

No. 673,964.

Patented May 14, 1901.

F. A. REYNOLDS.

BURNER FOR AUTOMOBILE BOILERS.

(Application filed Sept. 13, 1900.)

(No Model.)

2 Sheets—Sheet 1.

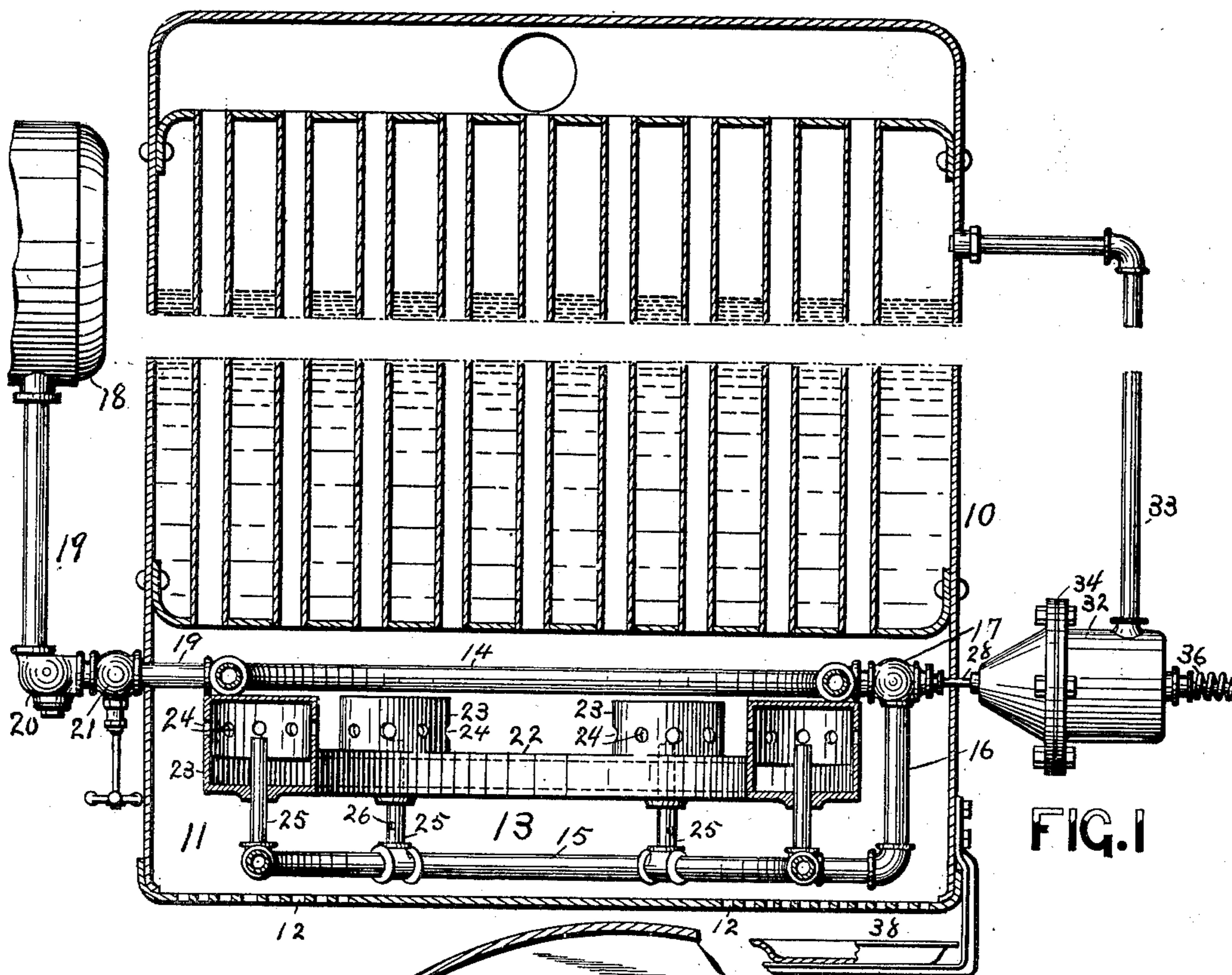


FIG. 1

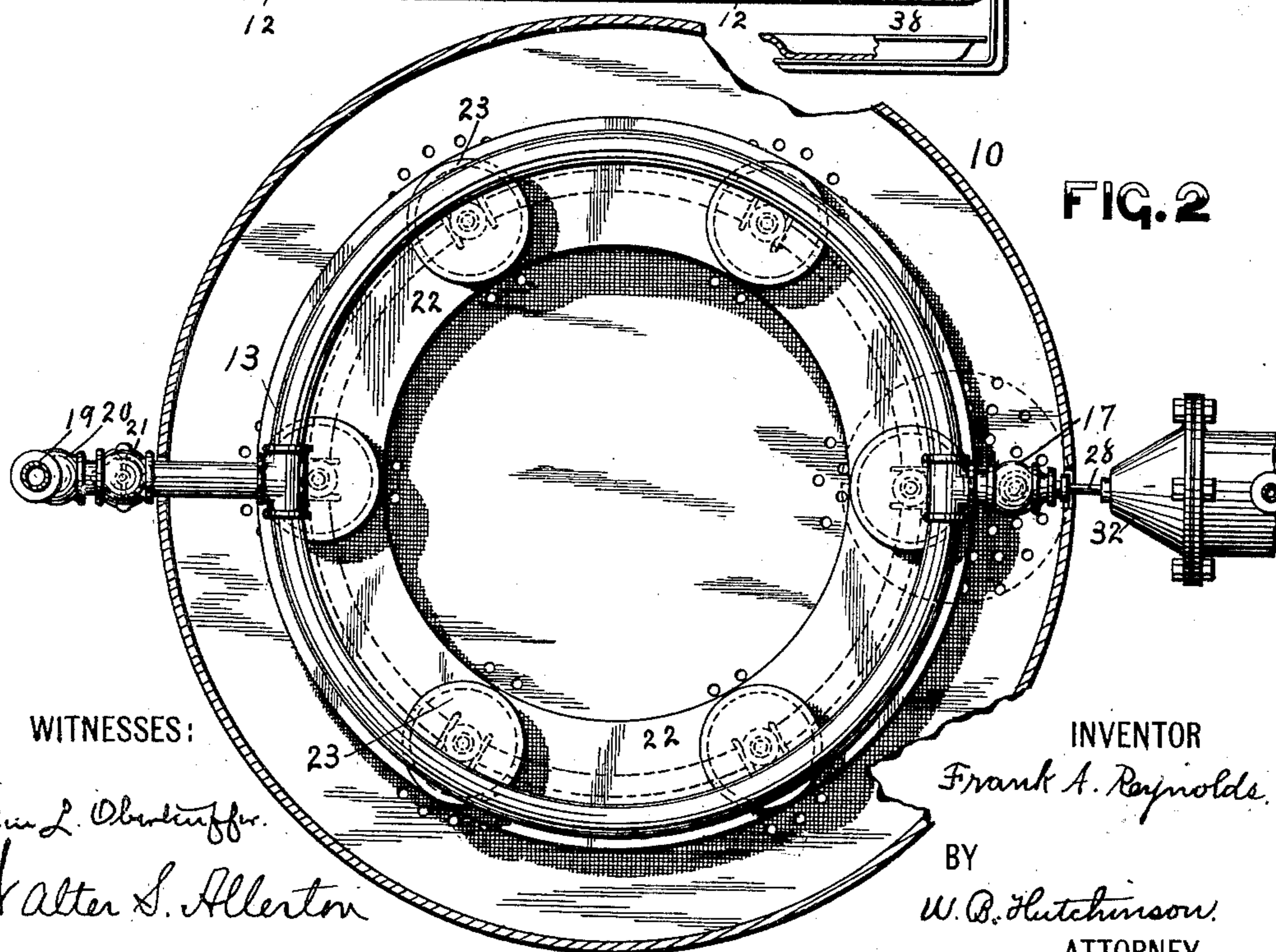


FIG. 2

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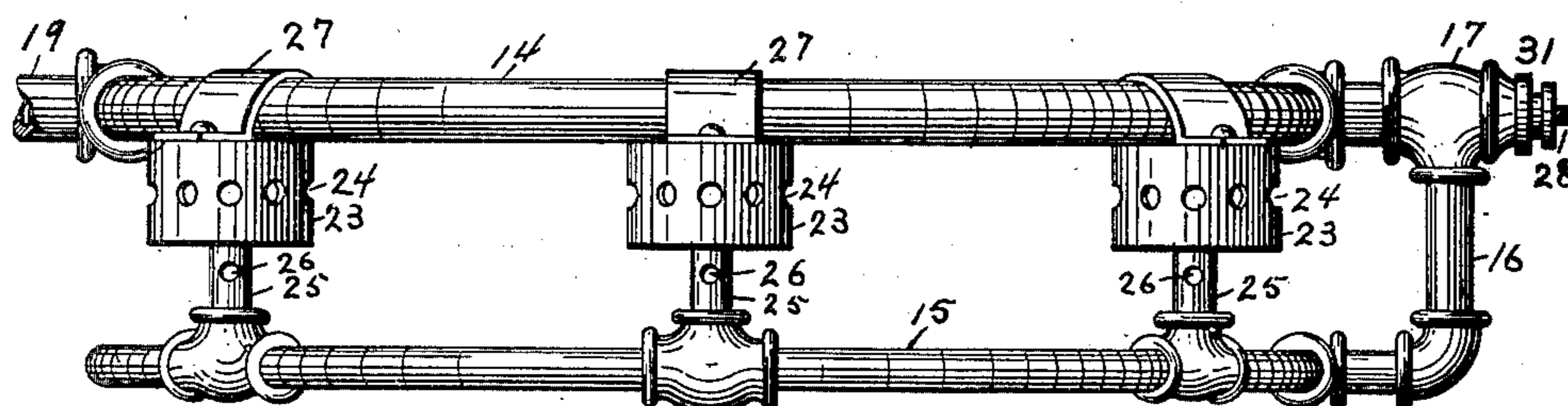
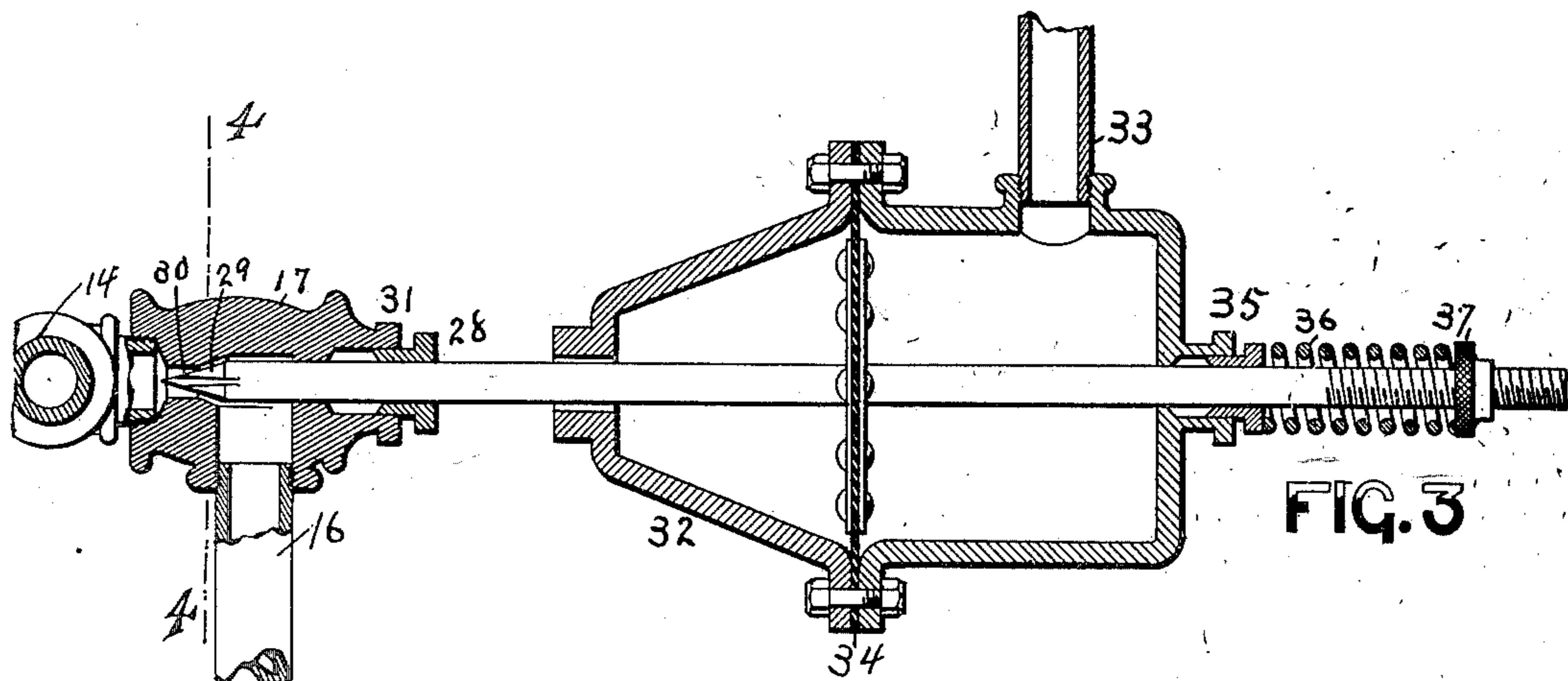


FIG. 5

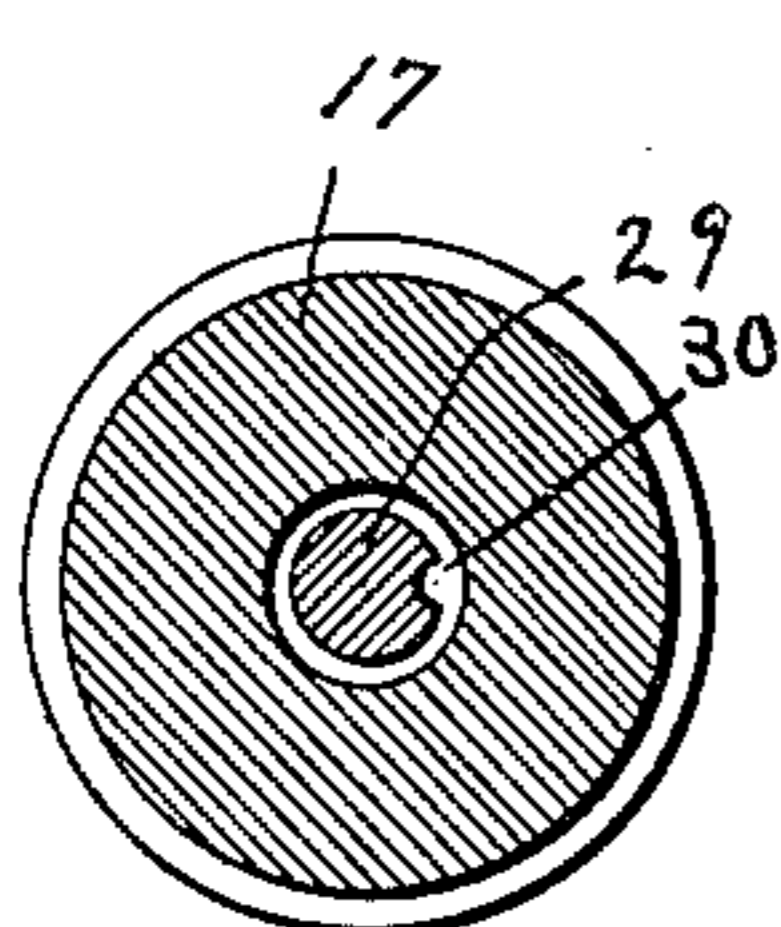


FIG. 4

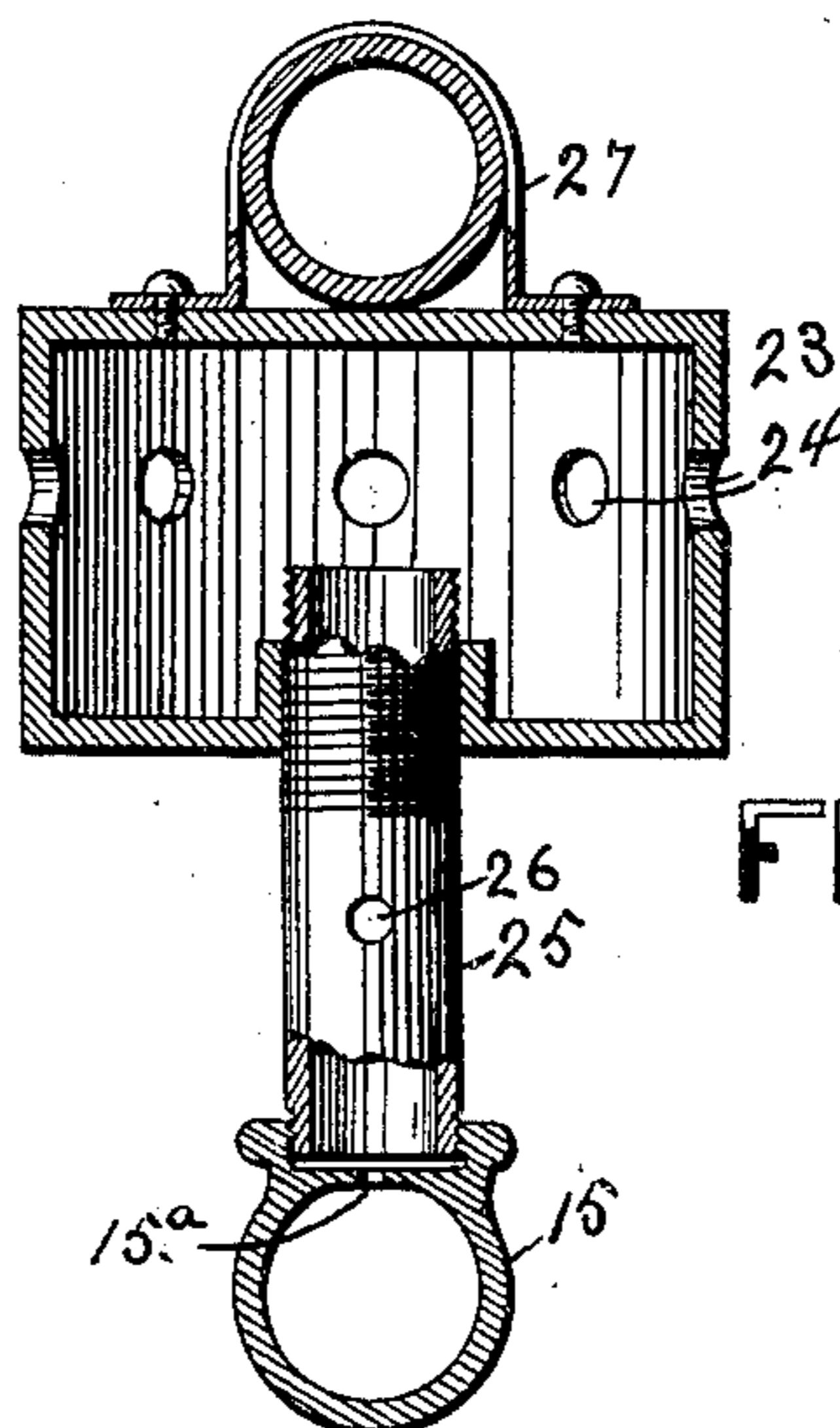


FIG. 6

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UNITED STATES PATENT OFFICE.

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BURNER FOR AUTOMOBILE-BOILERS.

SPECIFICATION forming part of Letters Patent No. 673,964, dated May 14, 1901.

Application filed September 13, 1900. Serial No. 29,911. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. REYNOLDS, of Lewiston, county of Androscoggin, State of Maine, have invented certain new and useful
5 Improvements in Burners for Automobile-Boilers, of which the following is a full, clear, and exact description.

My invention relates to improvements in burners, and particularly hydrocarbon-burners such as are used for automobile-boilers; and my invention is particularly adapted to such use, although it may be used for any other purpose where a burner of this class may be needed. It is well understood that a
15 successful burner for an automobile-boiler or for boilers of analogous classes must be compact and simple and should be capable of working noiselessly and with intense heat and at the same time without making any
20 offensive smoke or odor. It is also known that many burners of this type are relatively costly, largely because of the great amount of drilling that is required to make the necessary air and gas vents.

The objects of my invention are to meet these requirements and overcome the difficulties mentioned and to produce a very cheap and simple burner adapted to use gasoline, kerosene, and other fuel of like nature which is
30 easily volatilized; to produce a device of this character which is perfectly safe, will work without odor and smoke, and will generate great heat, and, further, to produce such a device and provide automatic means for controlling and substantially shutting off the fuel-supply whenever the steam-pressure rises above a desired point.

A further object of my invention is to produce a burner of this character which can be
40 operated easily and safely by any person of ordinary intelligence and which is not likely to clog or foul, so as to work imperfectly.

To these ends my invention consists of a hydrocarbon-burner the construction and organization of which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar figures of reference refer to
50 similar parts throughout the several views.

Figure 1 is a broken sectional elevation of the burner embodying my invention, showing the same applied to an upright tubular boiler. Fig. 2 is a broken plan view of the burner as applied to the boiler. Fig. 3 is an enlarged
55 detail vertical section of the automatic valve for regulating the fuel-supply and the means for working the valve. Fig. 4 is a cross-section on the line 44 of Fig. 3. Fig. 5 is a broken side elevation of a slightly-modified form of
60 the burner, in which the gas spreaders or turrets are separated and independent of the main ring; and Fig. 6 is a detail cross-section showing the construction of one of the gas-spreader turrets.

The burner is particularly adapted for use in connection with automobiles, and for this reason I have shown it as applied to a common upright form of tubular boiler 10, such as is largely used in automobiles, this boiler
70 having the customary combustion-chamber 11 and having the bottom sheet perforated, as shown at 12, to admit air. The burner 13 is provided with upper and lower parallel coils 14 and 15, which are preferably and
75 usually circular; but it will be understood, of course, that the general shape of the burner may be made to conform to the use to which it is to be put without affecting its principle. The upper coil is used for volatilizing the fuel,
80 which may be gasoline, kerosene, or other suitable fluid, and the two coils are connected by the pipe 16, which is provided with an automatic valve 17, to be more particularly described hereinafter.

The fuel-supply is taken from the tank 18 through the pipe 19, the latter having a check-valve 20 to prevent the gas from rushing back and a valve 21, by means of which the
90 supply may be controlled.

Interposed between the upper and lower coils 14 and 15 is the gas spreader and mixer, which in its preferred form comprises the hollow ring 22, on which at frequent intervals are the spreading and mixing turrets 23.
95 These turrets are in the form of a casing, circular in cross-section, and they are provided with numerous side ports or holes 24, through which the mingled fuel passes to the combustion-chamber 11. These turrets are each sup- 100

plied from the coil 15 by means of the pipe 25, which passes well up into the turret and has a small inlet 15^a, (see Fig. 6,) so that the intrushing volatilized fuel will strike the tops 5 of the turrets and be deflected and distributed and at the same time mix with the air, so as to issue through the said holes or ports 24 in condition to be quickly and completely consumed. The air is supplied 10 through the holes 26 in the pipes 25. It will be seen that the connection between the several turrets through the ring 22 insures a practically even distribution of the volatilized fuel and assists in the thorough mingling of the gas, and consequently when the 15 fuel issues to the combustion-chamber it is consumed so completely that an intense heat results and, moreover, there is practically no smoke or odor. Further, this arrangement 20 prevents a blowing out of the flame. It has been found, too, that the arrangement described prevents any noticeable noise in the burner.

It will be noticed that the area of the several ports 24 of each turret 23 is greater than 25 the inlet to the turret; but notwithstanding this fact the incoming volatilized fuel striking the top of the turret and being deflected will pass not only out through the ports 24, 30 but also down to the ring 22. Now if for any reason—as, for instance, some accidental clogging—the pressure is greater at one turret than the other the tendency of the hollow ring connection is for this pressure to be 35 equalized, and in any event the intrushing fuel is bound to pass into the ring 22 to a certain extent. The object of the ring will then be seen, and, further, by having all the parts in one integral casting a very compact, cheap, 40 and durable structure is produced.

The arrangement of the ring 22, with its turrets 23, is preferred; but it will be understood that an analogous result may be obtained by connecting independent turrets 23 45 (see Figs. 5 and 6) with the coil 15, and the turrets may be stiffened by connecting them with the coil 14 by means of straps 27, passed over the coil and secured to the turrets. This connection may also be carried out in 50 the style of burner shown in Figs. 1 and 2, if desired. In either case it will be seen that the burner is very compact and rigid and that the gas spreader and mixer being located below the coil 14 insures a thorough volatilization of the incoming fluid before the latter 55 reaches the combustion-chamber.

The valve 17 is adapted to automatically control the fluid-supply and is provided with a valve-stem 28, one end of which is reduced 60 to form the valve proper, 29, which fits a corresponding seat in the casing of the valve, and the valve 29 is provided with a small way or channel 30, so that if the valve is closed sufficient fuel will still pass to enable a slight 65 fire to be maintained in the combustion-chamber 11. Obviously this channel or way may be produced in the casing instead of in the

valve, or equivalent means may be used to permit a slight passage of fuel when the valve is closed. The valve-stem 28 works in a stuffing-box 31 of the valve 17, and it also extends through a steam-casing 32, which is 70 made in two parts and connects, by means of a pipe 33, with the steam-holding portion of the boiler 10. In the casing 32 is a transverse flexible diaphragm 34, which is secured 75 to the valve-stem 28. The valve-stem 28 extends outward through a stuffing-box 35 of the casing 32 and is provided with a coil-spring 36, which lies between the stuffing-box 35 and a 80 nut 37, which is adjustable on the threaded end of the valve-stem 28. There is nothing broadly new about this feature of operating the valve 29, although the combination shown is believed to be new. It will be seen that 85 the nut 37 may be adjusted so that the tension of the spring 36 may counterbalance a desired steam-pressure in the boiler. Consequently if the pressure rises above the desired point it will overcome the tension of 90 the spring 36 and acting on the diaphragm 34 will move the valve-stem 28 and close the valve 29, thus practically shutting off the fuel-supply and permitting the steam-pressure to drop, while, on the other hand, if the pressure drops below the desired point the tension 95 of the spring 36 will counterbalance the steam-pressure and will move the valve-stem 28 so as to open the valve and permit an increase of fuel-supply to the burner. It will 100 be seen, therefore, that the burner is thoroughly automatic so long as there is a supply of fuel for the burner and a supply of water in the boiler.

In starting the burner the valve 21 is closed 105 and a little oil is inserted in the starting-cup 38, which is located beneath the burner, after which the oil in the cup is ignited. When this oil is nearly consumed, the valve 21 is opened, after which the burner takes care of itself. 110

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

1. A burner of the kind described, comprising upper and lower coils suitably connected 115 and held in parallel relation, the upper coil serving to receive the fuel-supply, and a gas spreader and mixer arranged between the two coils, said spreader and mixer comprising a series of turrets with side openings or 120 escape-ports in combination with pipes having air-holes leading from the lower coil well up into the turrets.

2. A burner of the kind described, comprising suitably-connected coils held in parallel 125 relation, a hollow ring or casing arranged between the two coils, a series of turrets supported on and connected with the ring, said turrets having side openings or ports, and pipes leading from the lower coil and discharging 130 well up into the turrets.

3. A burner of the kind described comprising suitably-connected coils held in parallel relation, a gas spreader and mixer arranged

between the two coils comprising a casting of the same general outline as the coils, this casting being in the form of a ring and having raised turrets with side ports therein rising at intervals from the ring, and pipes leading from the lower coil and discharging into the turrets.

4. A burner of the kind described comprising an upper coil to receive the fuel to be volatilized, a lower coil, a valve-controlled pipe connecting the two coils, a gas spreader and mixer having a hollow ring with turrets ris-

ing therefrom and provided with side openings, these turrets being arranged beneath the upper coil, and pipes leading from the lower coil and discharging into the turrets, substantially as described.

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

FRANK A. REYNOLDS.

Witnesses:

WILBUR H. JUDKINS,
FRANK A. CONANT.