July 6, 1948.

D. GILES

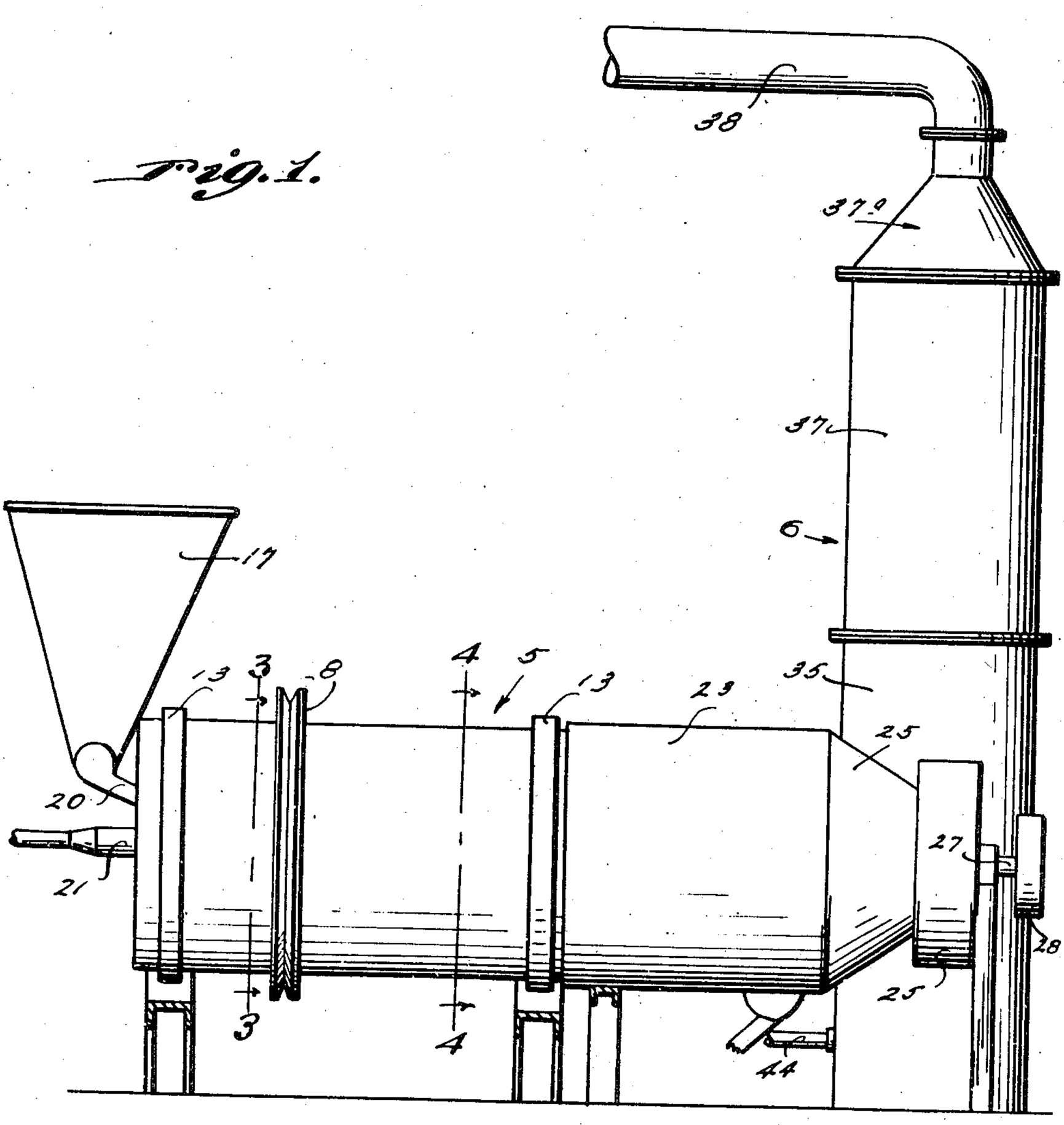
2,444,646

SMELTING FURNACE

Filed April 4, 1944

4 Sheets-Sheet 1

Fig. 1.



Inventor

Dee Giles

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

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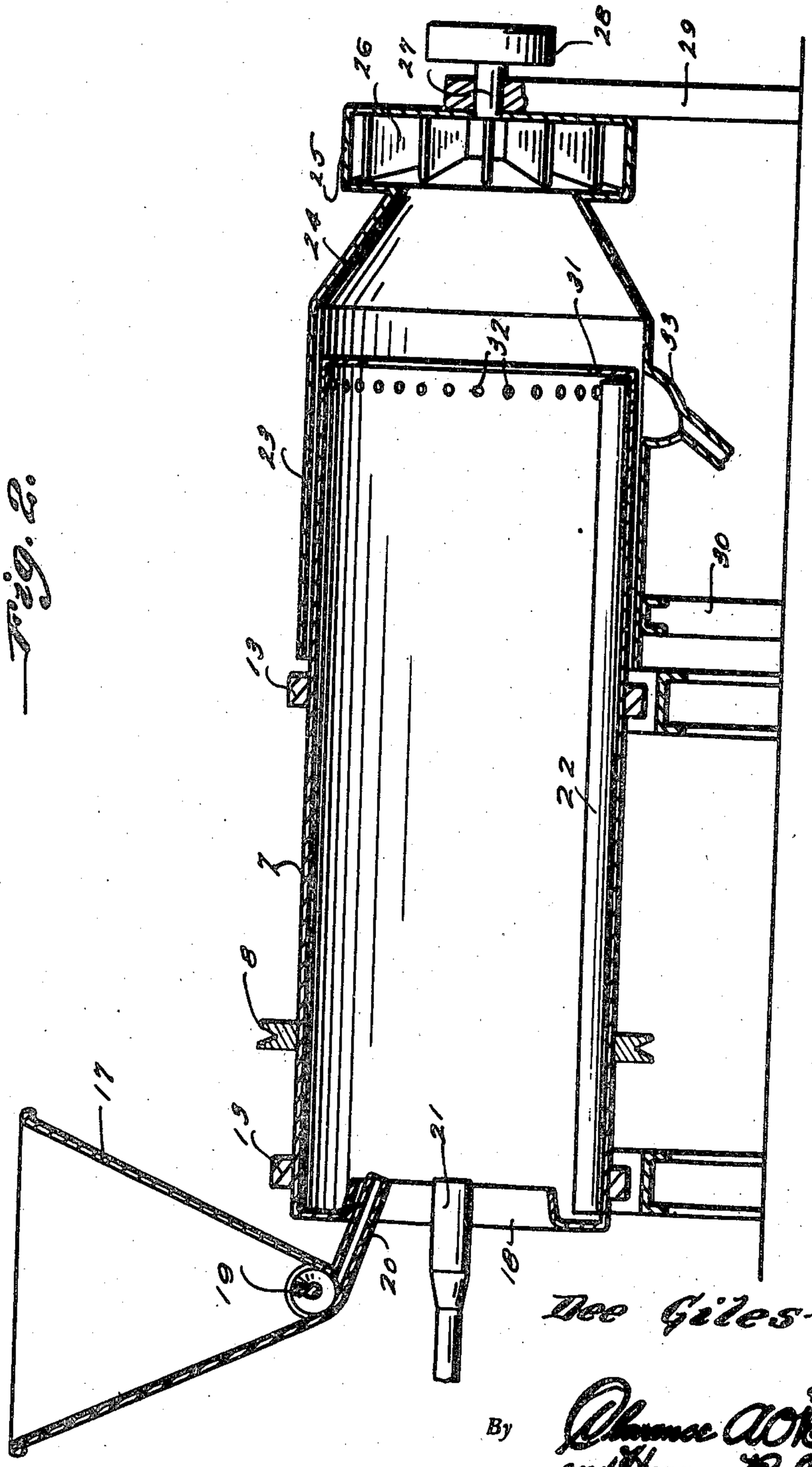
Fig. 2.



Inventor

Dee Giles

By Thomas A. O'Brien and Harvey B. Jacobson

Attorneys

July 6, 1948. D. GILES 2,444,646

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4 Sheets-Sheet 3

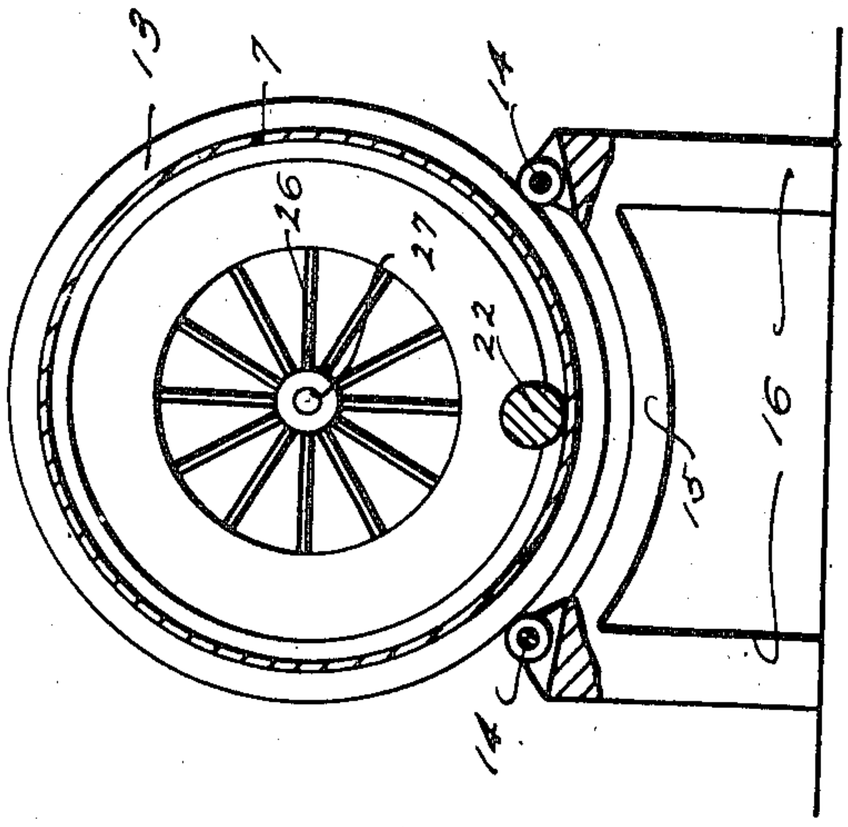

Fig. 2.

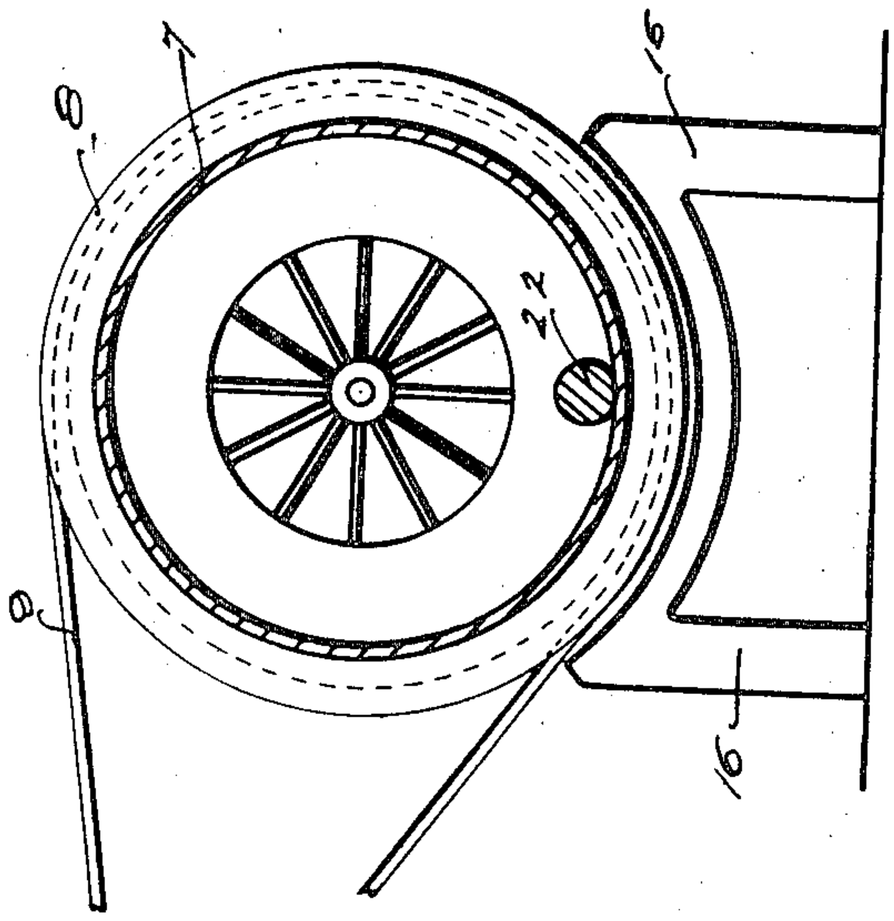

Fig. 3.

Fig. 5.

Inventor

Dee Giles

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

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D. GILES

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Fig. 6.

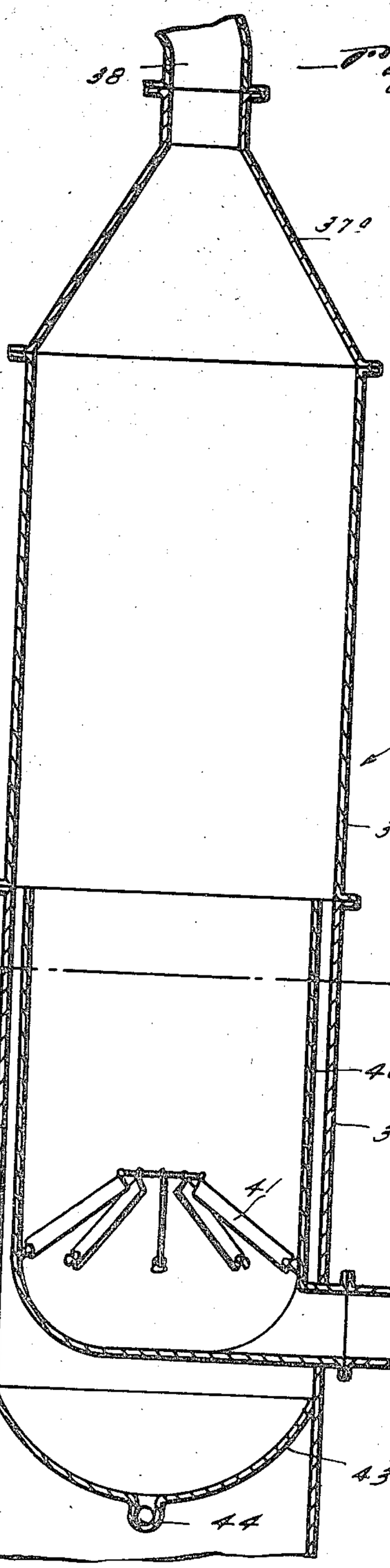
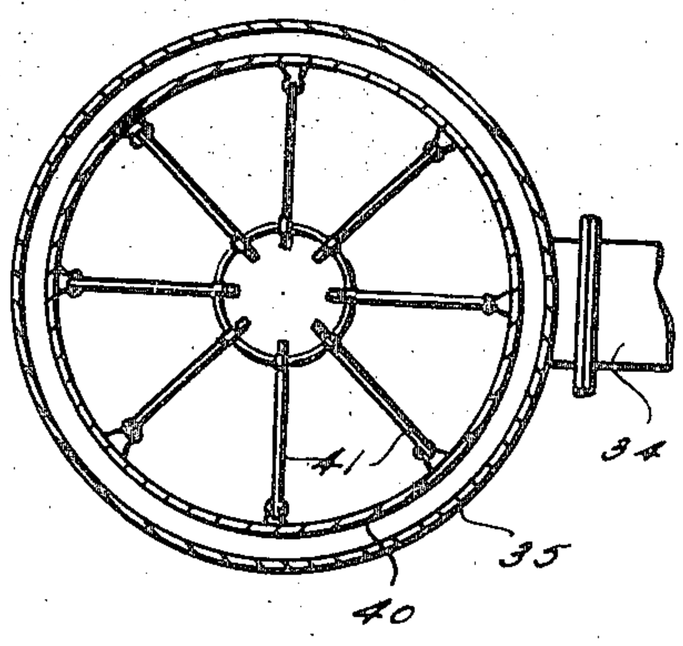


Fig. 7.



Inventor

Dee Giles

By Clarence O'Brien and Harvey B. Jackson

Attorneys

Patented July 6, 1948

2,444,646

UNITED STATES PATENT OFFICE

2,444,646

SMELTING FURNACE

Dee Giles, Farmington, N. Mex.

Application April 4, 1944, Serial No. 529,530

2 Claims. (Cl. 266—33)

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This invention relates to new and useful impovements in machines for separating precious or semi-precious metals or minerals from the insoluble parts of the quartz or other base material which retains the same.

An important object of the invention is to provide a smelting or separating unit of extremely low cost, simple construction and positive action in operation.

Another important object of the invention is to provide a machine of the character stated which will be considerably more efficient in recovering precious metals from ore than most machines of the simplified types comparative with the present machine.

Other objects and advantages of the invention will become apparent to the reader of the following description.

In the drawings—

Figure 1 is a side elevational view of the entire apparatus.

Figure 2 is a longitudinal vertical sectional view through the mounting unit.

Figure 3 is a cross sectional view taken substantially on the line 3—3 of Figure 1.

Figure 4 is a cross sectional view taken substantially on the line 4—4 of Figure 1.

Figure 5 is a perspective view of the gravity bar.

Figure 6 is a fragmentary vertical sectional view through the centrifugal recovery unit.

Figure 7 is a section on the line 7—7 of Figure 6.

Referring to the drawings wherein like numerals designate like parts, it can be seen that the apparatus is made up of a smelting unit generally referred to by numeral 5 and a recovery unit generally referred to by numeral 6.

The smelting unit consists of a rotary drum 7, the same having a pulley 8 driven by a belt 9, the latter being driven by a suitable source of power.

The drum 7 has external rings 13 which are supported by rollers 14 mounted in cradles 15 supported by legs 16.

A hopper 17 is provided at the open end 18 of the drum 7, this having an agitating and feed screw 19 in the bottom thereof for thoroughly pulverizing the coal dust or the like that is supplied from the hopper 17 by way of a chute 20 to the interior of the drum 7. Along with this finely pulverized coal is the finely pulverized ore, both being fed together into the drum 7 where the coal dust is ignited by the flames from an oil burner or the like 21. This results in the mounting of the precious metal in the fragments of

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ore and the small pellets of metal will gravitate to the bottom of the drum 7 lodging near a gravity roll or bar 22. This heavy rolling bar crushes the mounted material separating the metal from the slag and further, this bar serves to keep the inside of the combustion chamber clean.

Over the other end of the drum 7 is disposed and overlaps for substantially one-third of its length a sleeve 23, the outer end of this sleeve having a tapered portion 24 meeting and being connected to a fan housing 25 in which a suction fan 26 is located, this fan being on a shaft 27 driven by a pulley 28. A support 29 is provided for the fan and sleeve 23 at its outer end, and a suitable support 30 is provided for the inner end of the sleeve, it being observed that the sleeve is radially spaced from the corresponding end of the drum to permit the entrance of air into the sleeve, the air being drawn inwardly by the action of the suction fan 26.

The portion of the drum 7 enclosed by the sleeve 23 has an inwardly disposed flange 31 and this end portion of the drum has a plurality of circumferentially spaced openings 32 through which accumulated concentrates can pass to reach a sump 33 in the bottom of the sleeve 23.

It can now be seen that the residue of the ore and uncollected fragments of precious metal are delivered by the fan 26 through a conduit 34 to the recovery unit generally referred to by numeral 6 (see Figure 6).

The recovery unit 6 consists of a vertically disposed stack divided into sections 35, 36 and provided with a tapered head 37 connected to a flue 38.

The conduit 34 extends into the lower section 35 of the stack in connection to the lower portion of a well which is radially spaced inwardly from the section 35 of the stack and denoted by numeral 40.

A plurality of inclined deflectors 41 are located in the lower portion of the well 40 and through these deflectors the products of combustion including the remaining fragments of metal must pass and in so doing are whirled so that they effect a turbulent motion, sweeping the side wall of the stack section 37. The metal fragments due to their specific gravity will stop against the inside of the stack and then gravitate down, falling between the stack and the well 40 and being collected by a basin 43. This concentrate can pass through a suitable discharge opening 44.

While the foregoing specification sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and

materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter.

Having described the invention, what is claimed as new is:

1. A smelting unit for ore comprising a rotary drum, a hopper for containing combustible material and finely crushed ore, an outlet from the hopper to the interior of the drum and a burner protruding into the drum, and a freely rotatable roll gravitating in the drum.

2. A smelting unit for metal bearing ore comprising a rotary drum, a hopper for containing combustible material and finely crushed ore, an outlet from the hopper to the interior of the drum at one end of the drum, a burner protruding into the drum, a concentrate outlet at the other end of the drum, a sleeve surrounding said other end of the drum and spaced radially therefrom, a sump in the bottom of the sleeve for receiving concentrates passing into the sleeve from said concentrate outlet, a fan casing on the sleeve into which one end of the sleeve opens, said casing having a discharge conduit leading therefrom,

and a suction fan in said casing for drawing the residue of ore and uncollected fragments of metal out of said sleeve and discharging the same out of said conduit.

DEE GILES.

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