

No. 743,697.

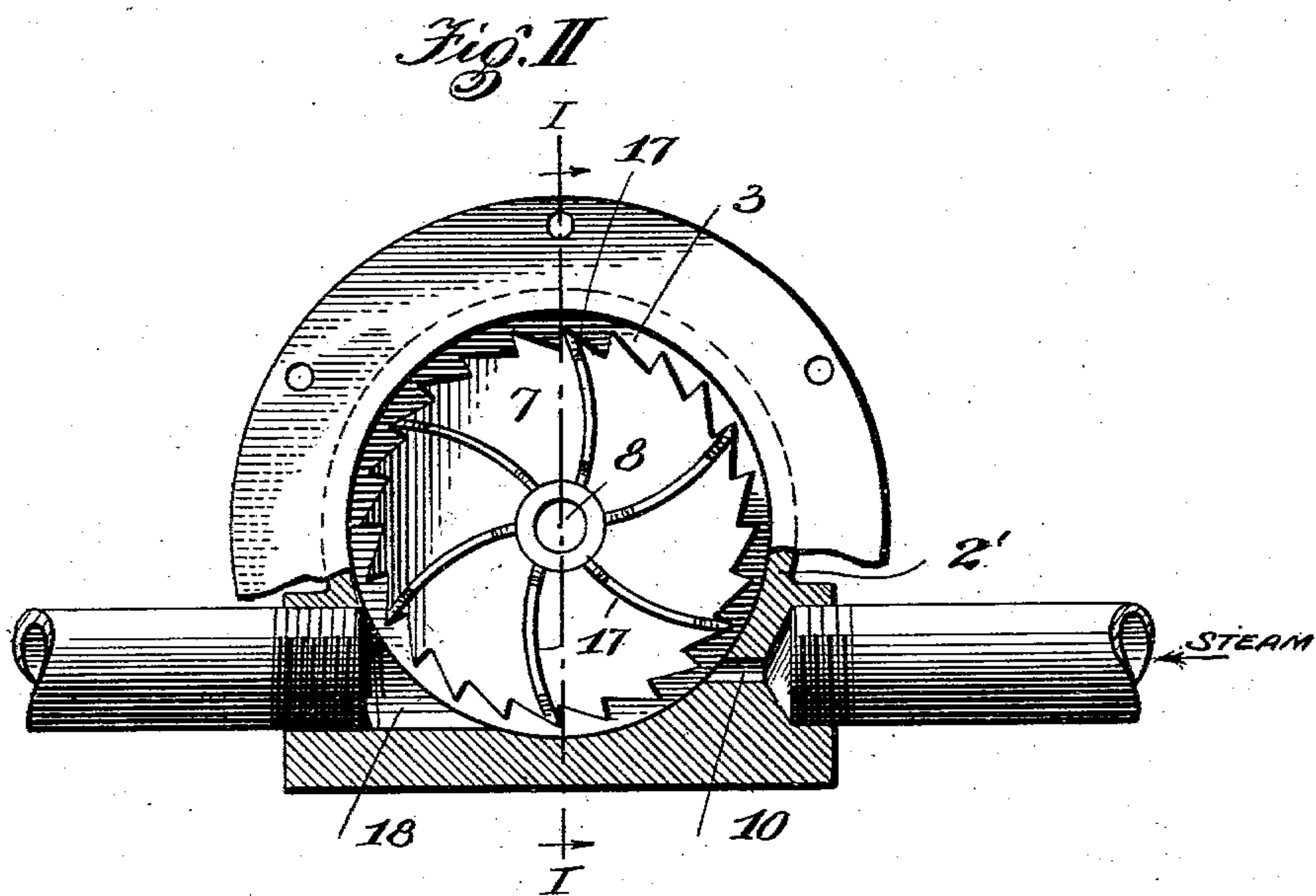
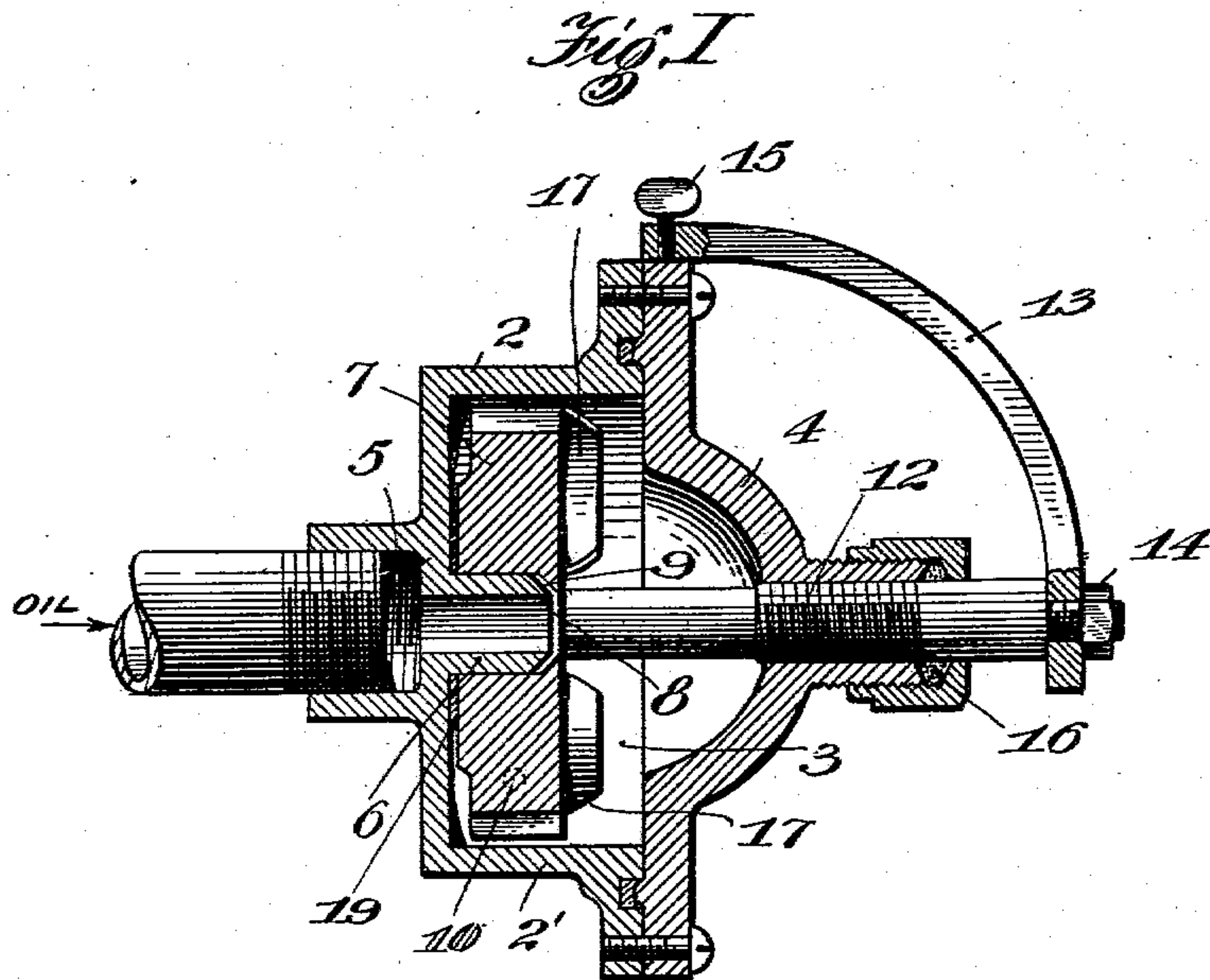
PATENTED NOV. 10, 1903.

A. S. DIXON.
ATOMIZER.

APPLICATION FILED OCT. 20, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

Edmund A. France,
Frederick Dixon

Inventor

Albert S. Dixon
by Townsend Bros.
his attys.

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2 SHEETS—SHEET 2.

Fig. III

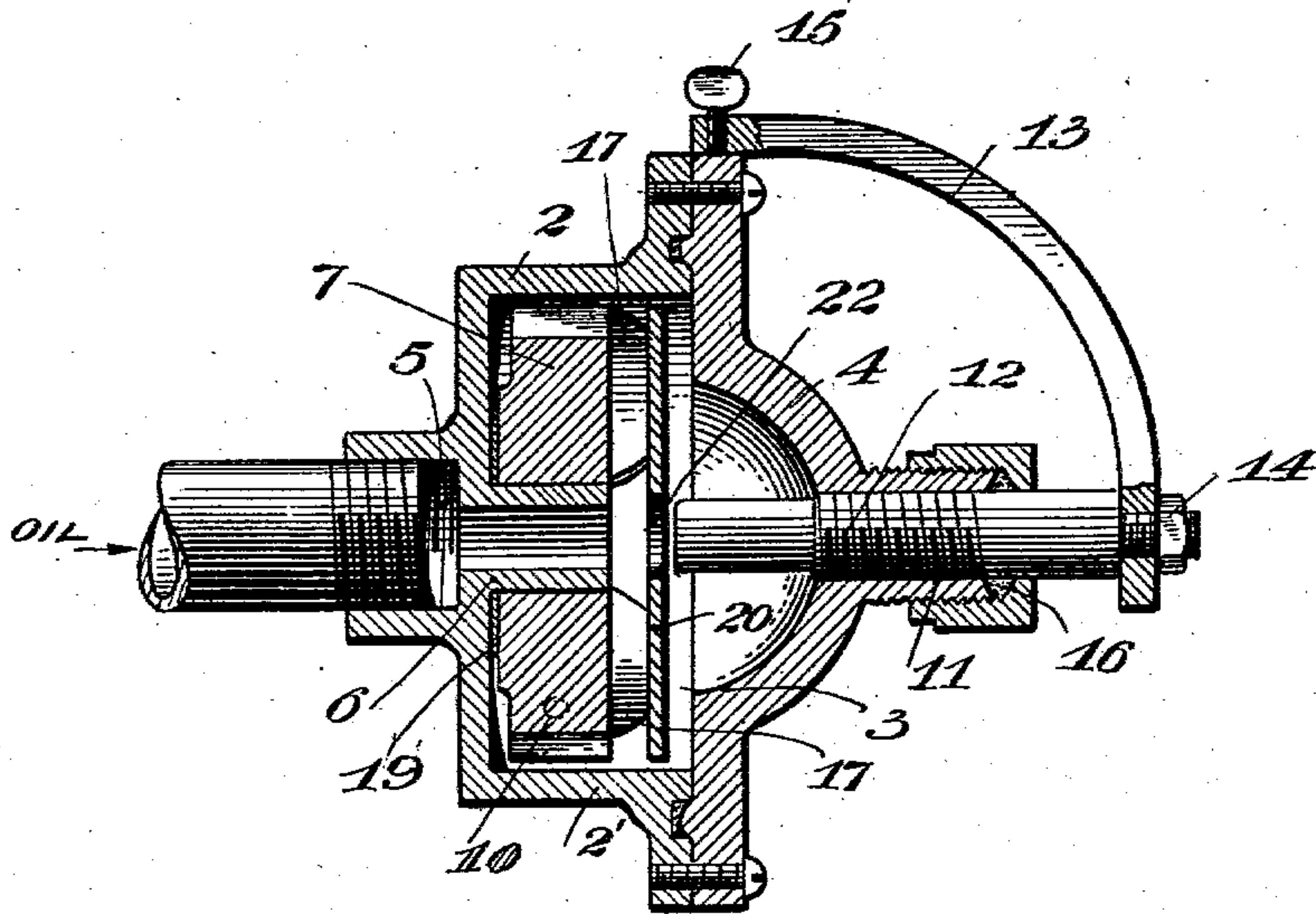
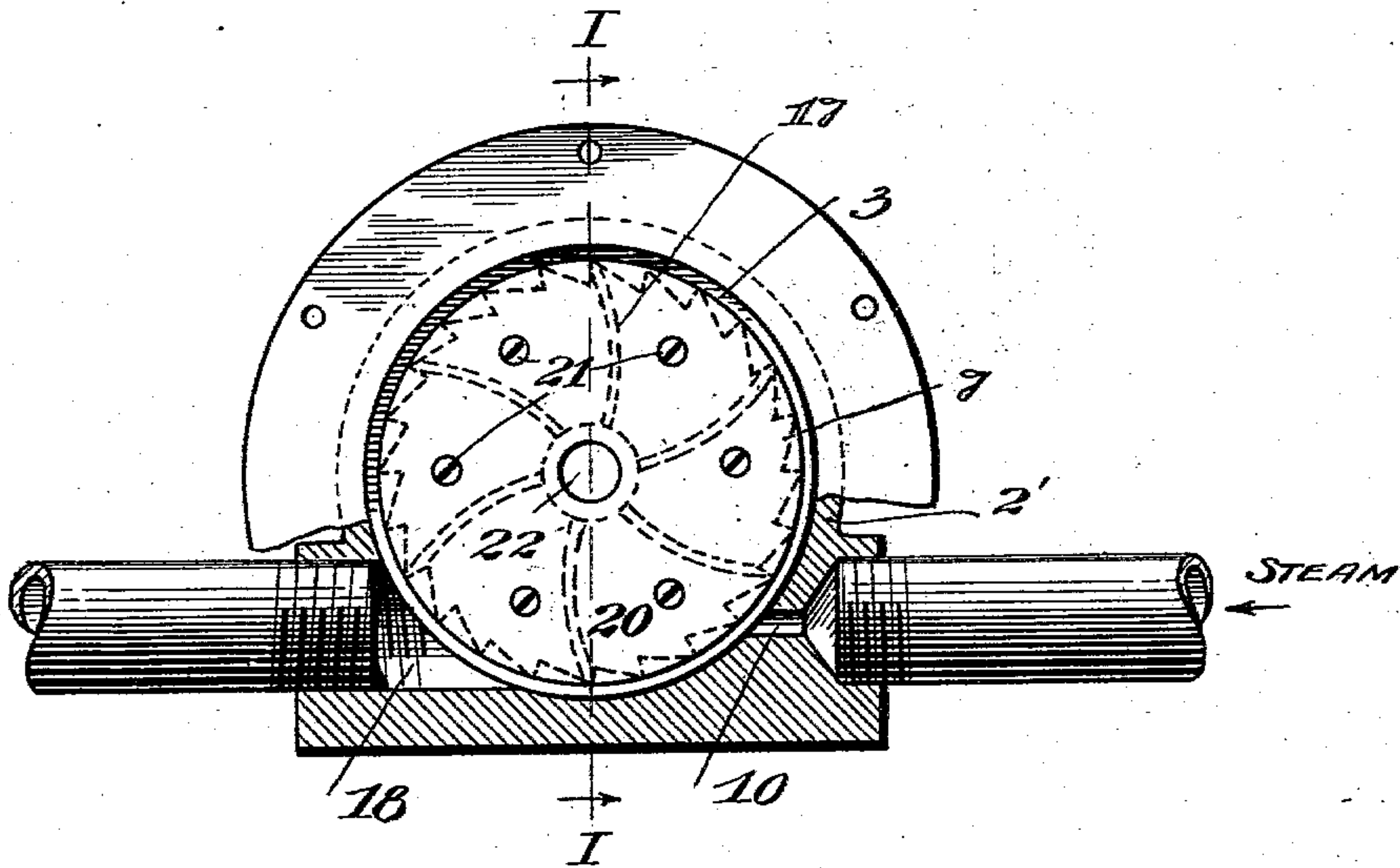


Fig. IV



Witnesses

Samuel A. Strauss,
Fredrick Dixon

Inventor
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UNITED STATES PATENT OFFICE.

ALBERT S. DIXON, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO ASPHALT PAPER PIPE COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

ATOMIZER.

SPECIFICATION forming part of Letters Patent No. 743,697, dated November 10, 1903.

Application filed October 20, 1902. Serial No. 128,080. (No model.)

To all whom it may concern:

Be it known that I, ALBERT S. DIXON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Atomizer, of which the following is a specification.

This invention is designed for breaking up and atomizing liquids under pressure of an expansive fluid for spraying or distributing the liquid.

A special object of the invention is to provide means whereby thick hydrocarbons may be reduced to vapor and supplied in perfectly-regulated quantities to the fire-box of a furnace, so that the fire may be constantly maintained at any determined volume and force.

A further object of my invention is to provide an atomizer of simple, cheap, and durable construction, which shall be positive and efficient in operation and in which wear of the several parts is reduced to a minimum.

A further object is to provide simple and effective means for preventing any clogging, owing to the usual presence of sand or grit, in heavy thick hydrocarbon oils.

To these ends my invention consists in an atomizer having a vaporizing-chamber, revoluble means therein for breaking heavy oil, an inlet adapted to deliver steam or other expansive medium under pressure against said revoluble means to operate the same, an inlet axial with respect to the revoluble means, adapted to deliver liquid at the side of said revoluble breaking means, means whereby said liquid-inlet is regulated, and revoluble means whereby clogging of said liquid-inlet is prohibited.

More specifically, my invention consists in an atomizer having a body comprising a vaporizing-chamber, a hollow shaft entering said chamber axially, a revoluble breaker and mixer loosely mounted on said shaft, the face of said mixer provided with a series of flights radiating from the center, a tangential expansive-medium inlet adapted to direct its stream against the periphery of said mixer, an outlet, and means whereby the duct through said shaft may be entirely or partially closed to regulate the entrance of liquid to said chamber.

The invention consists, further, in the devices, constructions, and combinations of parts, all as hereinafter described, and more particularly pointed out in the claims. 55

The radiating flights 17 form a series of open ways or channels, and the flights serve to cause a greater agitation and better commingling of the oil and steam.

The invention will be more readily understood by reference to the accompanying drawings, forming part of this specification, and in which— 60

Figure I is a vertical sectional view on line I I of Fig. II. Fig. II is a top plan view, partly in section. Fig. III is a vertical sectional view on the line III III of Fig. IV and shows my atomizer as designed more especially for use with an expansive medium under pressure and liquid supplied thereto without pressure. Fig. IV is a top plan view, partly in section, of the atomizer shown in Fig. III. 65

As shown in the drawings, the breaking and mixing chamber is formed of the section 2, provided with a cylindrical chamber 3, and a side wall or cover-section 4, adapted to be secured together in the ordinary or any suitable manner. Through the center of the wall 2 I provide a duct 5, which runs through the projection 6, extending inwardly from the wall 2 and forming a hollow shaft or hub for the rotary breaker and mixer 7, loosely mounted thereon, the shaft extending nearly through the breaker and the duct therein communicating into the chamber through the port 8. 70

An inlet through the wall 2 registers with the duct of the shaft 6. The end of the shaft 6 is beveled, as shown, and the wall of the bearing in the breaker 7 is provided with an inclined wall 9, near to which this beveled end operates. It will be noted that a slight clearance is thus provided, for the purpose hereinafter mentioned, between the end of the shaft and the opening or port 8. The periphery of the breaker and mixer 7 is provided with a series of teeth, as shown, and the side opposite the shaft or hub 6 is provided with a series of flights 17, radiating from the port 8. 75

The wall 2' is provided with an inlet 10 for steam or other expansive material. This in- 80 85 90 95 100

let enters the chamber at a tangent and is adapted to direct the jet of steam against the toothed periphery of the breaker and mixer 7. Opposite the inlet 10 is a tangential outlet 18, which, as shown, is of greater area than the area of the inlet-ports 8 and 10.

The cover-section 4 is provided with a threaded bearing 11, into which the liquid-inlet regulator 12 is adapted to be screwed. This regulator is in turn connected with an arm 13 by a nut 14. A set-screw 15 passes through this arm and is adapted to hold the regulator in the desired position. A packing-gland 16 is provided, as shown, about the regulator 12.

The operation is as follows: A jet of steam under pressure is introduced through the inlet 10 and strikes against the toothed periphery thereof, causing the breaker and mixer to rotate rapidly. A stream of oil passing through the inlet and hollow shaft or hub 6 is discharged against the wall 2' of the chamber, and the flights 17 accentuate the breaking of the oil and its thorough mixing with the steam therein. The resultant vapor passes out from the chamber through the outlet 18. All sand, sediment, or heavy material which might cause the clogging of the port 8 is ground up between the end of the hub 6 and the inclined wall or seat and the walls surrounding the port 8. By releasing the set-screw 15 and throwing the arm 13 the regulator 12 is turned toward or away from the port 8, regulating the discharge of oil therefrom. By this means I provide a device which thoroughly breaks up heavy thick oil and intermingles it with steam, forming a quick and readily burning vapor.

I provide a removable and renewable seat for the rotary breaker. This consists of the washer 19, preferably of brass, inserted on the hub 6 between the wall and the side of breaker shown.

In Figs. III and IV, I have shown a modification of the atomizer of Figs. I and II. As shown in Figs. III and IV, the flights 17 are covered by a plate or disk 20, which is secured on the flights by screws 21 or by any other suitable means. This plate or disk, if desired, may be formed integral with the flights 17, the same being cored out in castings, and where I hereinafter refer to such plate 20 I include either constructing the same as a plate fixed on said flights or as integral with the breaker. It is thus seen that in this form channels or ducts are formed between the side of the rotary breaker and the plate or disk 20 by the flights 17. As shown, the inclined wall 9 of the bearing in the breaker and the inclined portion of the hollow hub or shaft are omitted and the hub or shaft adapted to extend out flush with the side or face of the breaker, the plate 20 being provided with a central opening 22, through which the regulator 12 is adapted to be inserted to regulate the admission of liquid to the channels between the flights. By this

construction shown in Figs. III and IV, I am enabled to use my atomizer in connection with a liquid-supply without providing pressure for forcing the liquid into the atomizer. The expansive-medium stream under pressure striking the teeth on the periphery of the breaker, rotating the same, causes centrifugal action, by which the induction of the oil to the breaking-chamber is accomplished.

It is obvious that many equivalents for constructions and parts shown will readily suggest themselves to one skilled in the art, and I therefore do not confine myself to the exact construction shown or described, but may use many mechanical equivalents therefor.

Having described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination, in an atomizer, of a body comprising a breaking and mixing chamber, with a hollow shaft or hub projecting inwardly from one wall of said chamber and having an open inner end, a liquid-inlet communicating with the duct in said hollow shaft, a rotary breaker and mixer loosely mounted thereon, the duct through said shaft adapted to communicate through a port in the side of said rotary breaker opposite said inlet, an expansive-medium inlet adapted to direct its stream against the periphery of said rotary breaker, and an outlet.

2. The combination, in an atomizer, of a body comprising a breaking and mixing chamber, with a hollow shaft or hub projecting inwardly from one wall of said chamber and having an open inner end, a liquid-inlet communicating with the duct in said hollow shaft, a rotary breaker and mixer loosely mounted thereon, the duct through said shaft adapted to communicate through a port in the side of said rotary breaker opposite said inlet, an expansive-medium inlet adapted to direct its stream against the periphery of said rotary breaker, an outlet, and means adapted to regulate the admission of liquid through said port.

3. The combination, in an atomizer, of a body comprising a breaking and mixing chamber, with a hollow shaft or hub projecting inwardly from one wall of said chamber and having an open inner end, a liquid-inlet communicating with the duct in said hollow shaft, a rotary breaker and mixer loosely mounted thereon, the duct through said shaft adapted to communicate through a port in the side of said rotary breaker opposite said inlet, an expansive-medium inlet adapted to direct its stream against the periphery of said rotary breaker, an outlet, and a movable regulator adapted to operate in connection with said port to regulate the flow of liquid there-through.

4. The combination, in an atomizer, of a body comprising a breaking and mixing chamber, with a hollow shaft or hub projecting inwardly from one wall of said chamber and

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having an open inner end, a liquid-inlet communicating with the duct in said hollow shaft, a rotary breaker and mixer loosely mounted thereon, the duct through said shaft adapted to communicate through a port in the side of said rotary breaker opposite said inlet, an expansive-medium inlet adapted to direct its stream against the periphery of said rotary breaker, an outlet, and a regulator, operating in the same plane with said hollow shaft, adapted to regulate the admission of liquid through said port.

5. The combination, in an atomizer, of a body comprising a breaking and mixing chamber, with a hollow shaft or hub projecting inwardly from one wall of said chamber and having an open inner end, a liquid-inlet communicating with the duct in said hollow shaft, a rotary breaker and mixer loosely mounted thereon, the duct through said shaft adapted to communicate through a port in the side of said rotary breaker opposite said inlet, a series of flights radiating from said port toward the periphery of said breaker, an expansive-medium inlet adapted to direct its stream against the periphery of said rotary breaker, and an outlet.

6. The combination, in an atomizer, of a body comprising a breaking and mixing chamber, with a hollow shaft or hub projecting inwardly from one wall of said chamber and having an open inner end, a liquid-inlet communicating with the duct in said hollow shaft, a rotary breaker and mixer loosely mounted thereon, the duct through said shaft adapted to communicate through a port in the side of said rotary breaker opposite said inlet, a series of flights radiating from said port toward the periphery of said breaker, an expansive-medium inlet adapted to direct its stream against the periphery of said rotary breaker, an outlet, and means to regulate the admission of liquid through said port.

7. The combination, in an atomizer, of a body comprising a breaking-chamber, with a hollow shaft or hub projecting inwardly from one wall of said chamber, a liquid-inlet communicating with the duct in said hollow shaft, a rotary breaker and mixer provided with a port adapted to register with said duct through said hollow shaft, a central bearing for said shaft or hub whereby clearance is provided between said shaft and the inner wall of said port, an expansive-medium inlet adapted to deliver its stream against the periphery of said rotary breaker, and an outlet.

8. The combination, in an atomizer, of a body comprising a breaking-chamber, with a hollow shaft or hub projecting inwardly from one wall of said chamber, a liquid-inlet communicating with the duct in said hollow shaft, a rotary breaker and mixer provided with a port adapted to register with said duct through said hollow shaft, a central bearing for said shaft or hub whereby clearance is provided between said shaft and the inner wall of said port, an expansive-medium inlet

adapted to deliver its stream against the periphery of said rotary breaker, an outlet, and means adapted to regulate the admission of liquid through said port.

9. The combination, in an atomizer, of a body comprising a breaking-chamber, with a hollow shaft or hub projecting inwardly from one wall of said chamber, a liquid-inlet communicating with the duct in said hollow shaft, a rotary breaker and mixer provided with a port adapted to register with said duct through said hollow shaft, a central bearing for said shaft or hub whereby clearance is provided between said shaft and the inner wall of said port, an expansive-medium inlet adapted to deliver its stream against the periphery of said rotary breaker, an outlet, and a regulator adapted to operate in the same plane with said hollow shaft, adapted to regulate the admission of liquid through said port.

10. The combination, in an atomizer, of a body, comprising a chamber, with an open-ended hub or shaft projecting from the wall thereof, a rotary breaker and mixer adapted to operate in said chamber, a renewable seat provided between said wall and the said breaker, a liquid-inlet, an expansive-medium inlet, and an outlet.

11. The combination, in an atomizer, of a body, comprising a chamber, with an open-ended hub or shaft projecting into said chamber, a rotary breaker and mixer adapted to operate thereon, a renewable seat provided between said chamber-wall and said breaker, an axial inlet, a tangential inlet, and an outlet.

12. The combination, in an atomizer, of a body comprising a chamber, with an open-ended hollow hub or shaft projecting into said chamber, an inlet registering with the duct therein, a breaker and mixer loosely mounted on said shaft and provided with a port registering with said duct, a renewable seat for said breaker provided at the inner end of said hub, a tangential expansive-medium inlet, and an outlet.

13. The combination, in an atomizer, of a body comprising a chamber, with an open-ended hollow hub or shaft projecting into said chamber, an inlet registering with the duct therein, a breaker and mixer loosely mounted on said shaft and provided with a port registering with said duct, a renewable seat for said breaker provided at the inner end of said hub, an expansive-medium inlet, and an outlet.

14. The combination, in an atomizer, of a body comprising a chamber, with an open-ended hollow hub or shaft projecting into said chamber, an inlet registering with the duct therein, a breaker and mixer loosely mounted on said shaft and provided with a port registering with said duct, a renewable seat for said breaker provided at the inner end of said hub, an expansive-medium inlet, an outlet, and means for regulating the admission of liquid through said port.

15. The combination, in an atomizer, of a body comprising a chamber, with a hollow hub or shaft, projecting into said chamber, an inlet registering with the duct therein, a
5 breaker and mixer, loosely mounted on said shaft and provided with a port registering with said duct, a renewable seat for said breaker provided at the inner end of said hub, an expansive-medium inlet, an outlet,
10 and a regulator adapted, by changing its position with respect to said port, to regulate the admission of liquid through said port.

16. In an atomizer, the combination, of a body comprising a chamber, with a hollow
15 open-ended hub or shaft extending into said chamber, an inlet, through the wall of said chamber, registering with the duct in said shaft, a rotary breaker and mixer mounted on said shaft and provided with a central
20 port through which the duct of said shaft communicates into said chamber, an expansive-medium inlet, and an outlet.

17. In an atomizer, the combination, of a body comprising a chamber, with a hollow
25 open-ended hub or shaft extending into said chamber, an inlet through the wall of said chamber registering with the duct in said shaft, a toothed rotary breaker and mixer provided on its side face with a series of
30 flights radiating from the center and provided with a central port through which said shaft communicates with said chamber, a tangential expansive-medium outlet adapted to direct expansive medium against the periphery
35 of said breaker, and an outlet.

18. The combination in an atomizer, of a body comprising a breaking and mixing chamber, with a hollow open-ended shaft or hub projecting inwardly from one wall of said
40 chamber, a liquid-inlet communicating with the duct in said hollow hub, a rotary breaker and mixer loosely mounted thereon and provided with a central port through which the duct of said shaft communicates into said
45 chamber, a series of channels provided in one side of said breaker, the duct through said shaft adapted to communicate to said channels through a port in said breaker, an expansive-medium inlet adapted to direct its
50 stream against the periphery of said breaker, and an outlet.

19. The combination, in an atomizer, of a body comprising a breaking and mixing chamber, with a hollow open-ended shaft or
55 hub projecting inwardly from one wall of said chamber, a liquid-inlet communicating with the duct in said hollow shaft, a rotary breaker and mixer loosely mounted thereon, the duct through said shaft adapted to communicate
60 through a port in the side of said rotary breaker opposite said liquid-inlet, a series of flights radiating from said port toward the periphery of said breaker, a plate or disk on said flights, an expansive-medium inlet
65 adapted to direct its stream against the periphery of said rotary breaker, an outlet, and

means to regulate the admission of liquid through said port.

20. In an atomizer, the combination, of a body comprising a chamber, with a hollow
70 open-ended hub or shaft extending into said chamber, an inlet through the wall of said chamber registering with the duct in said shaft, a toothed rotary breaker and mixer provided on its side face with a series of flights
75 radiating from the center and provided with a central port through which the duct of said shaft communicates into said chamber, a plate or disk on said flights, a tangential expansive-medium inlet adapted to direct ex-
80 pansive medium against the periphery of said breaker, and an outlet.

21. The combination, in an atomizer, of a body comprising a breaking and mixing
85 chamber, of a hollow shaft or hub, a rotary breaker and mixer loosely mounted thereon, said breaker provided on its side with a series of flights, a plate over said flights, liquid adapted to enter said hollow shaft and be delivered to the channels formed by said flights
90 and plate, a movable shaft adapted to operate in conjunction with said hollow shaft to regulate the flow of liquid therethrough, a tangential expansive-medium inlet, and an outlet.

22. The combination, in an atomizer, of a
95 body, provided with a closed chamber, with a hollow open-ended shaft projecting into said chamber, a rotary breaker and mixer adapted to operate thereon and having a port opposite the open end of said shaft, a renewable seat
100 provided between the chamber-wall and said breaker and upon which said breaker rotates, said chamber provided with an expansive-medium inlet, with an inlet registering with the duct in said shaft and with an outlet.
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23. The combination, in an atomizer, of a body provided with a closed chamber with a hollow open-ended shaft projecting into said
110 chamber, a rotary breaker and mixer loosely mounted on said shaft and having a port opposite the open end of said shaft, said chamber provided with an inlet registering with the duct of said shaft, with a second inlet and with an outlet, and means for regulating the admission of liquid through said open end of
115 said shaft.

24. The combination, in an atomizer, of a body provided with a closed chamber, with a hollow open-ended shaft projecting into said
120 chamber, a rotary breaker and mixer loosely mounted on said shaft, said breaker and mixer provided within its inner face with a series of radiating channels and with a port registering with the open end of said shaft and communicating into said channels, and said cham-
125 ber having an inlet, registering with the duct of said shaft, with a second inlet and an outlet.

25. The combination, in an atomizer, of a body provided with a closed chamber, with a hollow open-ended shaft projecting into
130 said chamber, a rotary breaker and mixer mounted on said shaft, said breaker and mixer

provided within its inner face with a series of radiating channels and with a central duct communicating through its sides and with said channels, said chamber having an inlet, registering with the duct of said shaft, with a second inlet and an outlet, and means for regulating the flow of liquid through the duct of said shaft.

26. In an atomizer, in combination, a body provided with a closed breaking and mixing chamber, a rotary breaker and mixer revoluble therein and provided with an open axial duct, said chamber having an inlet in axial alinement with and opening into said axial duct, and an inlet entering the chamber tangentially, and an outlet.

27. In an atomizer, in combination, a body provided with a closed breaking and mixing chamber, a rotary breaker and mixer revoluble therein and provided with an open axial duct, said chamber having an inlet in axial alinement with and opening into said axial duct, and an inlet entering the chamber tangentially, and an outlet, and a longitudinally-adjustable regulator extending into said chamber in alinement with said axial duct and adapted to regulate the admission through said duct.

28. In an atomizer, in combination, a body provided with a closed breaking and mixing chamber, a rotary breaker and mixer revoluble therein and provided with an open axial duct, and with a series of radiating flights upon its side, said chamber having an inlet in

axial alinement with and opening into said axial duct, and an inlet entering the chamber tangentially, and an outlet.

29. In an atomizer, in combination, a body provided with a closed breaking and mixing chamber, a rotary breaker and mixer revoluble therein and provided with an open axial duct, and with a series of radiating flights upon its side, said chamber having an inlet in axial alinement with and opening into said axial duct, and an inlet entering the chamber tangentially, and an outlet, and a longitudinally-adjustable regulator extending into said chamber in alinement with said axial duct and adapted to regulate the admission through said duct.

30. In an atomizer, a body comprising a closed cylindrical chamber provided with an axial inlet, a tangential inlet and an outlet, a rotary member, revoluble in said chamber and provided with an open axial duct registering with said axial inlet, and regulating means extending into said chamber and forming with said rotary member a rotary self-clearing valve for said axial duct.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, at Los Angeles, in the county of Los Angeles and State of California, this 15th day of October, 1902.

ALBERT S. DIXON.

Witnesses:

FREDERICK S. LYON,
JULIA TOWNSEND.