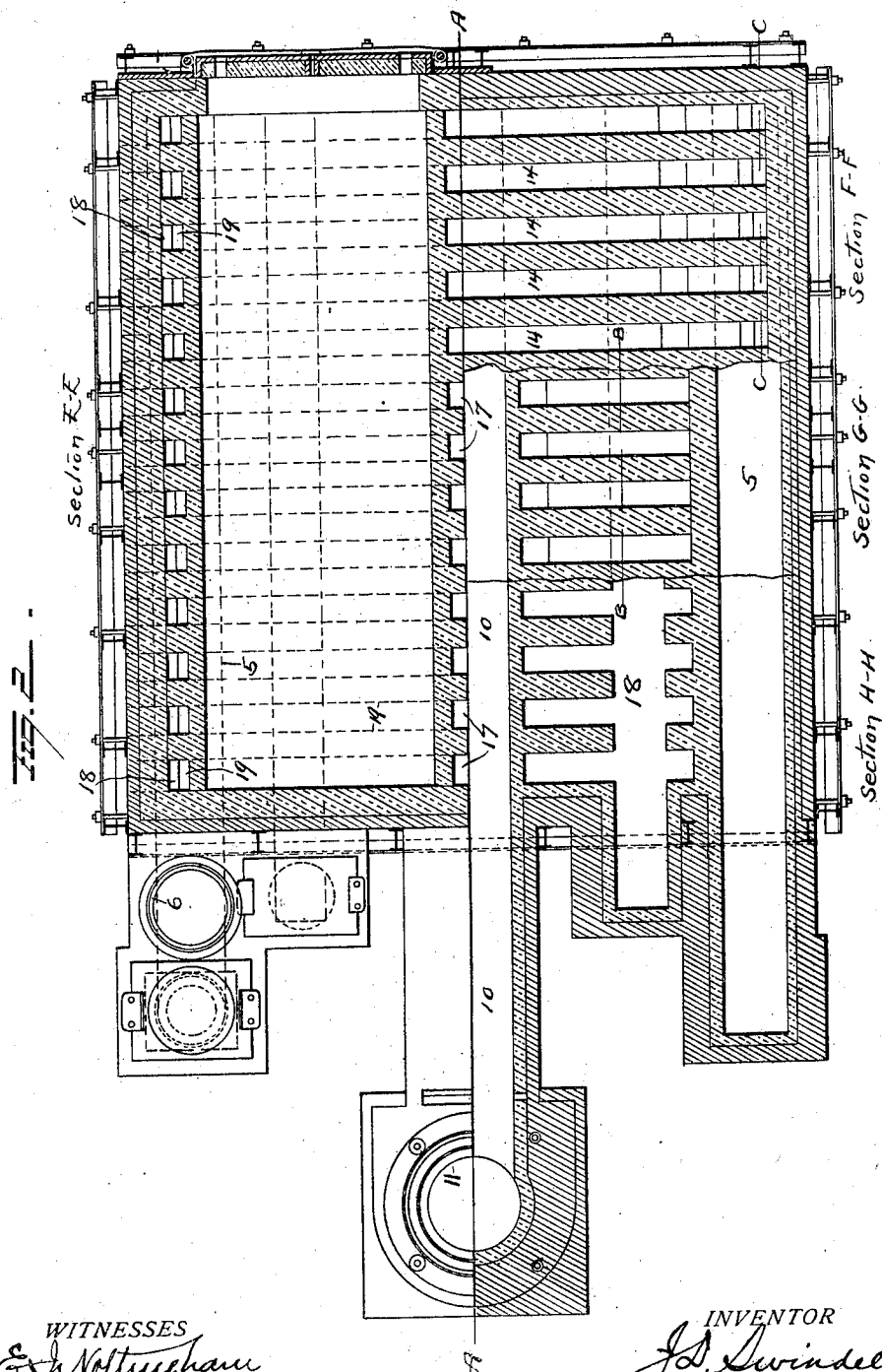
WITNESSES
E. Nottingham
G. J. Downing.

INVENTOR
J. D. Swindell
By H. A. Seymour
Attorney

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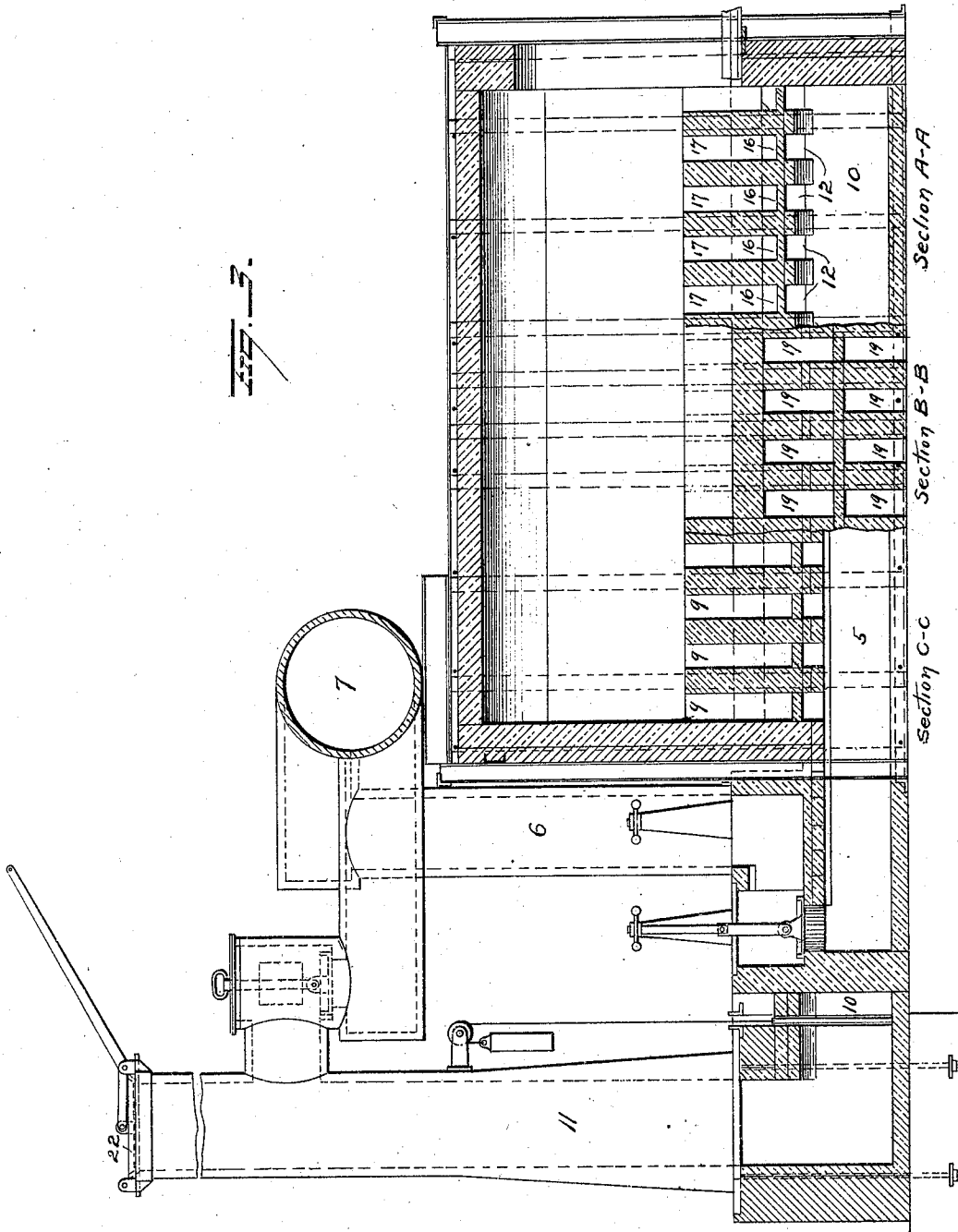
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G. F. Downing

INVENTOR
J. D. Swindell
By H. A. Seymour
Attorney

UNITED STATES PATENT OFFICE.

JAMES DAVIS SWINDELL, OF PITTSBURG, PENNSYLVANIA.

ANNEALING-FURNACE.

960,434.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed October 23, 1909. Serial No. 524,764.

To all whom it may concern:

Be it known that I, JAMES DAVIS SWINDELL, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Annealing-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to metallurgical apparatus and more particularly to improvements in annealing furnaces, the object of the invention being to construct an annealing furnace in such manner as to insure an adequate and even distribution of heat in the furnace chamber with an economical use of gaseous fuel.

A further object is to so construct the furnace that the combustible mixture of air and gas will be properly united before becoming discharged into the furnace chamber.

With these objects in view the invention consists in certain novel features of construction and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings, Figure 1 is a transverse sectional view of an annealing furnace embodying my improvements. Fig. 2 is a horizontal sectional view showing sections of the structure on lines F-F, G-G, H-H and also E-E of Fig. 1. Fig. 3 is a vertical longitudinal section on the lines A-A, B-B, and C-C of Fig. 2, and Fig. 4 is a front elevation.

1 represents a furnace structure having therein a heating chamber 2 provided on its floor 3 with suitable supports 4 to receive the articles to be annealed or the containers of such articles.

In the lower portion of the furnace structure at respective sides thereof, gas flues 5 are located and receive gas from suitable vertical pipes or flues 6 which communicate at their upper ends with a gas main 7. A series of vertical gas passages 8 communicate at their lower ends with the respective gas flues 5 and at their upper ends, these gas passages discharge at 9 into the furnace chamber at respective sides of the latter.

Located centrally in the base portion of the furnace structure is a horizontal stack flue 10 which communicates at one end with a stack 11. The stack flue 10 is provided at its top

with a series of inlet openings 12 which communicate with lateral passages 13 and the latter communicate at their outer ends with passages 14,—said passages 13 and 14 being formed within a chamber 15 under the floor of the heating chamber by means of a horizontal baffle or partition 16 as clearly shown in Fig. 1. The passages 14 communicate at the center of the furnace chamber with outlet openings 17 for hot gases and products of combustion as hereinafter explained. Between the central stack flue 10 and each gas flue 5, an air flue 18 is located. With the side of each air flue 18 nearest the stack flue 10, a passage 19 communicates and, after passing the side wall of the stack flue and the bottom and end wall of chamber 15, said passage 19 communicates with the gas passage 8 below the discharge end of the latter,—a gas and air mixing chamber being thus formed at 20 so that the gas and air will have been mixed before being discharged through the openings 9 into the furnace chamber. It will be understood that the construction last above described occurs at both sides of the furnace structure as shown in Fig. 1.

From the construction and arrangement of parts above described it will be readily understood that combustible mixtures of air and gas at proper temperature will be discharged into the furnace chamber at respective sides of the latter and that the waste heat and products of combustion will find their exit at the longitudinal center of the furnace chamber through the outlets 17 and through the passages 14 and 13 and finally into the top of the horizontal stack flue 10, from which latter they will escape through the stack 11. It is apparent that the heat of the products of combustion escaping through the passages 14, 13 and stack flue 10 will be utilized to raise the temperature of the air as it passes from the air flues through the passages 19 to the vertical passages 8 where said air mixes at 20 with the gas as previously explained.

The furnace is provided at one end with suitable doors 21; the stack may be provided with a suitable damper 22 and various changes might be made in the details of construction of my invention without departing from the spirit thereof or limiting its scope and hence I do not wish to restrict myself to the precise details herein set forth.

Having fully described my invention what

I claim as new and desire to secure by Letters-Patent, is,—

1. The combination of a furnace structure having a heating or annealing chamber, gas flues located in the furnace structure below the plane of the heating or annealing chamber, passages communicating with said gas flues and with the heating or annealing chamber at respective sides of the latter, air passages communicating with said gas passages below the discharge ends of the latter thereby forming mixing chambers between the ends of said gas passages, and means for conveying products of combustion from the longitudinal central portion of the heating or annealing chamber and in proximity to the wall of said air passages.

2. The combination of a furnace structure having a heating or annealing chamber, gas flues located at respective sides of the furnace structure below the plane of the heating or annealing chamber, gas passages communicating at their lower ends with said gas flues and at their upper ends with the heating or annealing chamber at respective sides of the latter, air flues located adjacent to the gas flues, passages communicating with said air flues and with said gas passages below the discharge ends of the latter, discharge outlets communicating with the longitudinal central portion of the heating or annealing chamber for the discharge of products of combustion, a stack, and passages adjacent to the air passages connecting the central discharge outlets with said stack.

3. The combination of a furnace structure having a heating or annealing chamber, gas flues located in the base portion of the furnace structure at respective sides of the latter and below the plane of the heating or annealing chamber, gas passages communicating with said gas flues and discharging into the heating or annealing chamber at respective sides of the latter, a centrally located stack flue, passages connecting said stack flue with the longitudinal central portion of the heating or annealing chamber, air flues located between the central stack flue and the side gas flues, and air passages communicating with the inner sides of the air flues and with the gas passages below the discharge

ends of the latter, said air passages located adjacent to the passages which communicate with the stack flue and the central portion of the furnace chamber.

4. The combination of a furnace structure having a heating or annealing chamber, inlets for air and gas communicating with said chamber at the sides thereof, means for supplying gas to said inlets, a centrally located stack flue in the base portion of the furnace structure, means forming chambers under the floor of the heating or annealing chamber, and baffles or partitions in said chambers forming passages communicating with each other and respectively with the top of the stack flue and with the central portion of the heating or annealing chamber, and air passages adjacent to said last mentioned passages and communicating with said inlets at the sides of the furnace chamber.

5. The combination of a furnace structure having a heating or annealing chamber, gas flues at respective sides of the furnace structure below the plane of the heating or annealing chamber, gas passages communicating with said gas flues and with the heating or annealing chamber at respective sides of the latter, a centrally located stack flue in the base portion of the furnace structure, means forming a chamber above the stack flue and under the floor of the heating or annealing chamber, a baffle or partition in said interposed chamber forming passages communicating with each other and communicating respectively with the top of the furnace flue and the central portion of the heating or annealing chamber, air flues interposed between the gas flues and stack flue, and passages between the stack flue and air flues and between the gas and air flues and the bottom and side walls of the interposed chamber, said passages communicating with the air flues at the inner sides thereof and with the gas passages below the discharge ends of the latter.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

JAMES DAVIS SWINDELL.

Witnesses:

H. A. SHAFFER,
S. C. CARVER.