E. J. OWIN.

CRUDE OIL BURNER.

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970,349. Patented Sept. 13, 1910.

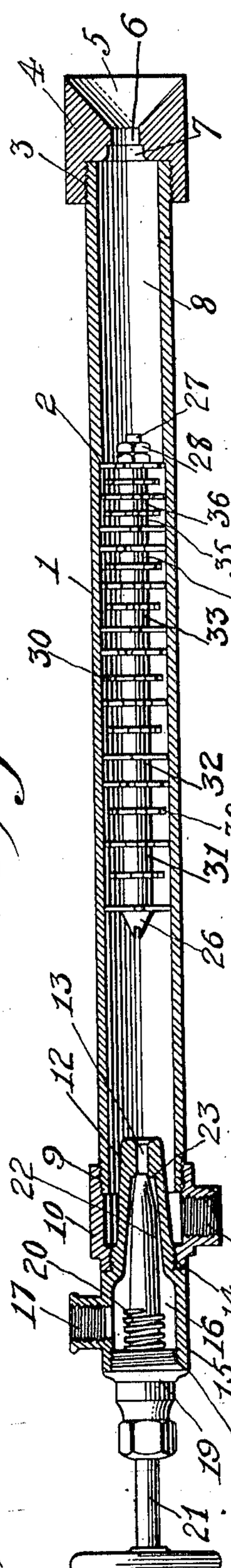

Fig. 1.

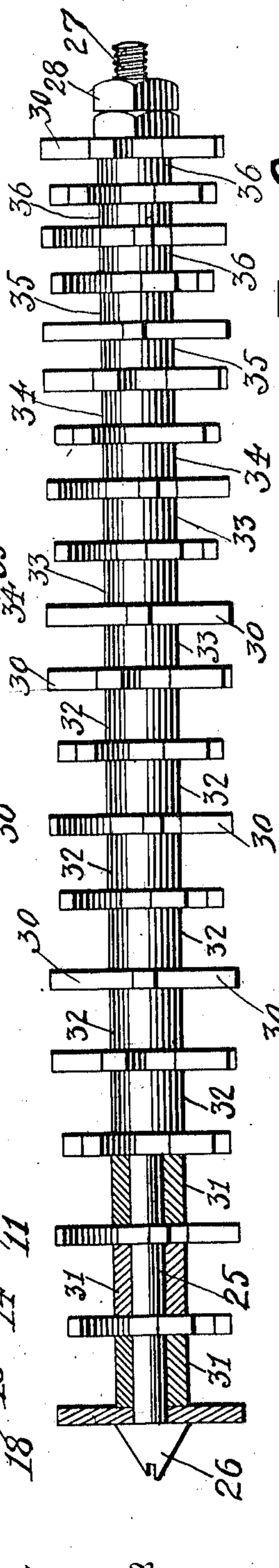

Fig. 2.

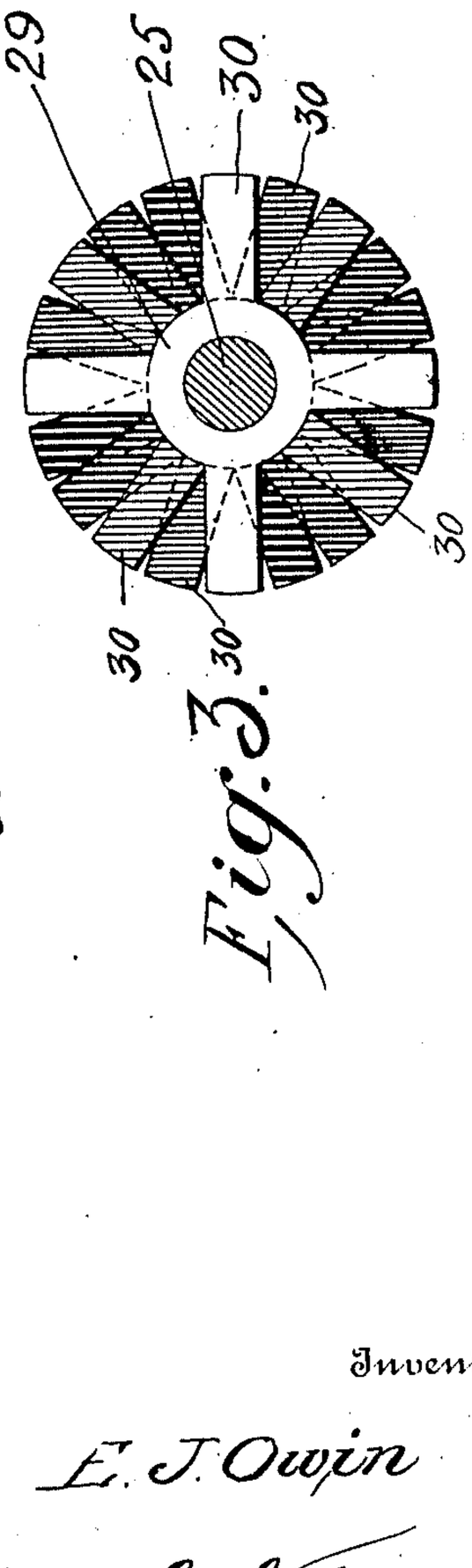

Fig. 3.

Witnesses

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CRUDE-OIL BURNER.

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To all whom it may concern:

Be it known that I, ELIJAH J. OWIN, a citizen of the United States of America, residing at Galveston, in the county of Galveston and State of Texas, have invented certain new and useful Improvements in Crude-Oil Burners, of which the following is a specification.

This invention relates to crude oil burners particularly adapted for use in connection with steam boilers, and the object thereof is to provide a burner of such class in a manner as hereinafter set forth whereby a saving in fuel oil is obtained, due to the fact that the oil supplied to the burner is thoroughly broken up and vaporized before leaving the burner at the same time requiring less steam or air than is required for the forms of crude oil burners now in general use.

Further objects of the invention are to provide a crude oil burner which shall be simple in its construction and arrangement, strong, durable, efficient in its use, obtaining a saving in oil consumption, readily set up in operative position, and comparatively inexpensive to manufacture.

With the foregoing and other objects in view the invention consists in the novel construction, combination and arrangement of parts as hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown one embodiment of the invention, it is to be understood, however, that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings wherein like references denote corresponding parts throughout the several views,—Figure 1 is a longitudinal sectional view of a crude oil burner in accordance with this invention. Fig. 2 is an enlarged elevation partly in section of the oil expanding or breaking-up element, and Fig. 3 is a cross sectional view of the latter.

Referring to the drawings by reference characters 1 denotes an elongated hollow cylindrical member constituting a burner tube and provided on its inner face with a shoulder as at 2 for a purpose to be presently referred to. The cylindrical member 2 at one end is formed with peripheral threads 3 whereby an interiorly-threaded burner tip 4 can be coupled therewith. The burner tip 4 is formed with a flaring outlet 5, which communicates with a passage 6, the latter opening into a passage 7 of greater diameter than the passage 6, whereby a contracted opening is provided for the outlet of the mixture from the expansion chamber 8 to the flaring outlet 5 of the tip 4. The other end of the member 1 is formed with an exteriorly-threaded end 9 whereby an interiorly-threaded annular casting 10 can be coupled therewith. The annular casting 10 projects from the threaded end 9 of the member 1 and is formed with an interiorly-threaded nipple 11 for connecting the casting 10 with a steam supply pipe (not shown).

The reference 12 denotes an injector nozzle having a port 13, which constitutes an outlet, and is further provided with exterior threads 14 for coupling with the annular casting 10. The nozzle 12 projects through the casting 10 and into the member 1 and has formed integral therewith an annular valve casing 15 forming an oil receiving chamber 16. The casing is provided with an interiorly-threaded nipple 17 for connecting thereto a crude oil supply pipe (not shown), whereby oil will be supplied to the chamber 16 and pass into the nozzle 12. The valve casing 15 is interiorly-threaded as at 18 and coupled with the threads 18 is an exteriorly-threaded cap 19 for closing the open end of the casing 15. The cap 19 is also interiorly-threaded and engaging with the interior threads of the cap 19 is the threaded portion 20 of a valve stem 21, the latter having a tapered end 22 to constitute a valve plug for engagement with the seat 23 formed in the nozzle 12, whereby the supply of crude oil through the nozzle 12 can be regulated. The stem 21 is provided on its outer end with a hand wheel 24 for convenient adjustment of the stem.

Arranged within the member 1 is what is termed an oil breaking-up, expanding, or diffusing member, the latter being positioned against the shoulder 2 and also engaging the inner face of the member 1 and comprises a longitudinally-extending bolt 25 provided at one end with a head 26 and at its other end with a threaded portion 27 upon which are mounted the clamping nuts 28. Positioned throughout and upon the bolt 25 is a series of sets of mangles each consisting of a hub 29 provided with a series of radiating arms or spokes 30. The hubs 29 are spaced apart by a series of sets

of collars 31, 32, 33, 34, 35, and 36, the collars of one set being of greater length than the collars of an adjacent set whereby the mangles of one set will be brought closer together than the mangles of adjacent sets throughout the bolt 25. The mangles are independent of the collars and are so placed that the spokes of one mangle are in alinement with the open spaces between the spokes of an adjacent mangle whereby a tortuous passage for the oil will be provided as the oil travels toward the tip 4. By disposing the arms or spokes 30 of the mangles in a manner as stated, a thorough atomizing of the oil is had as it winds its way or is forced through the spaces between the spokes or arms 30. The oil is the heaviest when it strikes the first mangle, as it travels farther, it gets thinner and thinner, and by the time it reaches the last mangle, it is completely atomized and does not require more pressure to force it onto the expansion chamber 8 than when it first entered between the spokes of the mangles.

One of the mangles is arranged against the head 26 of the bolt 25 and another against one of the nuts 28, and the other mangles are disposed throughout the bolt 25, and interposed between the mangles and abutting against the head 26 are the spacing collars, as clearly shown in Fig. 2, and as the arms or spokes of one mangle are disposed in staggered relation with respect to the spaces between the spokes of an adjacent mangle, a tortuous passage for the oil will be provided whereby the oil as it travels toward the tip 4 will be gradually thinned out or broken up, so that by the time the oil reaches the end of the diffusing member it will, as it enters the expansion chamber 8, be thoroughly atomized, thereby preventing any loss of oil during the operation of the burner, which would be the case if only a portion of the oil had been atomized after passing through the diffusing member. By providing the collars for separating the mangles, it allows the oil to travel through the spaces or wind through the openings of one mangle to the next and through these openings to the next and so on, but without utilizing the collars the oil would not pass through the tortuous passage formed by disposing the arms or spokes 30 of the mangles in the manner as stated.

By setting up the crude oil burner in the manner as stated, the crude oil is atomized before leaving the burner, with less steam or air than employed in the form of burners now in general use, consequently making a saving in fuel oil, as each pound of steam used in the burner requires oil to consume it to obtain the necessary results.

Although the nipple 11 has been referred to for connecting the casting 10 with a steam supply pipe (not shown) and the nipple 17 for connecting the casing with a crude oil supply pipe (not shown), yet it is to be understood that the nipple 17 can be connected with the steam supply and the nipple 11 with the oil supply.

What I claim is:

1. In a crude oil burner, a diffusion member comprising independent mangles each including a series of radially-disposed spokes, said mangles arranged side by side and with the spokes of one mangle disposed opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil for diffusing it on its passage to the burner.

2. In a crude oil burner, a diffusion member comprising independent mangles each including a series of radially-disposed spokes, said mangles arranged side by side and with the spokes of one mangle disposed opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil for diffusing it on its passage to the burner, a common support for said mangles, and means for retaining the mangles in position upon said support.

3. In a crude oil burner, a diffusion member comprising independent mangles each including a series of radially-disposed spokes, said mangles arranged side by side and with the spokes of one mangle disposed opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil for diffusing it on its passage to the burner, a common support for said mangles, spacing collars interposed between the mangles and mounted upon the support, and means for retaining the mangles and spacing collars upon the support.

4. In a crude oil burner, a diffusion member comprising spoked-mangles and with the spokes of one mangle arranged opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil as it travels through the burner, and means for spacing the mangles.

5. In a crude oil burner, a diffusion member comprising spoked-mangles and with the spokes of one mangle arranged opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil as it travels through the burner, certain of said mangles arranged closer to each other than the other of the mangles.

6. In a crude oil burner, a diffusion member comprising spoked-mangles and with the spokes of one mangle arranged opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil as it travels through the burner, said mangles arranged in sets, the mangles of one set arranged closer to each other than the mangles of an adjacent set.

7. In a crude oil burner, a diffusion member comprising spoked-mangles and with the spokes of one mangle arranged opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil as it travels through the burner, said mangles arranged in sets, the mangles of one set arranged closer to each other than the mangles of an adjacent set, and means for maintaining the mangles in spaced relation.

8. In a crude oil burner, a diffusion member comprising spoked-mangles and with the spokes of one mangle arranged opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil as it travels through the burner, said mangles arranged in sets, the mangles of one set arranged closer to each other than the mangles of an adjacent set, means for maintaining the mangles in spaced relation, and a longitudinal support for said spacing means.

9. In a crude oil burner, a diffusion member including a series of spoked-mangles arranged in spaced relation with respect to each other and each of the same diameter and arranged side by side with the spokes of one mangle opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage will be provided for the oil as it travels through the burner.

10. In a crude oil burner, a diffusion member including a series of spoked-mangles each of the same diameter and arranged side by side with the spokes of one mangle disposed opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage will be provided for the oil as it travels through the burner, and means for maintaining said mangles in spaced relation with respect to each other.

11. In a crude oil burner, a diffusion member including a series of stationary spoked-mangles each of the same diameter, the spokes of one mangle disposed opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage will be provided for the oil as it travels from the inlet to the outlet end of the burner.

12. In a crude oil burner, a diffusion member including a series of stationary spoked-mangles each of the same diameter, the spokes of one mangle being disposed opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage will be provided for the oil as it travels from the inlet to the outlet end of the burner, and a longitudinally-extending support common to said mangles.

13. In a crude oil burner, a diffusion member including a series of stationary spoked-mangles each of the same diameter, the spokes of one mangle disposed opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage will be provided for the oil as it travels from the inlet to the outlet end of the burner, a longitudinally-extending support common to said mangles, and spacing collars carried by the support and interposed between the mangles.

14. In a crude oil burner, a diffusion member including stationary spoked-mangles of the same diameter, the spokes of one mangle being disposed opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil as it travels through the burner, said mangles arranged in sets, the mangles of one set arranged closer to each other than the mangles of an adjacent set.

15. In a crude oil burner, a diffusion member including stationary mangles of the same diameter and each including a plurality of radially-disposed spokes, the spokes of one mangle being arranged opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil as it travels through the burner, said mangles arranged in sets, the mangles of one set arranged closer to each other than the mangles of an adjacent set, and a longitudinally-extending support common to said mangles.

16. In a crude oil burner, a diffusion member including stationary mangles of the same diameter and each including a plurality of radially-disposed spokes, the spokes of one mangle being arranged opposite the spaces between the spokes of an adjacent mangle whereby a tortuous passage is provided for the oil as it travels through the burner, said mangles arranged in sets, the mangles of one set arranged closer to each other than the mangles of an adjacent set, a longitudinally-extending support common to said mangles, and spacing means carried by the support for the mangles.

17. A diffusion member for crude oil burners comprising a series of independent spoked-mangles arranged in longitudinal alinement and spaced from each other, the spaces between certain of said mangles being of greater length than the spaces between other of the mangles.

In testimony whereof I affix my signature in presence of two witnesses.

ELIJAH J. OWIN.

Witnesses:

JAS. B. STUBBS,

PAUL DE BRUHL.