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2,331,663

OIL BURNER

Filed April 11, 1940

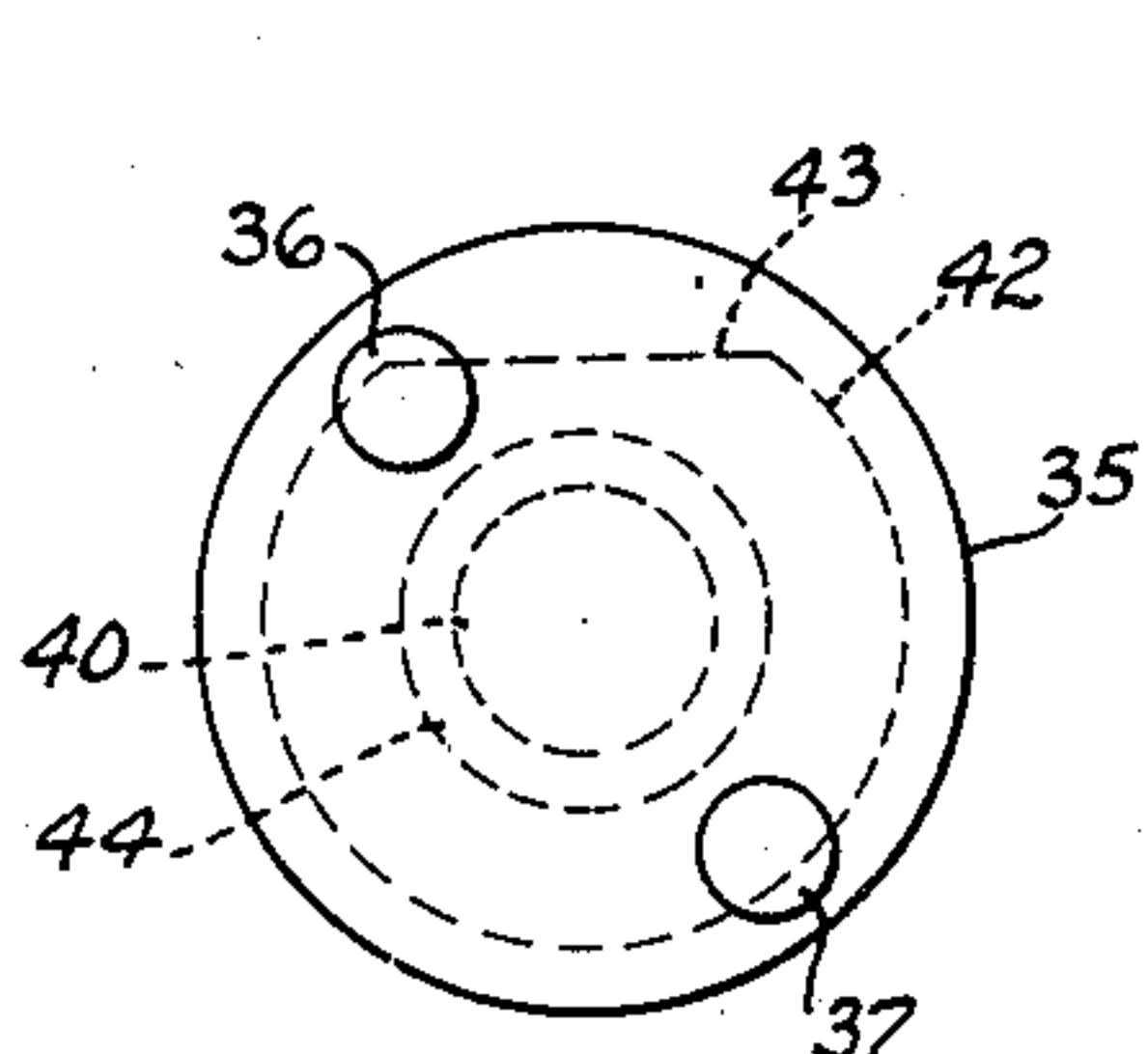


FIG. 5

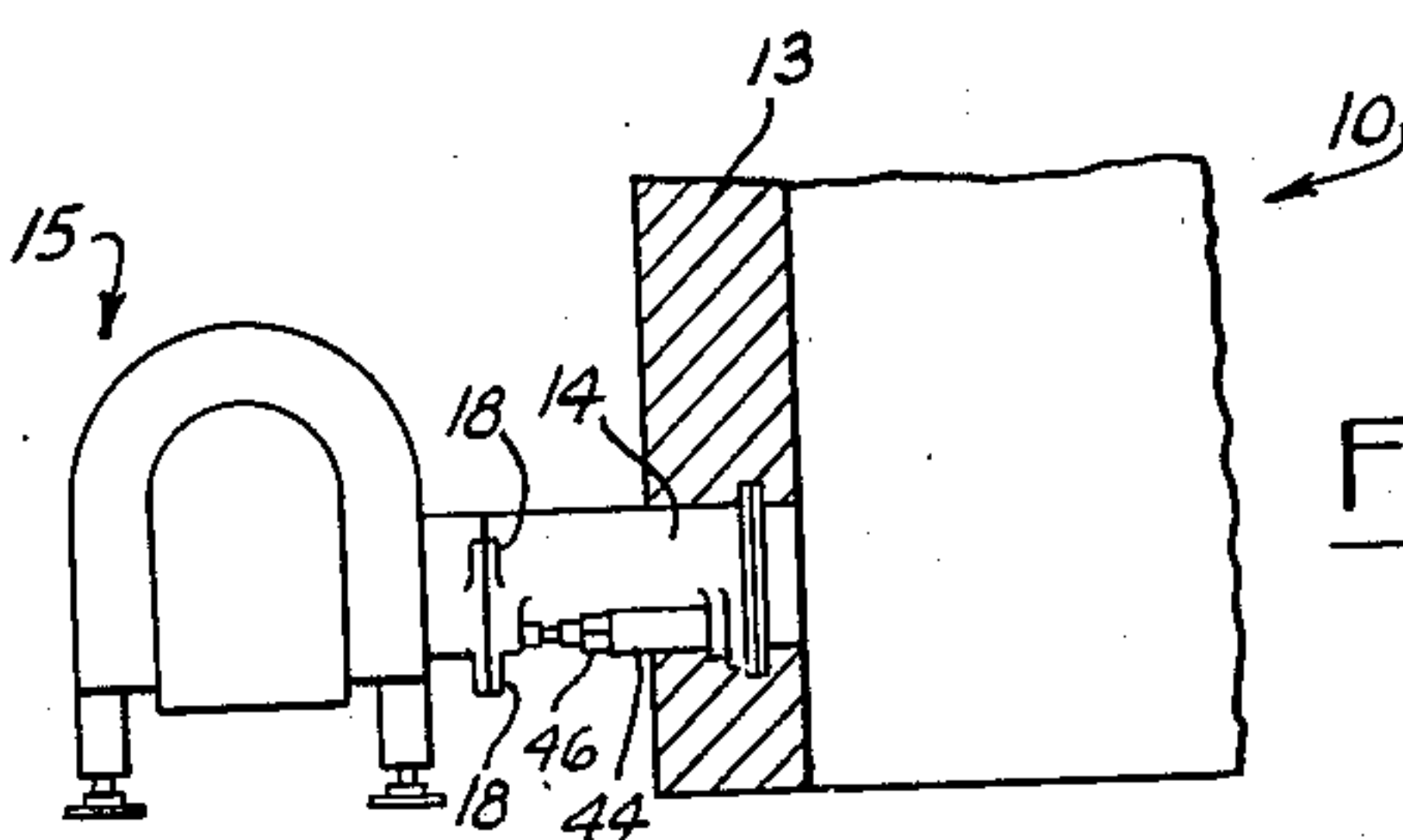


FIG. 1

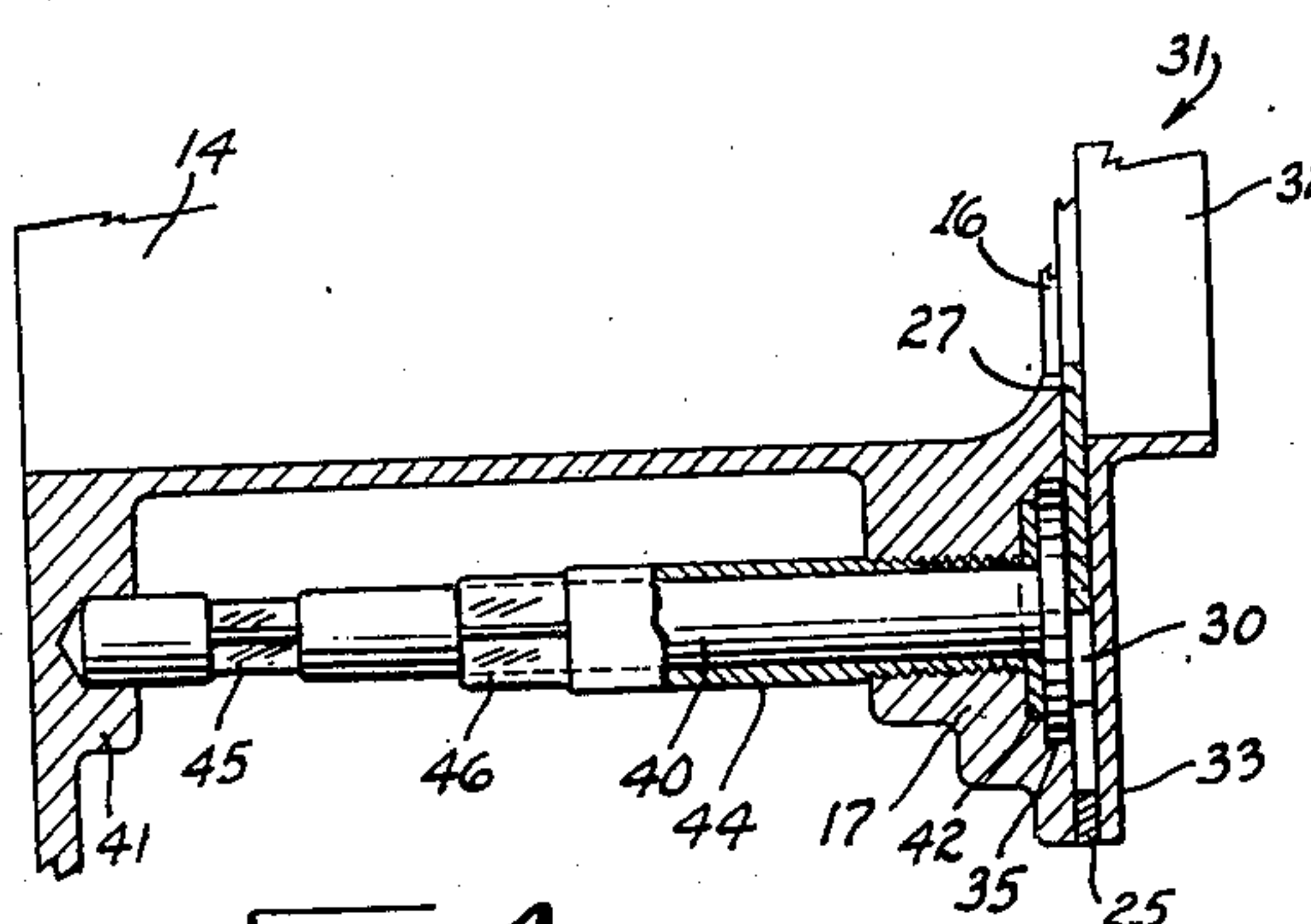


FIG. 4

FIG. 3

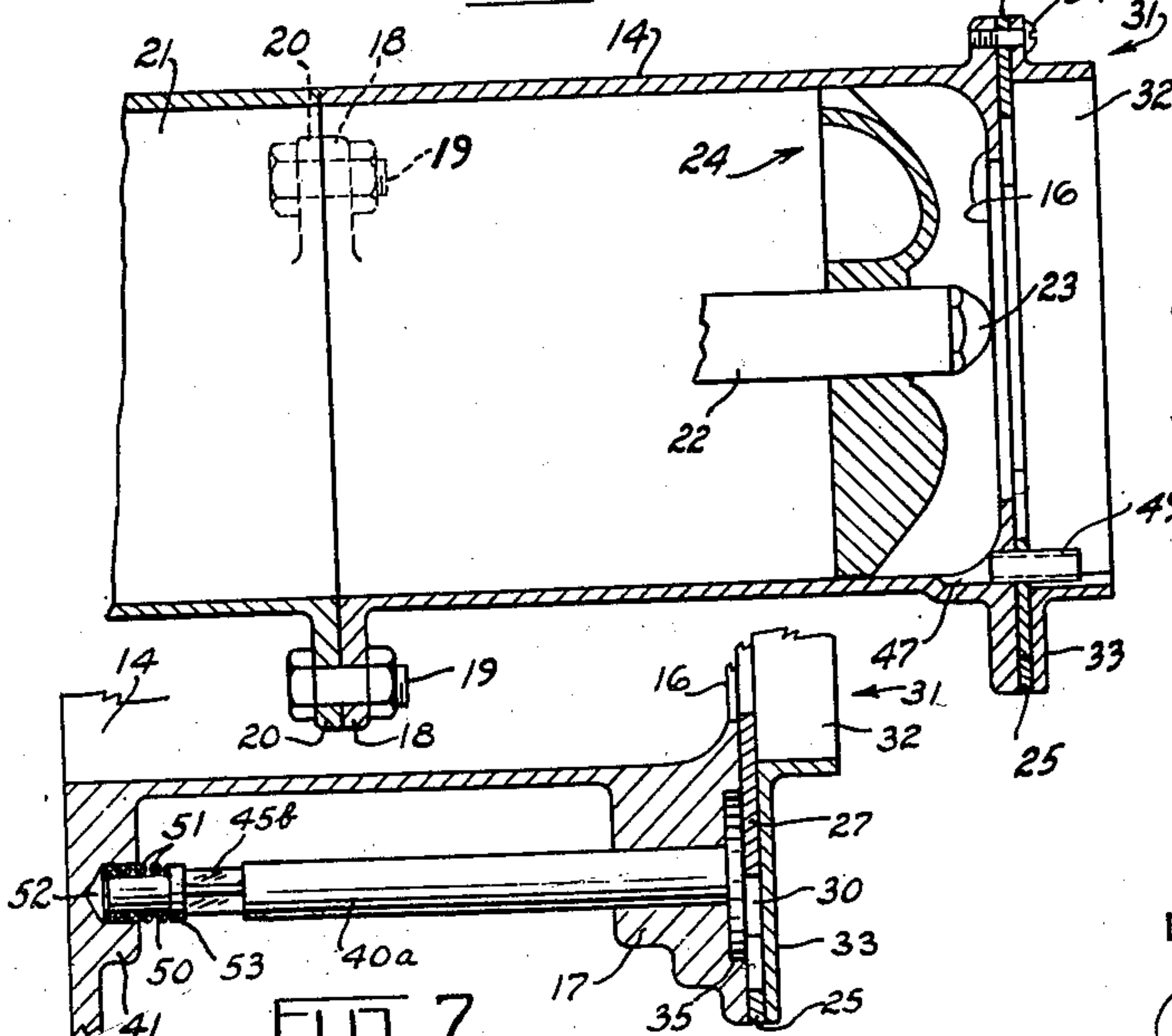


FIG. 7

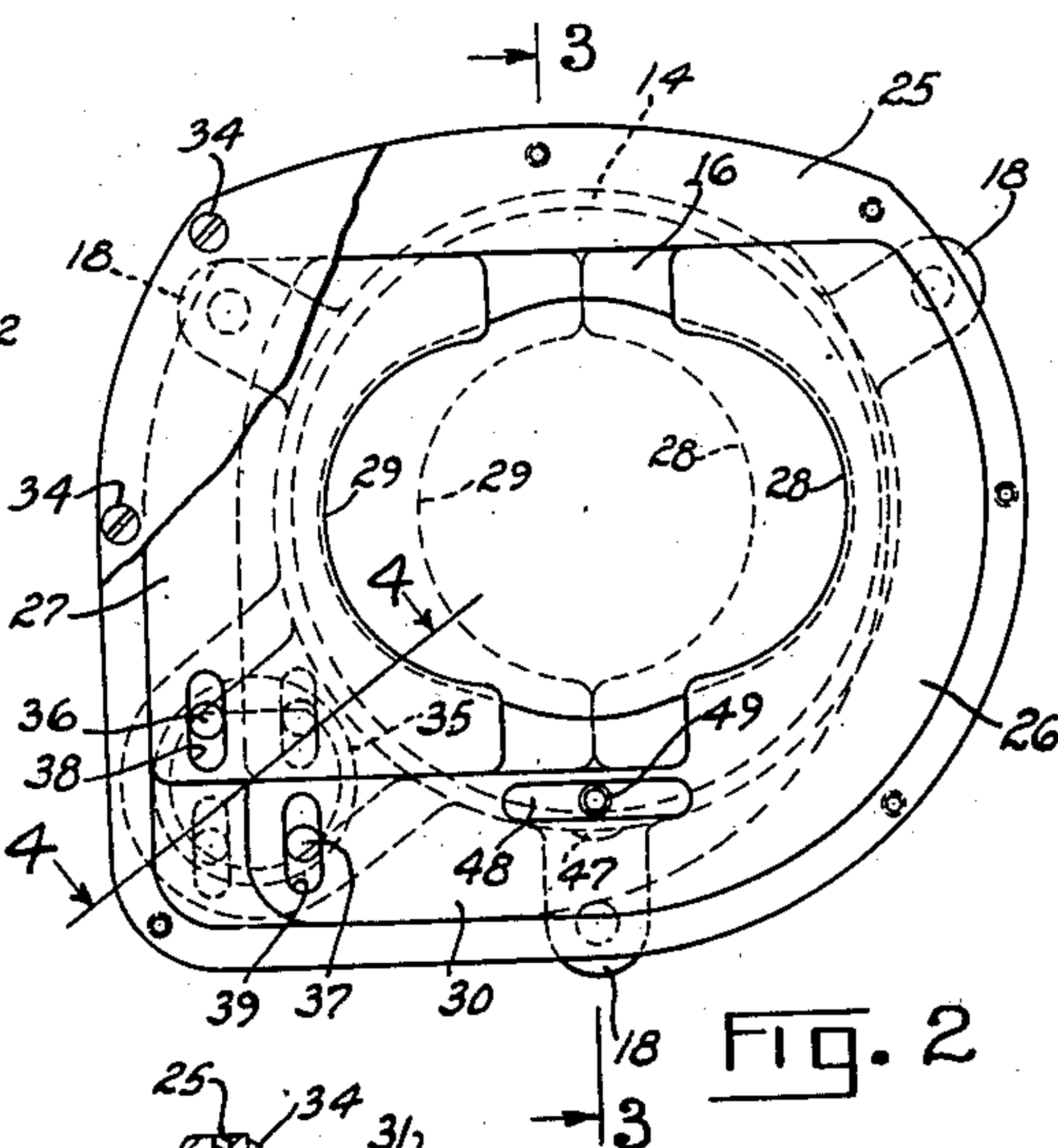


FIG. 2

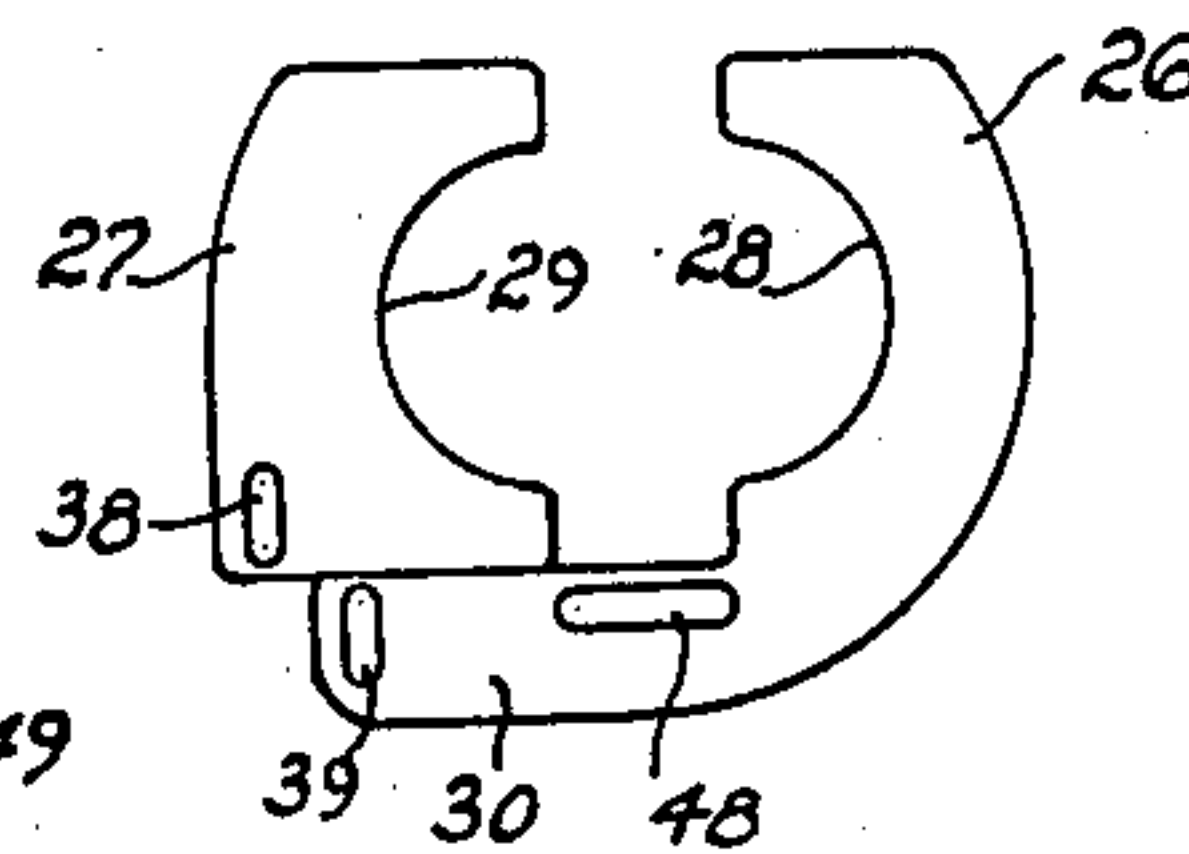


FIG. 6

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OIL BURNER

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8 Claims. (Cl. 158—1.5)

This invention relates to new and useful improvements in oil burners and has particular relation to an adjustable means for controlling the flame of a gun type of oil burner.

The objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein a satisfactory embodiment of the invention is shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawing—

Fig. 1 is an assembly view showing my improved burner as installed in a furnace;

Fig. 2 is an end view of the burner with parts broken away;

Fig. 3 is a longitudinal sectional view through the forward end portion of the burner;

Fig. 4 is a detailed sectional view taken as along the line 4—4 of Fig. 2;

Fig. 5 is an enlarged plan view showing a part employed;

Fig. 6 is an elevational view showing a pair of gates employed; and

Fig. 7 is a view similar to Fig. 4 but showing a modification.

Referring in detail to the drawing at 10 is shown a portion of a furnace including a front wall 13 in which is mounted the discharge portion of an oil burner air blast pipe 14 forming part of a burner generally designated 15 and located at the forward side of the furnace. Burner 15 is a gun-type burner. The present invention is concerned with the air blast pipe and particularly with the discharge end thereof.

Said pipe includes a flange 16 which extends beyond the inner and outer surfaces of the pipe and provides a flat end surface for a purpose to be described. At one point said flange is enlarged or thickened providing a boss 17. The inner end of the pipe section 14 is provided with lugs 18 which are secured by bolts 19 to the corresponding lugs 20 of a pipe section 21.

Within the pipe 14 and extending longitudinally thereof is an oil supply tube 22 provided at its forward end with an oil spray nozzle 23 located immediately adjacent the flange 16. Disposed about the forward end of pipe 22 is an air whirler generally designated 24 and preferably of the type disclosed in my Patent 2,146,250 of February 7, 1939. It will be understood that the burner 15 includes a pump and fan or blower

whereby a stream of air is forced through the pipe 14 to take up and mix with the oil sprayed from the nozzle 23 and form a combustible mixture therewith.

This invention is concerned with the control of the flame of the burner. Disposed against the outer side of the flange 16 and shaped to follow the contour of the outer edge thereof is a frame or spacer means 25, the inner edges of which comprise lateral guides for a pair of gates 26 and 27 respectively. These gates (see Fig. 6) comprise a pair of flat plate-like members of which the gate 26 is provided in one edge with a recess or cut-out 28 while the gate 27 is provided with a corresponding recess 29.

The upper and lower edges of gate 26 are guided by the edges of the frame 25 and such gate includes an extension 30, the inner edge of which is a guide for the lower edge of gate 27, while the upper edge of such gate 27 is guided by the inner upper edge of the frame 25. An end piece 31 completes the discharge end of the air blast pipe and comprises a short pipe-like section 32 and a flange 33 which latter overlies portions of the gates 26 and 27 whereby to retain them within the frame 25. Bolts or other securing means 34 pass through the flange 33, the frame 25, and the flange 16 whereby the piece 31 and the frame 25 are secured to the section 14 and serve to secure the gates 26 and 27 in place but in such manner that said gates may be adjusted relative to one another and to the other mentioned parts.

In the forward portion of the boss 17, immediately under the free end of gate extension 30 and the lower part of gate 27 is a head 35 in the form of a disc and this head is provided with forwardly projecting pins 36 and 37 entering slots 38 and 39 in the gate 27 and extension 30 respectively. Head 35 is rigid or integral with a rearwardly extending bar 40, the rear end of which has bearing in a lug 41 formed with the outer wall of the pipe 14.

Disposed under the head 35 is a washer-like member 42 having a flattened edge portion 43 engaging a correspondingly shaped portion of the boss 17 whereby the washer may not rotate about the bar 40. A sleeve or tubular piece 44 is disposed about the forward portion of bar 40 and threaded into the boss 17 and into engagement with the rear side of the washer 42. With the described construction it will be clear that on the bar 40 being turned, the head 35 will also be turned and due to its pin and slot connections with the gates 26 and 27, the latter will

be moved toward or from one another depending on the direction in which the head is turned.

The full lines in Fig. 2 show the gates in their outermost positions and when they are so located the opening through the flange 16 is substantially fully exposed. The dotted lines in Fig. 2 show the gates in their innermost position and it will be seen that when the gates are in such position, with their forward opposing edges abutting, the effective size of the discharge opening beyond the nozzle 23 is very materially reduced.

Bar 40 is provided with a flattened or squared portion 45 to be engaged by a wrench or the like and tube 44 is provided with a similarly shaped portion 46 for the same purpose. An inspection of Fig. 1 will show that such portions 45 and 46 are at the forward side of the furnace so that the parts may be engaged by a wrench after the burner is completely installed and sealed in place. When the burner is in place and in operation, the expert making the installation rotates the bar 40 so as to move the gates toward and from one another until the flame desired for the particular installation is obtained.

Heretofore various sizes of so-called reducer rings have been provided for installation in the pipe 14 but these are difficult to install after the burner is once set up and in addition, there is no adjustment except as provided by the different sizes of rings. With the present arrangement the gates may be minutely adjusted toward and from one another until the exact flame desired is obtained. If the gates are nearly closed and the burner of relatively large capacity, a hard long flame is obtained and the operator then makes an adjustment to open the gates an additional amount.

When the exact desired flame is obtained, the operator applies a wrench to the tube portion 46 and threads the latter up causing its inner end to force the washer 42 against the head 35 and the latter against the gates locking the parts in adjusted position. The described turning of the sleeve 44 does not result in the disturbing of any adjustments of the gates since the sleeve bears against the washer 42 and, owing to the flat sided construction of the latter at 43, it may not rotate and thus turning movement of the sleeve is not imparted to the head.

Cutting off of the burner may result in a few drops of oil leaking from the nozzle 23 and if so they do not drop from the forward tip of the nozzle but run down the end thereof and drop from the lowest point of the nozzle. Thus, these drops do not fall into the space in which the gates move and will not carbonize and cause any binding or locking of the latter although it is noted that once these gates have been adjusted at the time of installation, it is not planned that the adjustment should be changed by anyone other than an expert on burners.

To remove any drops of oil falling from the nozzle as above described, I form a depression 47 in the bottom wall of pipe 14 and provide an opening in the flange 16 aligning with said depression and then provide a slot 48 in the extension 30 of the gate 26. In this opening and slot I mount a short nipple 49 through which any drops of oil falling from the nozzle may pass. In Fig. 3 the nipple 49 will discharge onto the pipe-like portion 32 of the part 31 from which the oil may drain or be evaporated and consumed on the burner next being operated.

With the disclosed construction, I find that

with one size of burner I can take care of all requirements of the domestic trade where heretofore it has been necessary to manufacture and stock three different sizes of burners. The gates 26 and 27 are adjustable to adapt the burner for different capacities of fuel consumption. The use of the present structure eliminates the necessity for the four sizes of choke rings heretofore provided and of which the one best suited to any particular installation has heretofore been necessary. For example, heretofore one size of choke ring was used where a given capacity per hour was desired; a different size choke ring when a different capacity per hour is desired, etc.

Referring to the modification of Fig. 7, it is noted that a somewhat simpler construction is provided in that the tube 44 and washer 42 have been dispensed with thus eliminating the necessity for the threading of the opening in the boss 17. However, the bar 40a including the wrench engaging portion 40b has been provided with a reduced end portion 50, about which is disposed a coil spring 51 partially entering a socket 52 in the enlargement 41 and bearing against the shoulder 53 of the rod or bar 40a. Spring 51 is a heavy stiff spring and constantly presses rod 40a in a direction to press the head 35 against the gates 26 and 27 whereby there will be no casual movement of the parts. To adjust the gates a wrench is applied to part 45b and the rod 40a is turned and the stiff spring 51 keeps the parts in their adjusted positions.

Having thus set forth the nature of my invention, what I claim is:

1. In an oil burner, an air blast pipe, an oil supply tube in said pipe, a nozzle on said tube adjacent the discharge end of said pipe, an inwardly directed flange on the discharge end of said pipe, gates at the outer side of said flange, means mounting said gates adjacent said flange for movement toward and from one another to vary the effective diameter of the pipe outlet, and means outside of said pipe and extending longitudinally thereof and operable to adjust said gates and secure them in adjusted positions.

2. In an oil burner, an air blast pipe, an oil supply tube in said pipe, a nozzle on said tube adjacent but inwardly of the discharge end of said pipe, an inwardly directed flange on the discharge end of said pipe, gates, means mounting said gates on said flange for movement toward and from one another to vary the effective diameter of the pipe outlet, means for adjusting said gates, said flange having an opening therethrough immediately above the lower internal surface of said pipe, one of said gates having a slot therein registering with said opening, and a drain nipple disposed in said opening and slot and extending to the outer side of said gates for draining oil from the interior of said pipe.

3. In an oil burner, an air blast pipe, an oil supply tube in said pipe, a nozzle on said tube adjacent the discharge end of the pipe, gates at the discharge end of the pipe, means mounting said gates on the pipe for movement toward and from one another to vary the effective diameter of the discharge end of the pipe, each of said gates having a slot therein, a head rotatably mounted adjacent the discharge end of the pipe, laterally spaced pins on said head eccentric to the axis thereof and entering said slots whereby on turning of the head the gates are moved toward or from each other, and means outside said pipe and operable to turn said head.

4. In an oil burner, an air blast pipe, an oil supply tube in said pipe, a nozzle on said tube adjacent the discharge end of the pipe, gates at the discharge end of the pipe, means mounting the gates on the pipe for movement toward and from one another to vary the effective diameter of the discharge end of the pipe, each of said gates having a slot therein, a head rotatably mounted adjacent the discharge end of the pipe, laterally spaced pins on said head eccentric to the axis thereof and entering said slots whereby on turning of the head the gates are moved toward or from each other, means outside said pipe and operable to turn said head, and other means outside said pipe and operable to force said head against said gates and thereby lock the latter in their adjusted positions.

5. In an oil burner, an air blast pipe, an oil supply tube in said pipe, a nozzle on said tube adjacent the discharge end of said pipe, gates at the discharge end of the pipe, means mounting the gates on the pipe for movement toward and from one another to vary the effective diameter of the discharge end of the pipe, each of said gates having a slot therein, a head rotatably mounted adjacent the discharge end of the pipe, laterally spaced pins on said head eccentric to the axis thereof and entering said slots whereby on turning of the head the gates are moved toward or from each other, means outside said pipe and operable to turn said head, a washer under said head, means holding said washer against turning movement, and turnable means engaging said washer and operable to force the same against said head and the latter against the gates to secure the gates in their adjusted positions.

6. In an oil burner, an air blast pipe, an oil supply tube in said pipe, a nozzle on the tube adjacent the discharge end of the pipe, gates at the discharge end of the pipe, means mounting said gates on the pipe for movement toward and from one another to vary the effective diameter of the discharge end of the pipe, each of said

gates having a slot therein, a head rotatably mounted adjacent the discharge end of the pipe, laterally spaced pins on said head eccentric to the axis thereof and entering said slots whereby on turning of the head the gates are moved toward or from each other, means outside said pipe and operable to turn said head, and a stiff spring associated with said means and urging it in a direction maintaining said head pressed against said gates whereby the latter are held against casual movement.

7. In an oil burner, an air blast pipe, an oil supply tube in said pipe, a nozzle on said tube adjacent and substantially concentric with the discharge end of the pipe for spraying oil into the air stream moving from said pipe, plate-like gates mounted in the same plane on the discharge end of the pipe for relative sliding movement to and from abutting relation, said gates recessed in their opposing edges whereby when they are moved to abutting relation an opening substantially concentric with the discharge end of the pipe is defined by said gates, and means operable from the exterior of said pipe to adjust said gates toward and from one another.

8. In an oil burner, an air blast pipe, an oil supply tube in said pipe, a nozzle on the end of said tube and located substantially at the discharge end of said pipe for spraying oil into the air stream moving from said pipe, flat plate like gates, means mounting said gates on the discharge end of said pipe for sliding movement toward and from one another in directions transversely of said pipe, operating means extending rearwardly from said discharge end of the pipe, means mounting said operating means for movement relative to said pipe, and connections between said operating means and said gates whereby on predetermined movements of said operating means said gates may be moved transversely of the end of said pipe toward and from one another to partly close the discharge end of the pipe when moved toward one another.

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