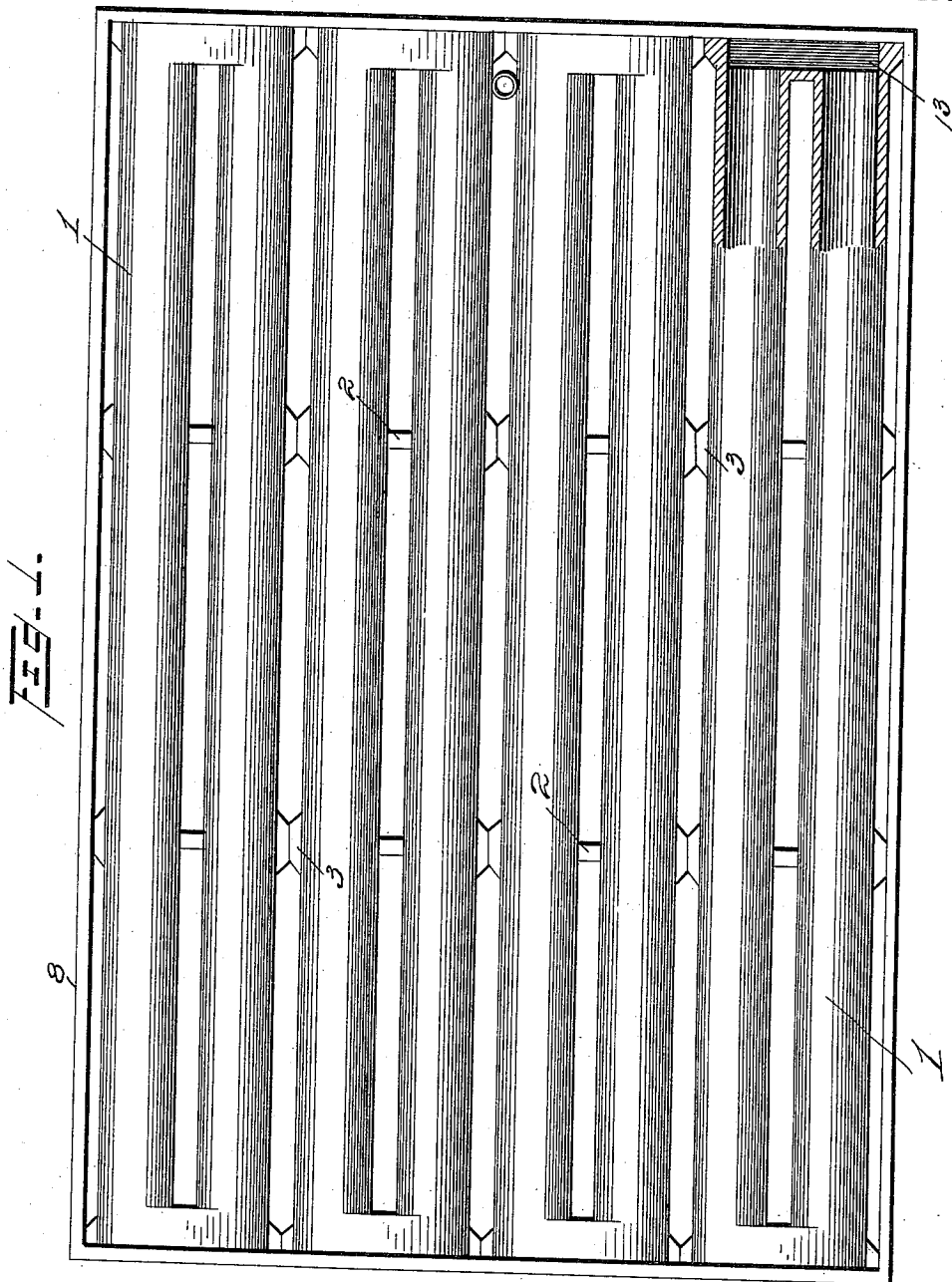


1,045,233.

C. W. WILLIS.
LIQUID FUEL BURNER.
APPLICATION FILED JULY 26, 1911.

Patented Nov. 26, 1912.

3 SHEETS—SHEET 1.



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Charles W. Willis

Witnesses

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H. E. Garner

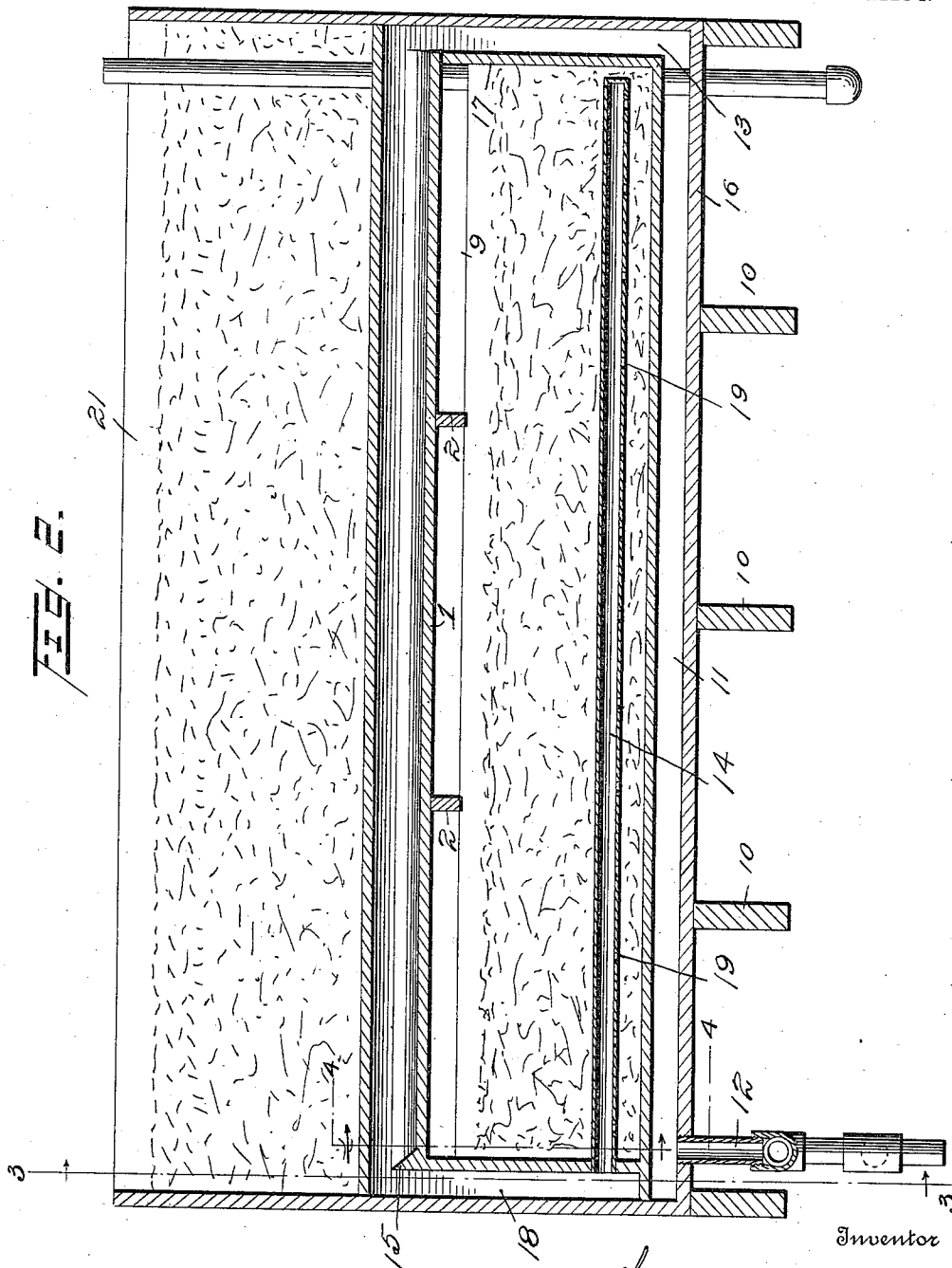
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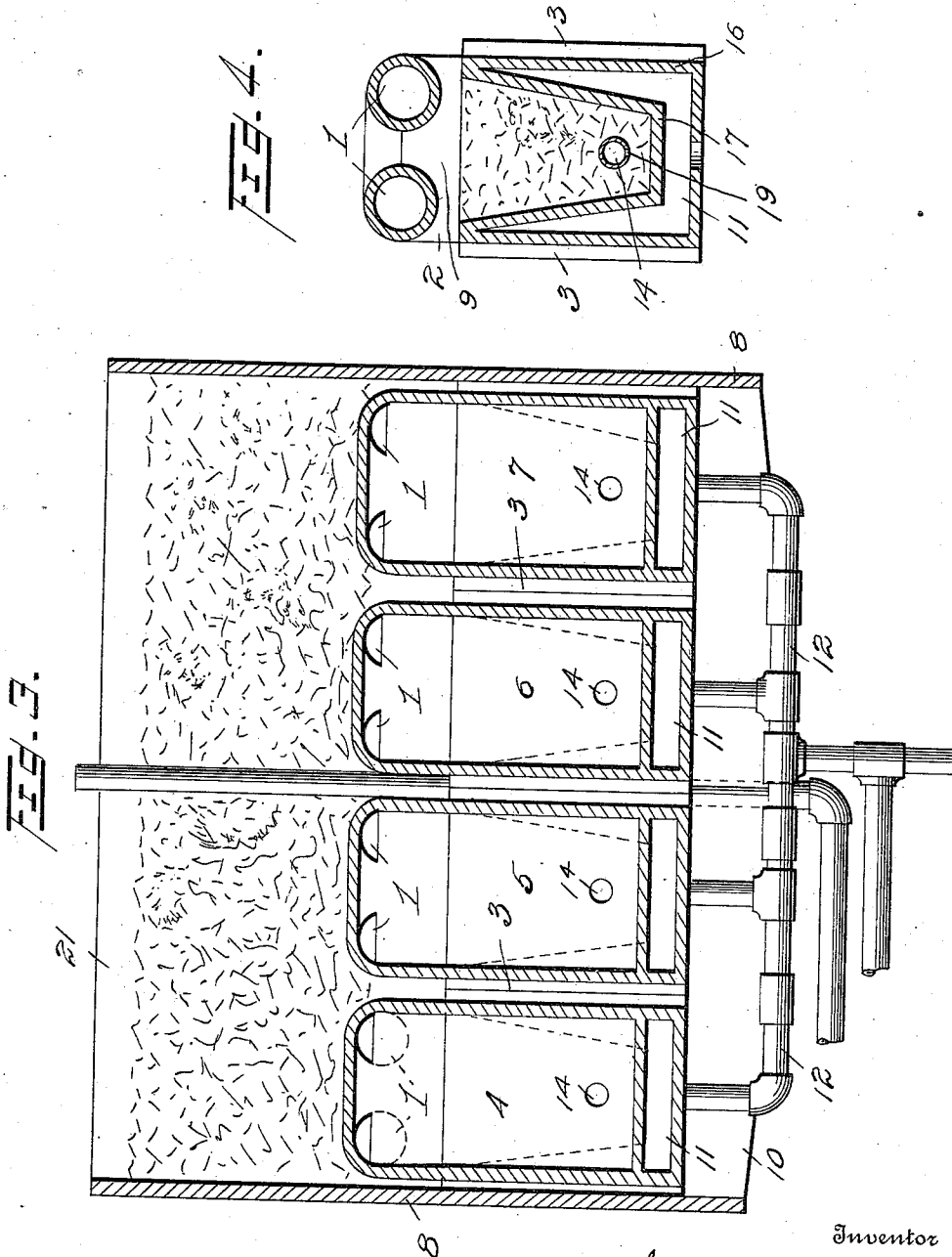
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

CHARLES W. WILLIS, OF GLAZIER, TEXAS.

LIQUID-FUEL BURNER.

1,045,233.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed July 26, 1911. Serial No. 640,665.

To all whom it may concern:

Be it known that I, CHARLES W. WILLIS, a citizen of the United States, residing at Glazier, in the county of Hemphill and State of Texas, have invented certain new and useful Improvements in Liquid - Fuel Burners, of which the following is a specification.

This invention has relation to new and useful improvements in liquid fuel burners and the main object thereof is to provide a burner of this nature that is adapted to be utilized in a steam engine or traction engine, stationary boilers of various types, shapes and sizes, employing vertical, horizontal, tubular sterling or any other tube boiler. The burner is also applicable to marine boilers of all shapes, styles and sizes.

A further object of my invention is to provide a burner that is adapted to be applied also to steam heating purposes, for cooking stoves, ranges and heating stoves.

With the foregoing and other objects in view, my invention consists of the novel features of construction, combination and arrangement of parts as are described in this specification, illustrated in the accompanying drawings forming a part thereof, and particularly pointed out in the appended claims.

Reference being had to the drawings, Figure 1 is a top plan view of the invention. Fig. 2 is a vertical, longitudinal sectional view of the invention. Fig. 3 is a vertical, transverse, sectional view on the line 3—3 of Fig. 2, illustrating the various sections of which the generator and burner is composed. Fig. 4 is a vertical, transverse sectional view of one of the sections illustrated in Fig. 3, taken on the line 4—4 of Fig. 2, together with a pair of super-heater pipes and their supports.

Referring more particularly to the drawings which are not drawn to any particular scale, and in which like numerals designate like parts throughout, my invention is described as follows:

Fig. 1 shows in top plan the appearance of the burner as it rests in the fire box of a locomotive type of boiler, one portion of a pair of pipes being illustrated in horizontal, longitudinal section showing the manner in which each two pipes of each pair of pipes communicate with each other. This view also shows the supports 2 for the super-heater pipes 1 above mentioned, and the re-

inforcements 3 interposed between each two pair of said super-heater pipes 1.

The generator as illustrated in Fig. 3 is composed of four sections but it is obvious that as many sections may be employed as is desired, said sections being indicated by the numerals 4, 5, 6 and 7. Said sections are located in a casing 8. The reinforcements 3 also act as spacers to allow the air to pass up between each two adjacent said sections to the combustion space 9, where the air and vaporized oil co-mingle for ignition or combustion.

In Fig. 2 the manner in which the burner rests upon the grate of a locomotive type of engine is clearly shown, the grate being indicated by the numeral 10. As each section 4, 5, 6 and 7 is similar in construction, I deem it necessary to describe only one of them, as follows: Oil enters the generating space 11 by means of the pipe 12, wherein the oil commences to vaporize, by being subjected to heat generated from the burning gas in said combustion space 9. Thence the partly vaporized oil passes upward through the space 13 into the super-heater pipes 1, which pipes are in communication therewith and whose duty it is to heat the gas to a combustible temperature before reaching the feed pipe 14 which communicates with the super-heater pipes 1 by means of the space or opening 18. A block or enlargement 15 is formed at the forward end of the superheater pipe 1 to arrest or retard any oil that may arise into said super-heater pipe and which has not become vaporized.

Each section is formed in two parts 16 and 17. The inside part is so arranged that a space 11, heretofore referred to as the generating space, is left between the two bottom walls of said parts and a converging space left between corresponding side walls thereof. A further space is left between the rear end walls of said parts and the forward end walls of said parts, said spaces being heretofore designated by the numerals 13 and 18 respectively. The feed pipe 14 is provided with a plurality of perforations 19 therein, which allow the gaseous fuel to enter the upper part 17, which is filled with any kind of fire proof filler, such as asbestos pulp, quartz gravel, or small fragments of fire brick (except any kind of ashes adapted to fill up feed pipes on account of their fineness) filled to within about one or two inches of the top of the part 17. The parts 16 and

17 converge so that they meet at their upper edges and are joined together in one solid piece. The gaseous fuel, after passing into the fire proof filler, then passes upward into
 5 the combustion space 9 where it co-mingles, as heretofore stated, with the air that passes into said combustion space through openings or air spaces between each two pair of adjacent super-heater pipes, where it is ignited or wherein combustion takes place.
 10

Above the super-heater pipes the space 21 is filled to the desired depth with broken brick, the purpose of which is to act as a heat retainer, the heat from said brick serving to ignite any gas that may escape from said combustion space 9, and furthermore retaining the heat in the fire box of the engine until it can be taken up by the fire box lining or fire jacket proper of the engine.
 15

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

1. In a liquid fuel burner of the kind described, the combination of a casing, a plurality of sections received thereby, each of said sections comprising two parts, one of said parts being so constructed as to receive the other thereof, leaving a generating space between the lower walls and side walls
 25 of said parts and a space between the rear end walls of said parts and a space between the forward end walls thereof, the upper of said parts being for the reception of a fire proof filler, super-heater pipes arranged directly above each section, said pipes communicating with said generating space by means of said space between the rear end walls of said parts, a feed pipe extending into the fire proof filler of each section, and
 30 means of communication between the feed pipes and respective super-heater pipes, said means comprising the space between the front end walls of said parts.
 35

2. In a liquid fuel burner of the kind described, the combination of a casing, a plurality of sections received thereby, each of
 40

said sections comprising two parts, one of said parts being so constructed as to receive the other thereof, leaving a generator space between the lower walls and side walls of said parts and a space between the rear end walls of said parts and a space between the forward end walls thereof, the upper of said parts being for the reception of a fire proof filler, a pair of super-heater pipes arranged
 50 directly above each section, each of the pipes of said pair communicating with each other at each of their ends, said super-heater pipes communicating with said generating space by means of said space provided between the rear end walls of said parts, a feed pipe provided with a plurality of perforations extending into the fire proof filler of each section, and means of communication between the feed pipe and respective super-heater
 55 pipes, said means comprising the space provided between the front end walls of said parts.
 60

3. In a liquid fuel burner of the kind described, the combination of a casing with a plurality of sections received thereby, each of said sections comprising two parts, one of said parts so constructed as to receive the other thereof, leaving a generating space between respective lower and side walls and
 70 between the respective front and rear walls thereof, the upper section substantially filled with a fire proof filler, super-heater pipes arranged directly above each section, said pipes communicating with said generating
 75 space, a feed pipe extending into the fire proof filler of each section, and means of communication between the super-heater pipes, the space in said casing above the superheater pipes being filled with a fire
 80 brick heat retainer, substantially as shown.
 85

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES W. WILLIS.

Witnesses:

W. D. FISHER,
 B. M. BAKER.