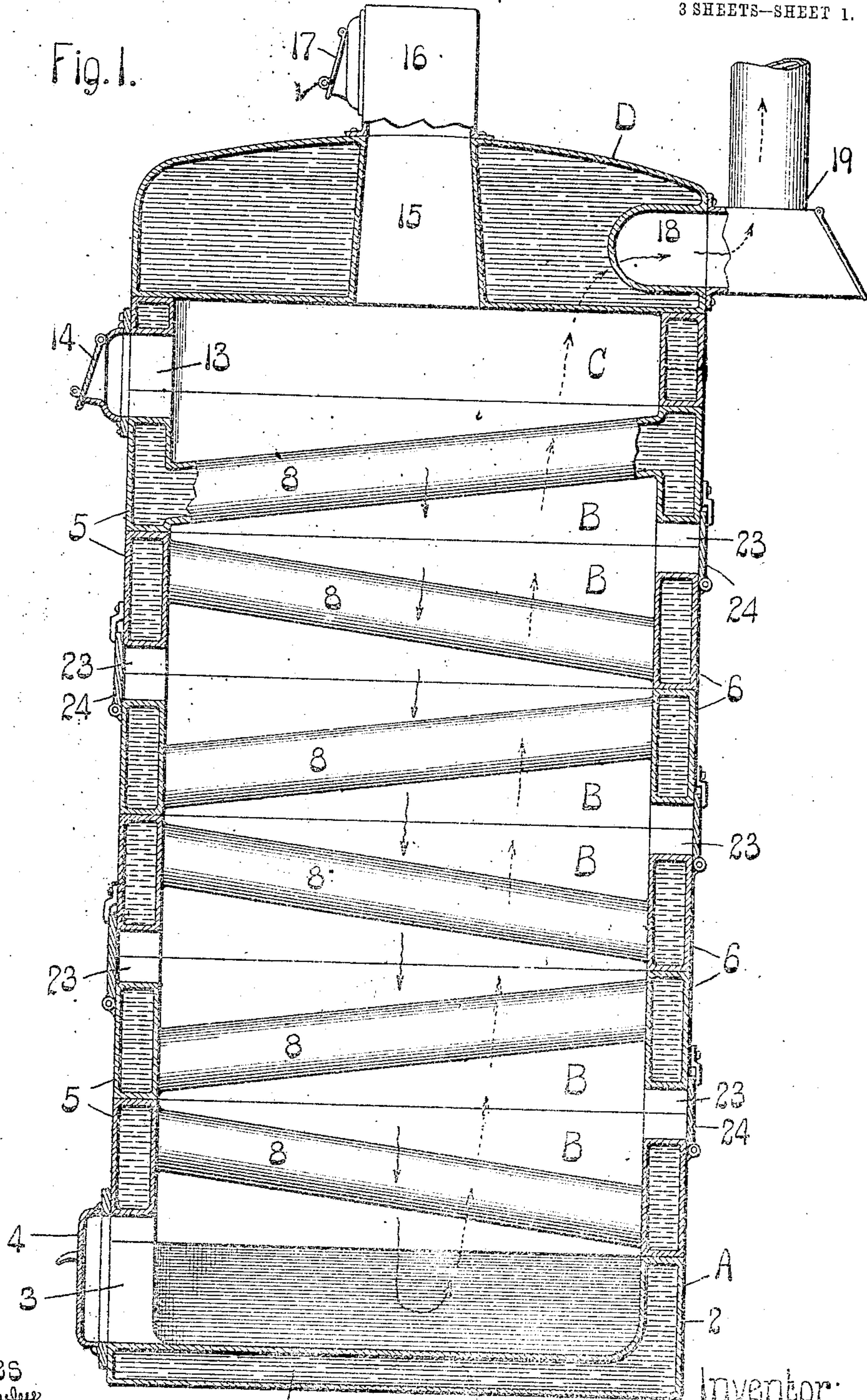


930,140.

Patented Aug. 3, 1909.  
3 SHEETS—SHEET 1.

Fig. 1.



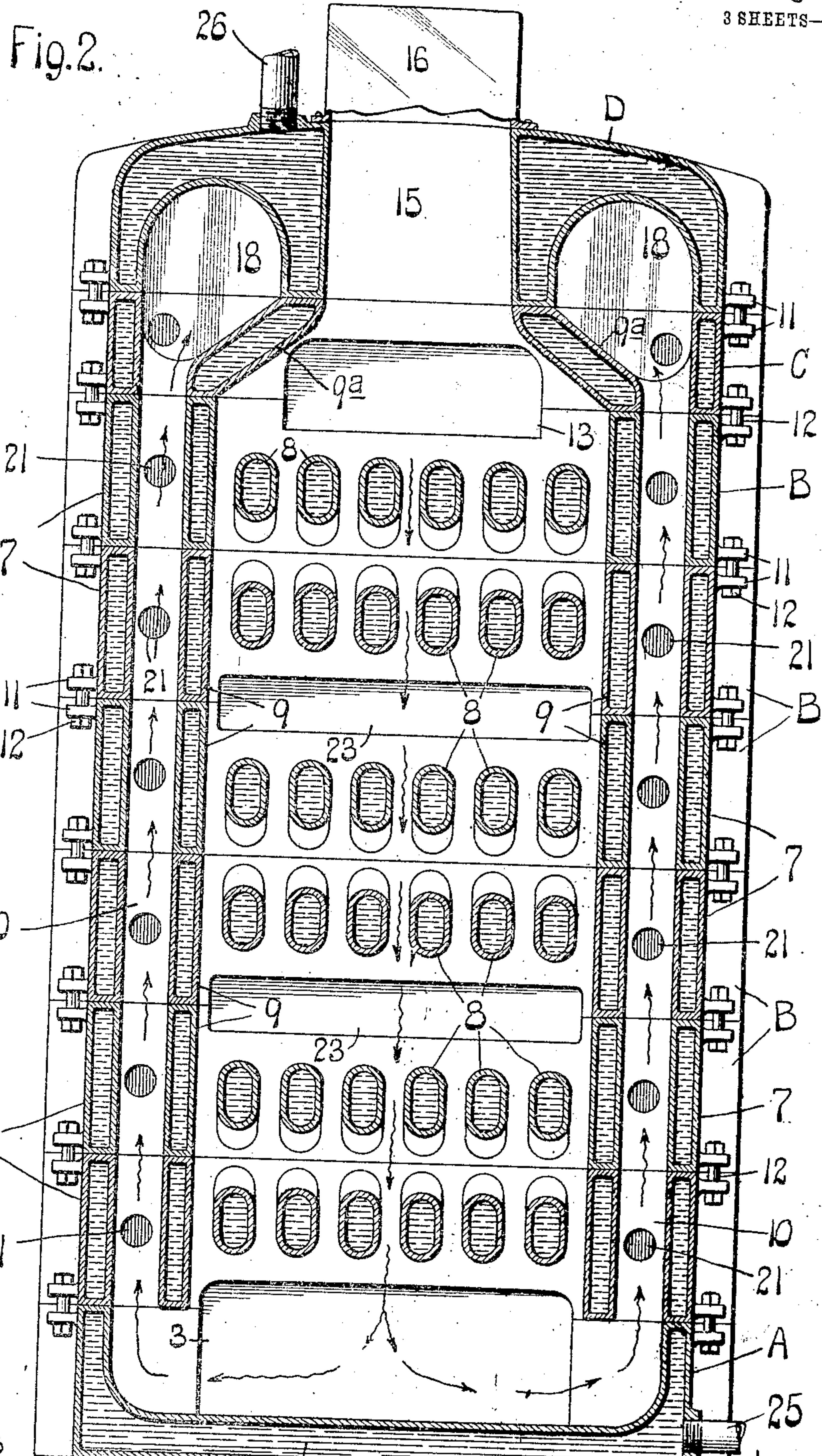
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SECTIONAL BOILER.  
APPLICATION FILED JUNE 15, 1908.

Patented Aug. 3, 1909  
3 SHEETS—SHEET 3.

Fig. 3.

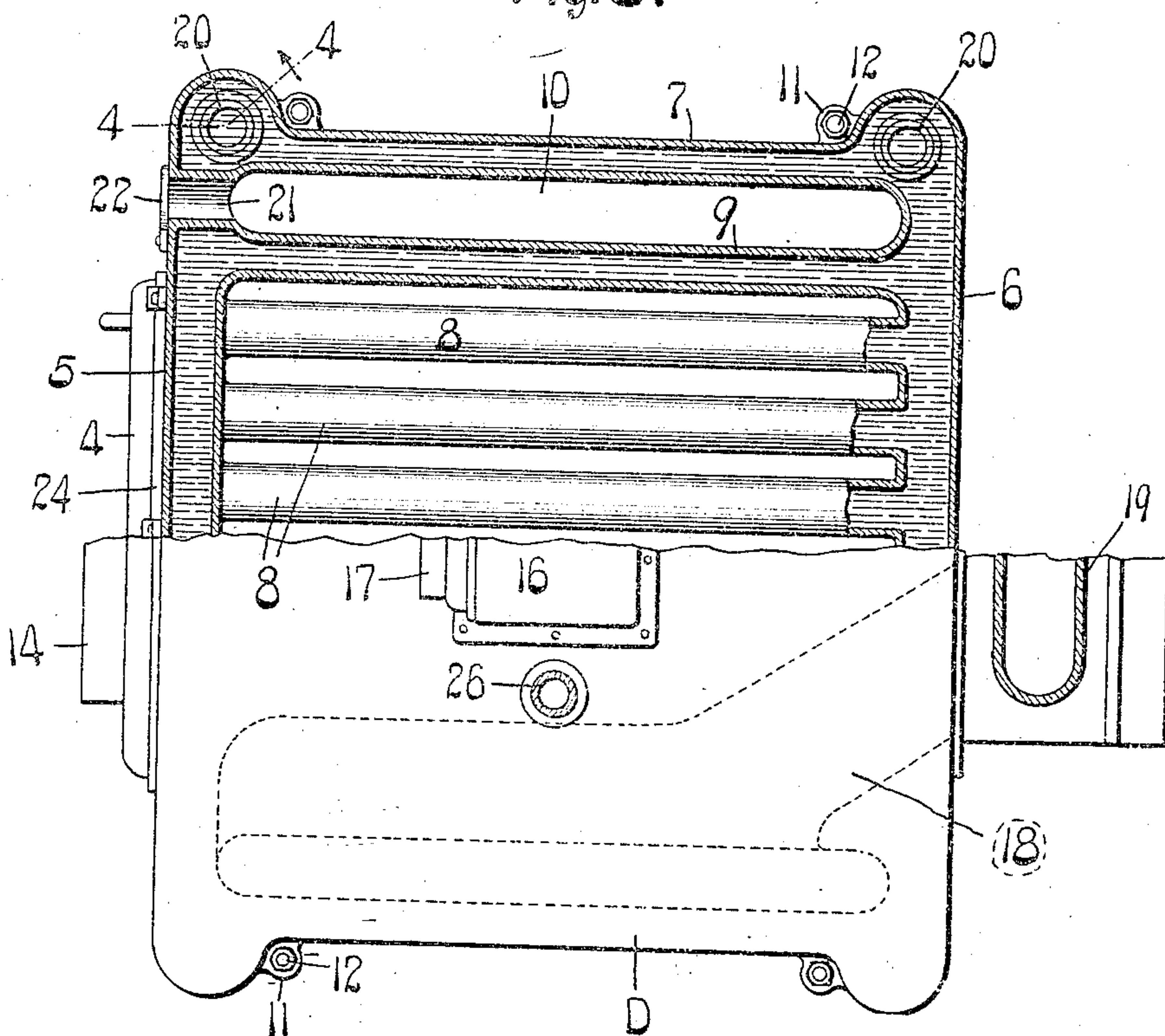
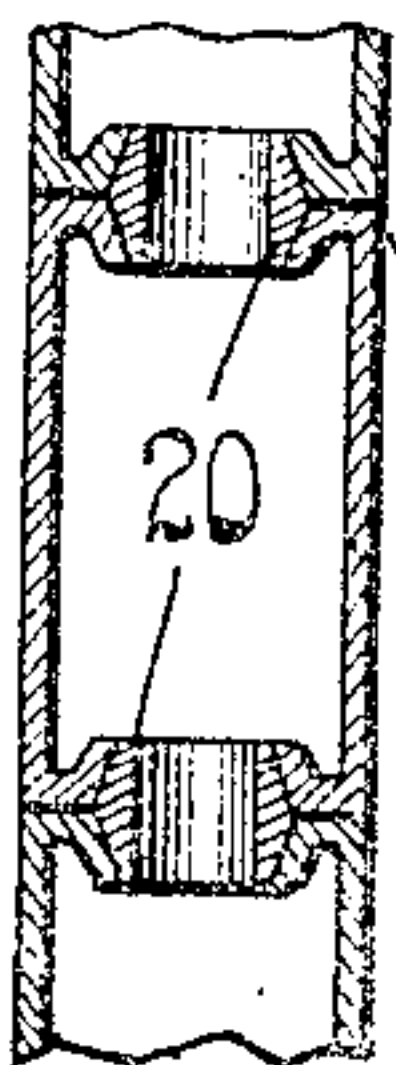


Fig. 4.



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# UNITED STATES PATENT OFFICE.

ELIJAH M. BOSLEY, OF ST. LOUIS, MISSOURI.

## SECTIONAL BOILER.

No. 930,140.

Specification of Letters Patent.

Patented Aug. 3, 1909.

Application filed June 15, 1908. Serial No. 438,582.

To all whom it may concern:

Be it known that I, ELIJAH M. BOSLEY, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Sectional Boilers, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical longitudinal sectional view of a boiler constructed in accordance with my invention; Fig. 2 is a vertical transverse sectional view of said boiler; Fig. 3 is a top plan view partly in horizontal section of the boiler shown in Figs. 1 and 2; and Fig. 4 is a detail vertical sectional view taken on approximately the line 4—4 of Fig. 3.

This invention relates to boilers, and particularly to sectional boilers of the type used in steam or hot water heating systems.

One object of my invention is to provide a comparatively small sectional boiler that has a large heating area.

Another object of my invention is to provide a down-draft sectional boiler composed of a number of horizontally arranged or superimposed sections.

Another object of my invention is to provide a down-draft sectional boiler composed of a number of horizontally arranged sections, one of which is provided with an integral grate. And still another object of my invention is to provide a down-draft sectional boiler having a magazine feed.

Other objects and desirable features of my invention will be hereinafter pointed out.

Briefly described, my improved boiler consists of a number of horizontally disposed sections having hollow chambers through which the heating medium circulates, and flues through which the hot gases of combustion travel. The grate on which the fuel rests is so constructed that the heating medium can circulate through it, and means is provided for admitting air above the bed of fuel so as to create a draft down through the grate, the various sections of the boiler having vertically disposed flues that lead from the combustion chamber to

the smoke-pipe so as to carry off the products of combustion. The hollow members that constitute the grate-bars are preferably cast integral with the section which carries said hollow members, and the sections which are arranged underneath what I will term the grate section, are also preferably provided with hollow members that are located in the path of the flame which travels downwardly from the grate, said hollow members being so constructed that they form a coil through which the heating medium circulates. The top section of the boiler is provided with a hopper or magazine which is adapted to be filled with fuel that is supplied automatically to the fire and as the draft passes downwardly through the grate and does not strike the magazine, the fuel in same will not coke.

Referring to the drawings which illustrate the preferred form of my invention, A designates the base section of my improved boiler, and B designates a plurality of sections that are arranged one above the other on said base section, the uppermost section B constituting the grate section. The sections B are preferably of the same shape and configuration so that one pattern can be used in manufacturing all of said sections and the sections do not have to be arranged in a certain sequence when the boiler is being erected.

The base section A is approximately channel-shaped in cross section, as shown in Fig. 2, so as to produce an ash-pit, and is provided with a chamber 1 through which the heating medium can circulate. This base section is so formed that a hollow wall 2 is located at the rear end thereof, as shown in Fig. 2, and its front wall is provided with a clean-out opening 3 that is covered by a door 4.

While I prefer to use a base section that is provided with chambers through which the heating medium circulates, I do not wish it to be understood that my broad idea is limited to such a structure, for if desired the base section can consist merely of a plate provided with a rim or vertical wall that forms a portion of the outside of the boiler.

Each of the sections B that are superimposed upon the base section A is provided with hollow front and rear walls 5 and 6, respectively, and hollow side walls 7 that



communicate with said front and rear walls, as shown clearly in Fig. 3. Hollow members 8, which preferably are of approximately oval shape in cross section, extend from the hollow front wall 5 to the hollow rear wall 6 so that the heating medium can circulate through said members and walls. While I have herein stated that the hollow members 8 are of approximately oval shape in cross section, I wish it to be understood that the particular cross sectional shape of said members is immaterial so far as my broad idea is concerned. The hollow members 8 are spaced away from each other, as shown in Fig. 2, so that the flame from the fuel can pass down between them, as hereinafter described. Each of the sections B is also provided with hollow walls 9 that extend parallel to the side walls 7 and cooperate therewith to produce vertically disposed side flues 10, the walls 9 communicating with the hollow front and rear walls of the section, as shown in Fig. 3, so that the heating medium will circulate through them.

Preferably, the hollow members 8 are pitched slightly or arranged at an angle, as shown in Fig. 1, so as to cause the heating medium to flow through them, and the hollow members 8 of adjacent sections are inclined in opposite directions so that they will form a coil up through which the heating medium circulates.

The sections B rest firmly upon each other and are provided with cooperating laterally projecting lugs 11 through which fastening devices 12 pass to secure the sections together, the base section A and the top section hereinafter described also being provided with similar lugs 11. As previously stated, the upper section B constitutes what I term the grate section, for the hollow members 8 of said upper section act as grate-bars that support the bed of fuel. These hollow grate bars are cast integral with the section B so that the cost of the boiler is materially reduced owing to the fact that it is not necessary to employ skilled workmen to fit the water grate in position or connect it to the sections of the boiler by means of nipples or other similar devices which permit the water in the sections to circulate through the grate. The section C that is mounted upon the grate section is of similar construction to the sections B except that it is not provided with hollow members 8, and instead of being provided with hollow walls that extend parallel to its hollow side walls, it is provided with hollow walls 9<sup>a</sup> that converge, as shown in Fig. 2, so as to partially form the top of the fuel chamber. The front wall of the section C is provided on its lower edge with a wide recess or cut-out portion that aligns with a recess or cut-out portion of the same width in the upper edge of the

front wall of the grate section B so as to produce an opening 13 that is covered by a draft door 14. This door is opened to admit air to the fuel chamber and thus create a draft down through the grate and up through the vertical side flues 10.

The top section D of the boiler is hollow and is provided with a vertically disposed hopper or magazine 15 that is adapted to be filled with fuel so that the fuel will be supplied automatically to the fire. An auxiliary hopper 16 is arranged above the magazine 15 and said auxiliary hopper is provided with a door 17 that closes the opening through which the fuel is introduced. If desired, this door 17 can be used instead of the door 14 to admit air to the fuel chamber, the air being drawn down through the coal in the hopper 15. The bottom wall of this top section D is so formed that two horizontally disposed flues 18 will be produced, said flues communicating with the vertical side flues 10 and having their rear ends communicating with the smoke-stack 19 so as to form a continuous passage for the products of combustion.

The base section, top section and intermediate sections communicate with each other so that the heating medium can circulate through all of the sections, and the means herein shown for establishing communication between the various sections consists of slip nipples 20 that pass through aligning openings in the contacting top and bottom walls of the sections, as shown in Fig. 4, said nipples being preferably located at the corners of the sections, as shown in Fig. 3.

I prefer to provide one wall of the boiler with openings through which an implement can be inserted to clean out the vertical side flues 10, and in the construction herein shown the hollow front walls of each of the sections B are provided with openings 21 that align with the vertically disposed flues 10, as shown in Figs. 2 and 3, said openings 21 being covered by movable caps 22. By removing the caps 22 a suitable implement can be inserted in the vertical flues 10 to clean same. I also prefer to provide the boiler with clean-out openings 23 through which an implement can be inserted to brush off the cinders or ashes that collect on the hollow members 8 arranged underneath the grate. These openings 23 are formed by aligning recesses or cut-out portions in the front and rear walls of the sections B, and each opening is covered by a movable door 24 of any preferred design. As shown in Fig. 2, the boiler is provided with an intake pipe 25 that communicates with the base section A and an eduction pipe 26 that communicates with the top section D.

A boiler of the construction above described can be used for a steam or a hot



water heating system, and when it is used for a steam heating system the top section is made large enough to form a steam dome above the level of the water. The magazine 5 15 supplies the fuel automatically to the fire and as the flame passes downwardly through the grate it does not come in contact with the fuel in the magazine and consequently said fuel will not coke.

10 By casting the hollow grate-bars integral with the section that carries them I eliminate the expense of fitting the grate-bars in position after the sections have been erected. Another great advantage of a boiler of this 15 construction is that it can be composed of very few sections. Heretofore, sectional boilers were composed of a number of vertically arranged sections and in order to obtain a fire grate of the required area it was 20 necessary to use four or five sections even though the heating system with which the boiler was used did not require a boiler of so great a capacity. With my improved construction I am able to produce a boiler of 25 just the required capacity for the heating system with which it is used by varying the number of sections that are arranged between the base section and the grate section without reducing the grate area. Another 30 advantage of my boiler is that the flues are formed in each section instead of being formed between the sections, namely, placing two sections together so that alining hollowed-out portions of the sections will 35 form flues. While I have herein illustrated and described a boiler in which the sections that are arranged between the grate section and the base section are provided with hollow members 8 through which the heating 40 medium circulates, I do not wish it to be understood that my broad idea is limited to such a construction for, if desired, these intermediate sections need not be provided with hollow members 8 if a boiler of small 45 capacity is desired. I prefer, however, to provide the intermediate sections with hollow members 8 for these members are located in the combustion chamber of the boiler and consequently are subjected to an intense 50 heat. The boiler can be produced at a low cost and can be erected with very little trouble and as it is small and has a large heating area, it forms a very efficient boiler for dwelling houses.

55 Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A down-shaft sectional boiler provided with vertically disposed flues that extend 60 from approximately the front to the rear wall of the boiler, and a combustion chamber arranged underneath the fuel grate of the boiler and communicating with the lower ends of said flues; substantially as described.

2. A down-draft boiler composed of a base 65 section that forms an ash pit, a top section having horizontally disposed flues that communicate with the smoke pipe, and intermediate sections provided with vertical flues that have their lower ends open so as to 7 establish communication between the ash pit and the horizontal flues of the top section; substantially as described.

3. A down-draft boiler, consisting of a number of horizontally disposed superim- 75 posed sections having alining openings that form a vertical flue, one of the sections adjacent the upper end of the boiler being provided with a fuel grate consisting of hollow bars formed integral with said section and 80 having their ends communicating with chambers through which the heating medium circulates, and means for admitting air above said grate to create a draft down 85 through same and thus cause the products of combustion to enter the lower end of said vertical flue and pass upwardly through same; substantially as described.

4. A down-draft boiler, comprising a number of horizontally arranged cast metal sec- 90 tions provided with chambers through which the heating medium circulates, one of said sections being provided with integral hollow bars that form a grate for the fuel, vertical flues in said sections which lead from a com- 95 bustion chamber under the grate, a plurality of rows of oppositely inclined hollow members arranged in the combustion chamber under the grate and communicating with the chambers in said sections through which the 100 heating medium circulates, and means for admitting air above the fuel to create a draft down through the grate and thus cause the products of combustion to pass upwardly 105 through said vertical flues; substantially as described.

5. A down-draft boiler, consisting of a horizontally disposed base section that forms an ash pit, a number of superimposed sections 110 mounted on the base section and provided with alining openings that form flues which establish communication between the ash pit and the smoke-pipe to carry off the products of combustion, a fuel grate arranged adja- 115 cent the top of the boiler, and means for admitting air above said fuel grate so as to create a draft down through same and thus cause the products of combustion to pass upwardly through said vertical flues; 120 substantially as described.

6. A down-draft boiler composed of a number of horizontally disposed superim- posed sections having communicating cham- 125 bers through which the heating medium circulates, one of the sections adjacent the upper end of the boiler being provided with a grate on which the fuel rests, means for admitting air above said grate to create a

draft down through same, and a top section provided with a chamber through which the heating medium circulates and also having an opening through which the fuel is introduced onto said grate; substantially as described.

In testimony whereof I hereunto affix my

signature in the presence of two witnesses, this twelfth day of June 1908.

ELIJAH M. BOSLEY.

Witnesses:

WELLS L. CHURCH,  
GEORGE BAKEWELL.