

No. 617,712.

Patented Jan. 17, 1899.

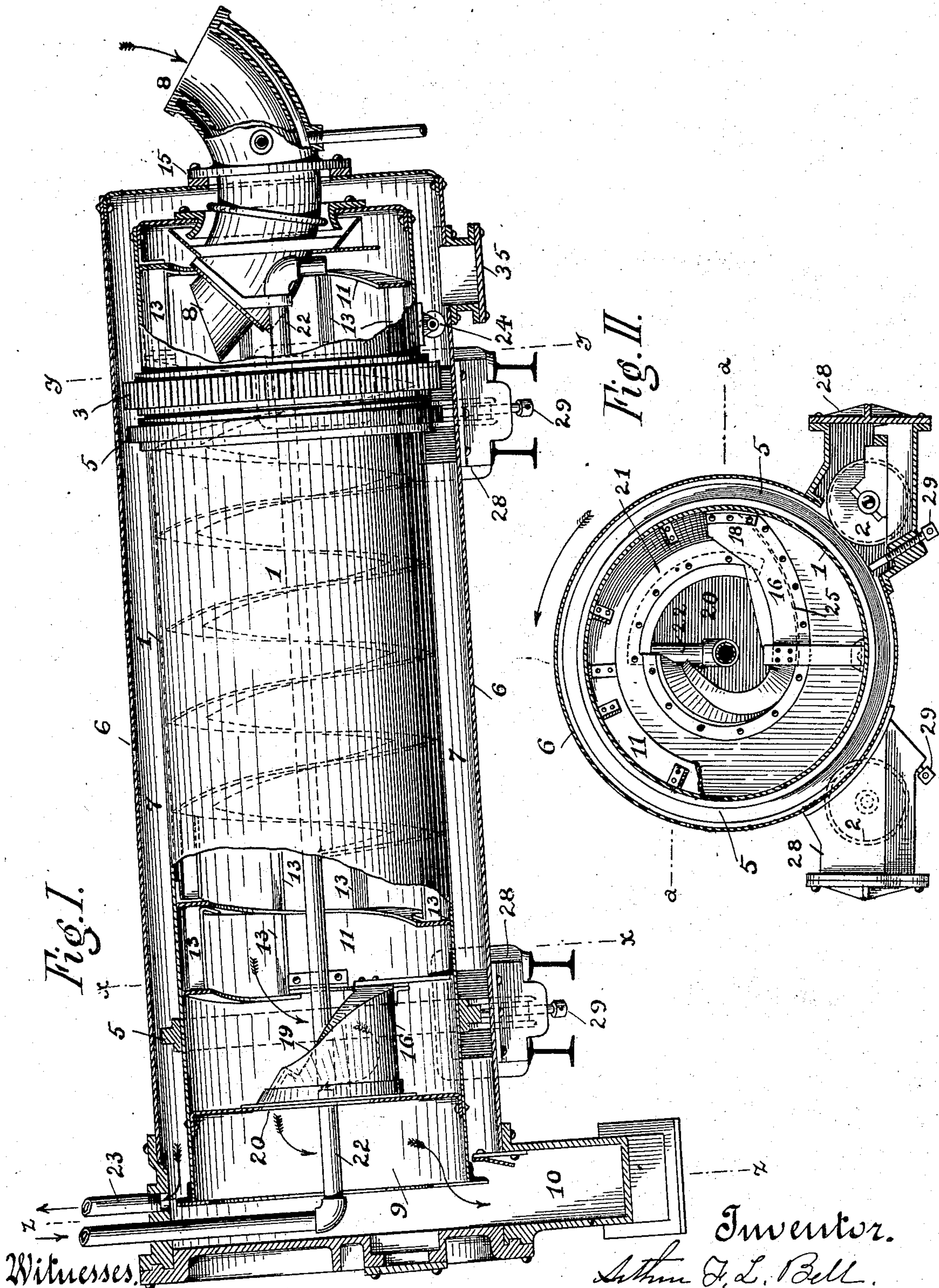
A. F. L. BELL.

MACHINE AND APPARATUS FOR EXTRACTING AND REFINING ASPHALT.

(Application filed July 29, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.  
*F. H. H. H. H. H.*  
*H. Sanderson.*

Inventor.  
*A. F. L. Bell.*  
By *J. Richards* Atty.



A. F. L. BELL.

MACHINE AND APPARATUS FOR EXTRACTING AND REFINING ASPHALT.

(Application filed July 29, 1897.)

(No Model.)

2 Sheets—Sheet 2.

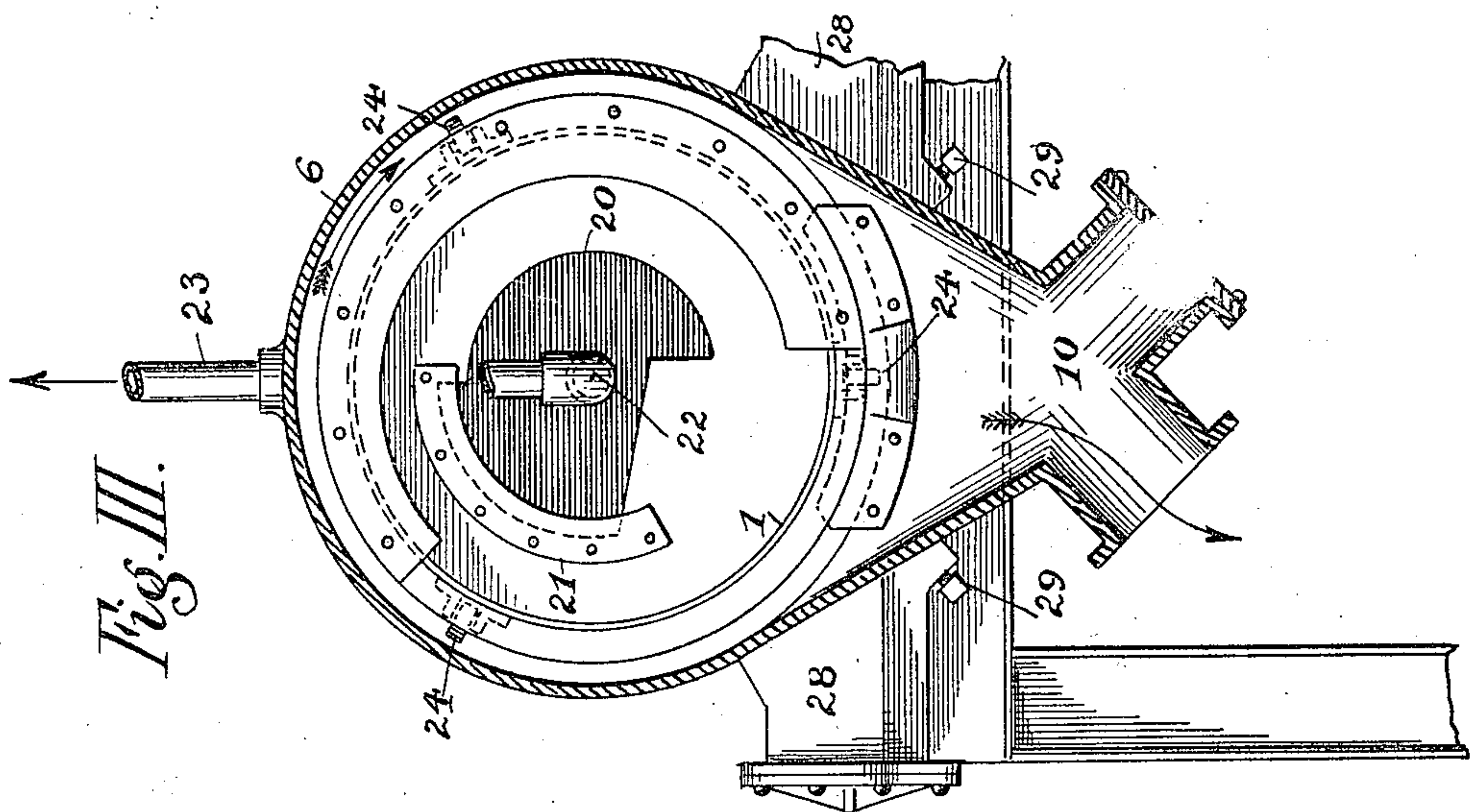


Fig. III.

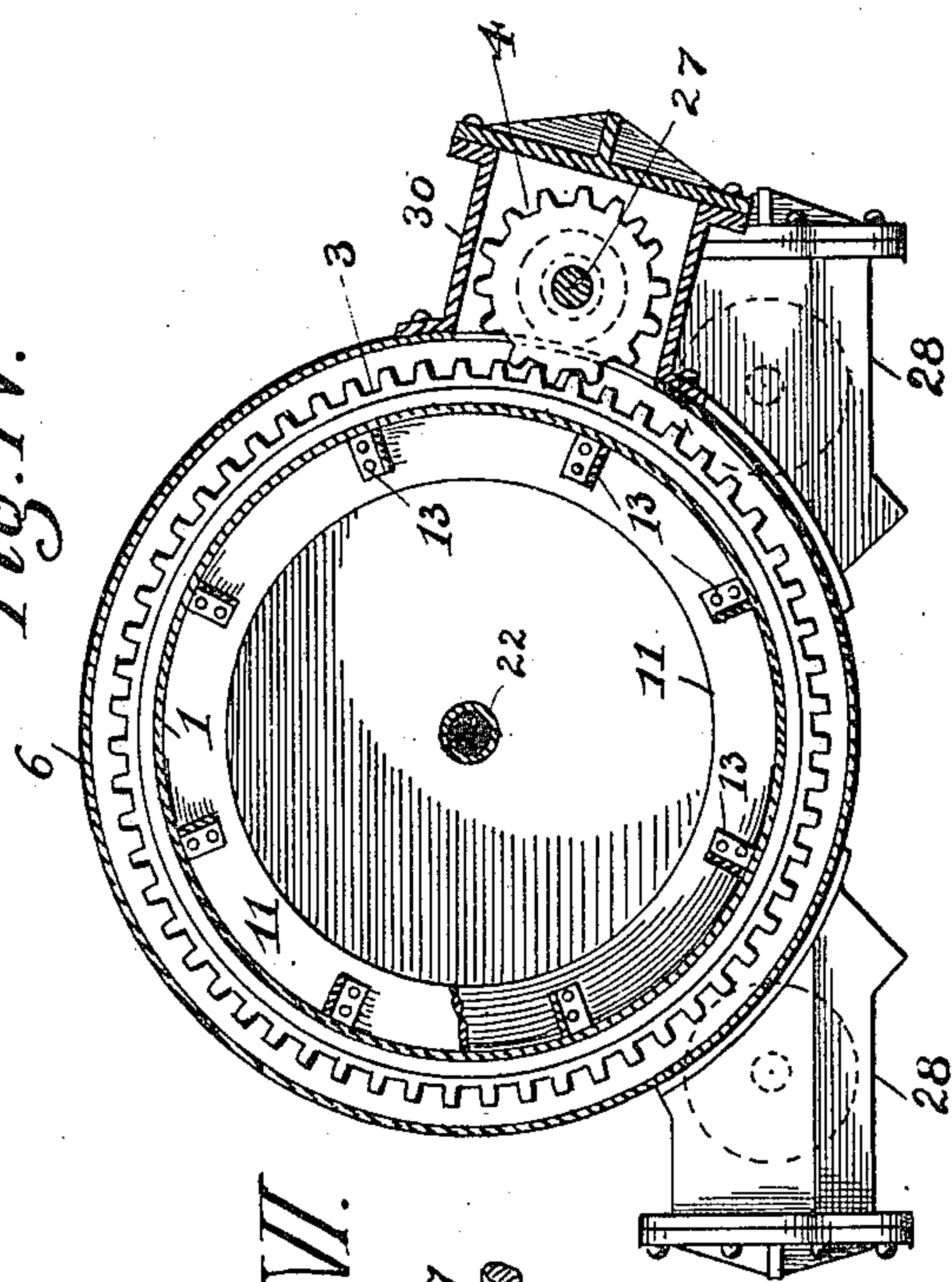


Fig. IV.

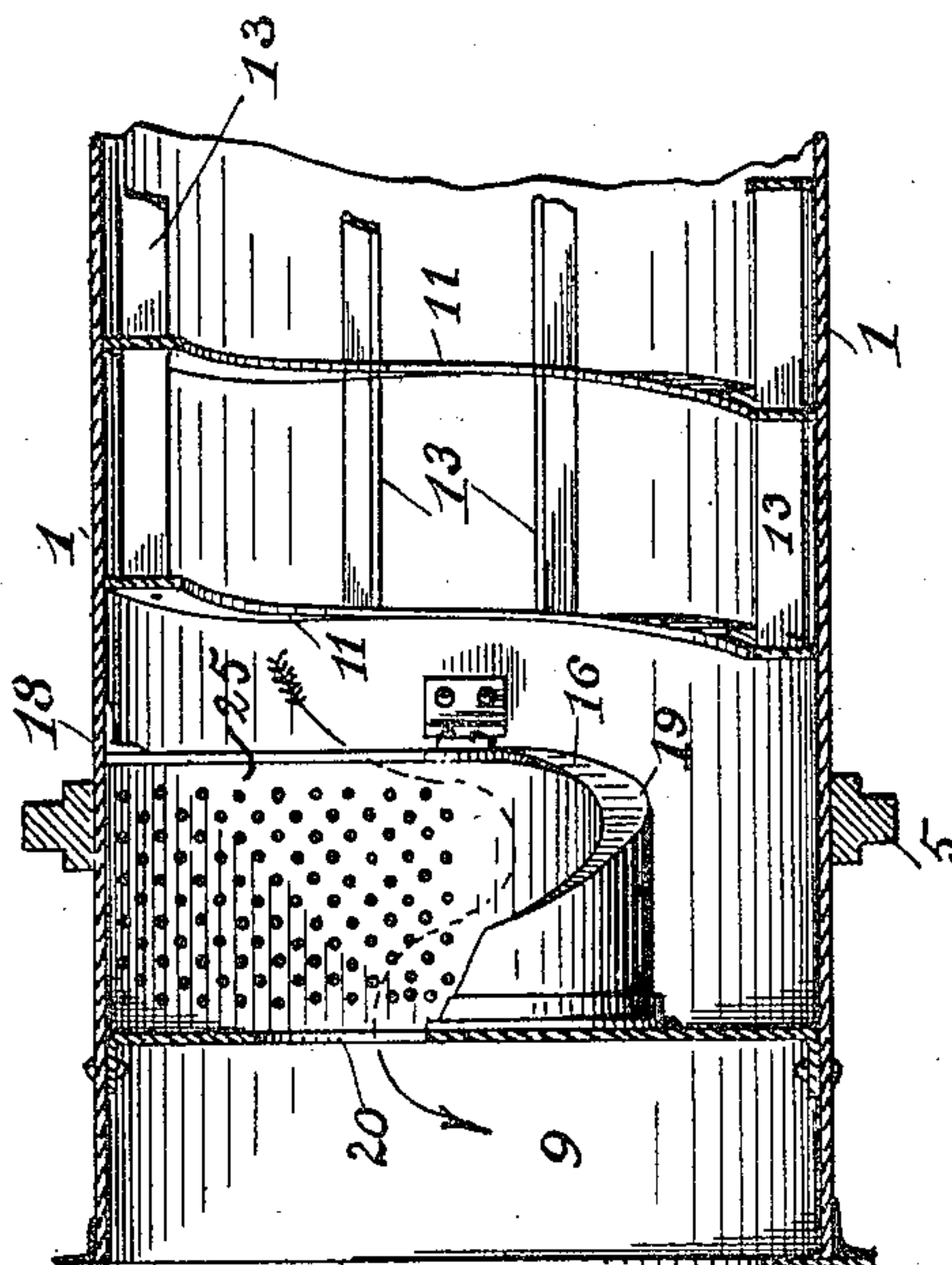
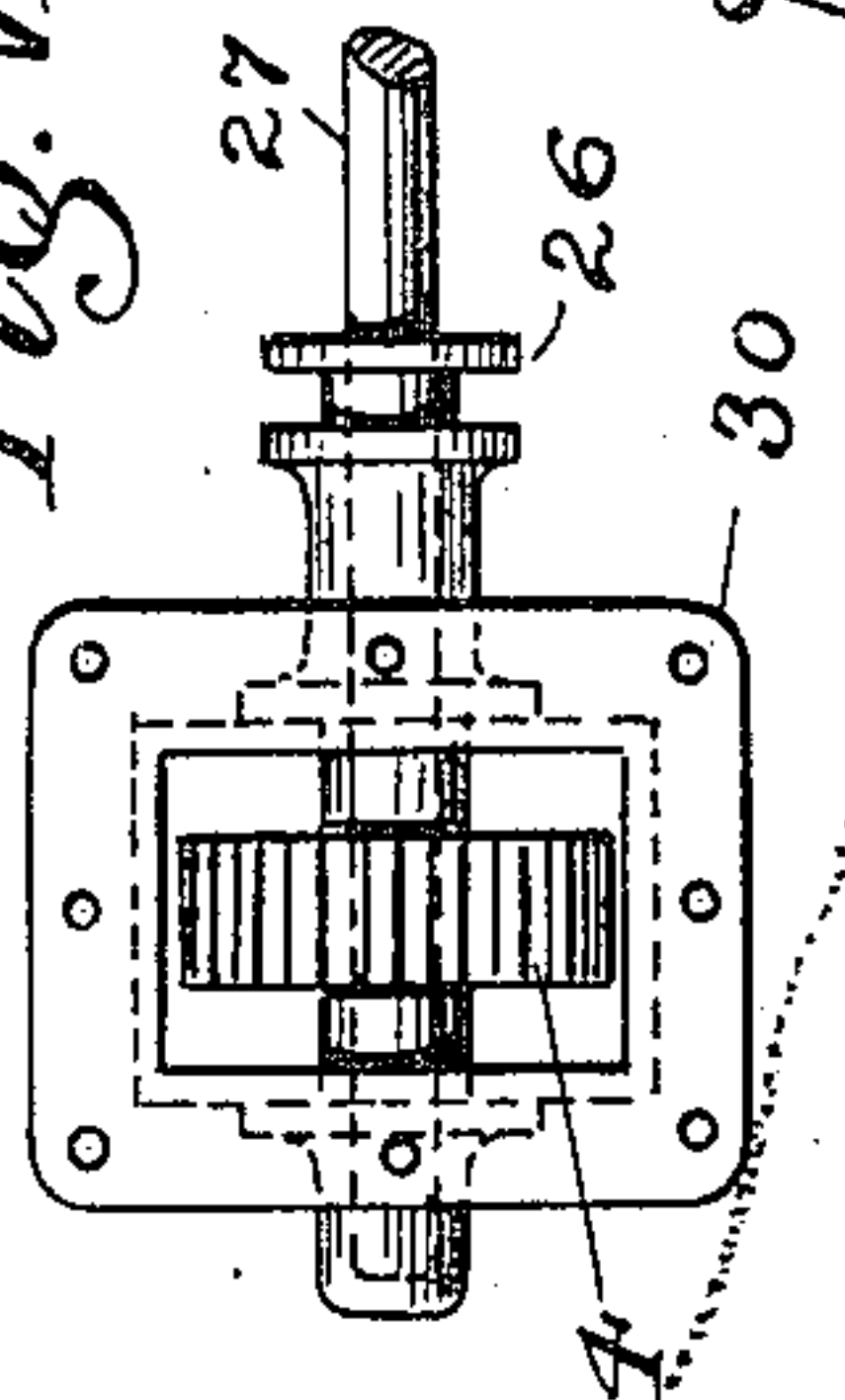


Fig. V.

Fig. VI.



Witnesses.  
*J. Monteverde*  
*H. Sanderson*

Inventor.  
*Arthur F. L. Bell*  
*J. Richardson*  
*Atty.*



# UNITED STATES PATENT OFFICE.

ARTHUR F. L. BELL, OF CARPENTERIA, CALIFORNIA, ASSIGNOR TO THE  
ALCATRAZ COMPANY, OF SAN FRANCISCO, CALIFORNIA.

MACHINE AND APPARATUS FOR EXTRACTING AND REFINING ASPHALT.

SPECIFICATION forming part of Letters Patent No. 617,712, dated January 17, 1899.

Application filed July 29, 1897. Serial No. 646,281. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR F. L. BELL, a citizen of the United States, residing in Carpenteria, county of Santa Barbara, and State of California, have invented certain new and useful Improvements in Machines and Apparatus for Extracting and Refining Asphaltum when this substance is treated by what is called the "solvent" process, whereby the asphaltic material is dissolved out of the sand, earth, or other waste matter with which the asphaltum is associated or combined in its natural state, of which the following is a specification.

My present invention relates to devices for mixing the asphaltic material, previously disintegrated and softened by heat, with the liquid solvent, thus forming a solution from which the waste material is afterward separated.

My improvements consist in a revoluble cylinder or vessel inclosed in a vapor-tight exterior shell or casing, leaving an annulus between, with which the main vessel is in communication; devices to introduce the asphaltic material against some internal pressure, if required, and to prevent the escape of vapor or volatilized solvent; devices to agitate and cause a gradual movement of the material longitudinally through the mixing cylinder or vessel; devices to admit the liquid solvent and conduct away the vapor evolved therefrom; devices to cause a periodical discharge of the insoluble matter after the solvent is incorporated with the asphaltic material; also other features of a constructive nature, hereinafter more fully pointed out and explained in connection with the drawings and in the claims at the end of this specification.

Referring to the drawings, Figure I is a longitudinal section of the machine. Fig. II is a transverse section on the line  $xx$  in Fig. I, looking from the right. Fig. III is a transverse section on the line  $zz$  in Fig. I, looking from the left. Fig. IV is a transverse section on the line  $yy$  in Fig. I, looking from the right. Fig. V is a partial longitudinal section through the central cylinder. Fig. VI is a detail of a portion of Fig. IV.

The numerals of reference apply to like parts throughout.

The apparatus forming the subject of this application is known technically as the "mixer" and forms one in a series of machines and apparatus for the reduction of asphaltic material. Its office is to thoroughly incorporate with the asphaltic material, previously heated and broken, a liquid solvent, preferably a distillate of petroleum, that will combine with the contained asphaltum and form a solution, to be afterward separated by other machines and apparatus not included in my present application.

The main cylinder 1 is made of iron plates riveted and provided with bearing-rings 5, that revolve on rollers at 2 on each side, as indicated in Fig. II, and is driven by means of a circular tooth-rack 3, and a tooth-pinion at 4, Fig. IV, in the usual manner of supporting and driving reduction-cylinders of this kind. Surrounding and inclosing the main cylinder 1, also inclosing by means of connecting-housings the bearing-rollers and the driving-gearing, is a fixed casing or outer shell 6, which serves to collect and save the vapor and volatilized solvent that escapes from the interior of the cylinder 1, which at its ends is in free communication with annular space 7 between the outer casing 6 and the cylinder 1.

The structure is by preference set with some inclination downward from the supply end and the inlet-pipe 8, so as to cause liquid material to flow to the discharge end and also to facilitate the movement of the solid or undissolved material in the same direction.

The forward movement of the material toward the discharge-chamber 9 and discharge-chute 10 is performed preferably by means of a helical inward-projecting vane 11, Figs. I and IV, riveted to the interior of the cylinder 1 and terminating in a discharge-scoop 16, to be hereinafter described. This same result could of course be obtained, but in a less desirable manner and with less agitation of the material, by setting the cylinder 1 at a sufficient inclination.

The discharge-way 10 can be single or double, as seen in Fig. III, and is protected or sealed against the escape of vapor by its con-



nection with the next machine or apparatus employed in treating the asphaltic material.

Between the convolutions of the helix 11 I place longitudinal vanes 13, Fig. V, that agitate and raise the material as the cylinder 1 revolves, so the solid or undissolved portions will be raised through the contained solvent or solution, and thus be the sooner reduced and saturated with the solvent.

The asphaltic material, being first reduced to a plastic state by preceding machines and processes, is forced through the curved pipe 8, which forms a seal against the escape of vapor back through the inlet-way, because of the plastic material in the pipe 8 being impervious; also, because of the curved depression in this pipe, as seen in Fig. I. This siphon-pipe 8 is steam-jacketed, so as to be kept hot, and is attached by a flange 15 to the outer casing 6, forming a close joint, as seen in Fig. I.

At the discharge end of the apparatus I provide a scoop 16, made integral with or attached to the main cylinder 1, that picks up at each revolution of the latter a certain amount of the solution and the insoluble matter from the bottom of the cylinder. A part of this scoop 16 is, as indicated at 25 in Fig. V, perforated with small holes that permit most of the liquid solution to fall back again into the main cylinder, but raises and guides the sand and other insoluble matter, discharging it at each revolution into the chamber 9, whence it falls down through the spout 10 and passes to another machine and apparatus for completely separating the waste or insoluble matter from the asphaltum.

The scoop 16 is a continuation of the helix 11, but is drawn in on a gradually-diminishing radius, so as to give it the form of a diminishing spiral in transverse section. It has a raised edge 19, imparting a trough-like form, and this has a more rapid pitch than the helix, contracting the width of the trough rapidly toward the outlet or delivery which discharges through the mouth 20 at an elevated point quite near the axis into the end of the main cylinder 1, as indicated in Figs. I, II, and V of the drawings. Two or more of these scoops 16 can be employed; but the construction shown is believed to be that most desirable. Thus it will be seen that the purpose of this scoop 16 and the manner of its periodical action are to raise and discharge at some distance above the bottom of the main cylinder 1 the solid or insoluble matter and retain the liquid contents up to or near this discharge-level.

The liquid solution, such as escapes freely, finds its way into the compartment 9 by pouring over the segmental discharge-way at 21, and such portion of the solution as is retained in the sand or other insoluble matter is discharged by the scoop 16. The amount of solution that is discharged over the segmental dam 21 is regulated by the supply of solvent from the pipe 22, and the level of the

liquid within the main cylinder 1 can be raised or lowered by moving the dam 21 outward or inward from the center or by substituting segments of different widths. This dam 21 can be of helical or other form to equalize the discharge throughout its arc, if required.

The liquid solvent is supplied through the pipe 22 and discharged near where the material falls from the inlet-pipe 8. Vapor collecting in the chamber 7 passes off through the pipe 23 to a condenser, where it is liquefied and saved.

The housings 28, that contain the pinions 4, are bolted to the outer casing 6 and are provided with glands 26 to prevent the escape of vapor around the shaft 27. The bearing-rollers 2 are mounted in the housings 28, also bolted to the fixed outer casing 6, screws 29 being provided to raise the cylinder 1 clear of these rollers when they require to be moved or adjusted.

The rollers 24 are to facilitate removal of the main cylinder 1 from the casing 6, and is a manhole to give access to the interior.

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

1. In asphaltum extracting and refining apparatus, a revoluble mixing vessel or cylinder provided on its interior with a helical vane to move the material longitudinally, longitudinal vanes set between the convolutions of the helical vane to raise and agitate the asphaltic material, a sealed steam-jacketed feedway to introduce the asphaltic material and means for introducing a liquid solvent to be incorporated therewith, all combined and operating substantially as specified.

2. In asphaltum extracting and refining apparatus, a revoluble mixing-cylinder surrounded and inclosed by a vapor-collecting chamber or casing, a sealed steam-jacketed inlet-way for the asphaltic material connected to the external casing and open thereto; means to move the asphaltic material longitudinally through the mixing-cylinder, and means to raise and discharge the same above the bottom of the mixing-cylinder, in the manner substantially as specified.

3. In asphaltum extracting and refining apparatus, a revoluble mixing-cylinder, means to support and revolve the same, the whole inclosed in a shell or casing, or in closed chambers attached thereto, a sealed steam-jacketed inlet-pipe for the asphaltic material and an inlet-pipe for the liquid solvent, both discharging within and at one end of the mixing-cylinder, a helical inward projecting vane therein to move the material longitudinally, and longitudinal vanes to raise and agitate the same, combined and operating in the manner substantially as described.

4. In asphaltum extracting and refining apparatus, a revoluble mixing-cylinder to incorporate the asphaltic material with a liquid solvent, annular ends and central openings



617,712

in this cylinder, open to and communicating with a surrounding casing, but sealed to the external air, a sealed inlet for the asphaltic material at or near one end of the mixing-cylinder, and at the outer end a revolving scoop that raises and discharges the insoluble matter through the opening in the discharge end of the mixing-cylinder, whereby the latter remains partially filled with the liquid solution or solvent, substantially as described.

5. In asphaltum extracting and refining apparatus, a revoluble mixing-cylinder inclosed within and opening at its ends to an inclosing vapor-tight casing, the ends of the cylinder having central openings equal to about one-third of the cylinder's diameter, through which openings the asphaltic material is received and discharged, at one end a sealed inlet-way for the asphaltic material, and at the other end a lifting-scoop attached to and revolving with the mixing-cylinder, raising the insoluble matter from the bottom of the cylinder and discharging it at each revolution through the opening in the discharge end of the same, substantially as specified.

6. In asphaltum extracting and refining apparatus, a revoluble mixing-cylinder inclosed within and open to an inclosing vapor-tight casing, the ends of the cylinder having open-

ings equal to about one-third of its diameter, through which the asphaltic material is received and discharged, at one end a sealed inlet-way for the asphaltic material, and at the other end a discharging scoop or scoops attached to and revolving with the mixing-cylinder to raise and discharge the insoluble matter, said scoop provided with perforations or a screen at its bottom so the free liquid solution or solvent can drain back and remain in the mixing vessel, substantially as described.

7. In asphaltum extracting and refining apparatus, a revoluble mixing-cylinder having central openings in its ends, means to introduce therein the asphaltic material and a liquid solvent therefor, a scoop or scoops attached to and revolving with the mixing-cylinder, to raise and discharge intermittently insoluble or waste matter, and therewith a segmental dam over which the liquid contents of the cylinder can escape at some predetermined height or level, in the manner substantially as described.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

ARTHUR F. L. BELL.

Witnesses:

S. MCADAMS,  
VICTOR S. HALL.