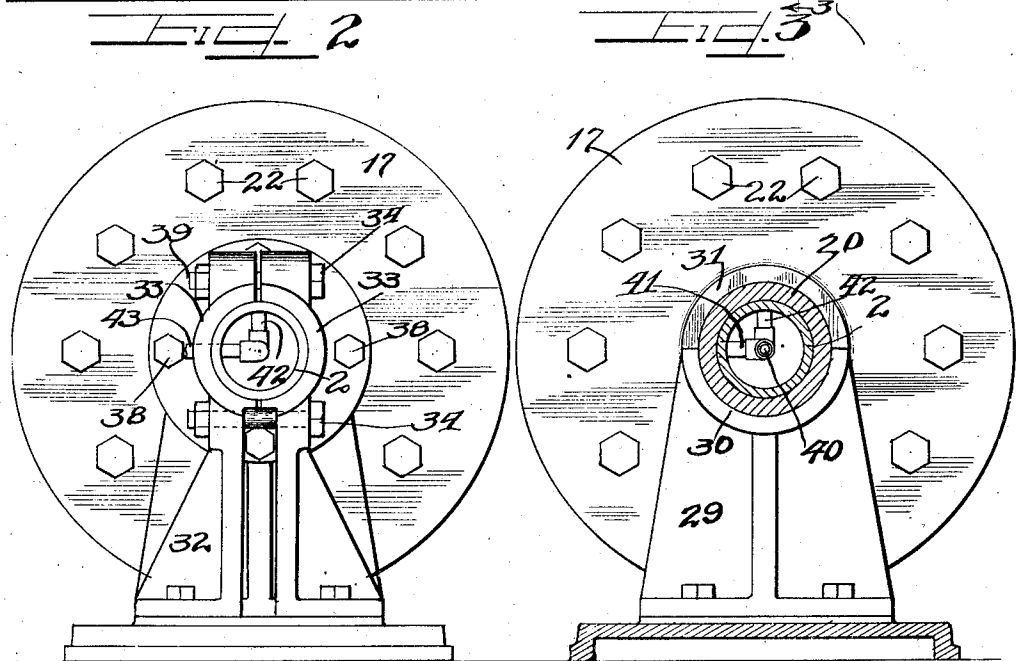
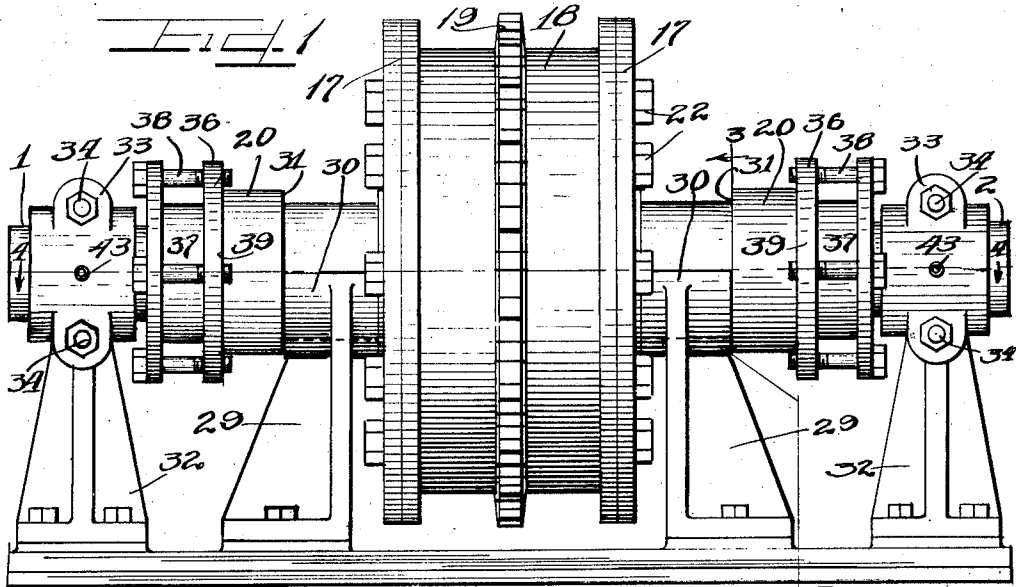


E. H. GOLLINGS.
 ROTARY POWER DEVICE.
 APPLICATION FILED SEPT. 19, 1918.

1,361,046.

Patented Dec. 7, 1920.

3 SHEETS—SHEET 1.



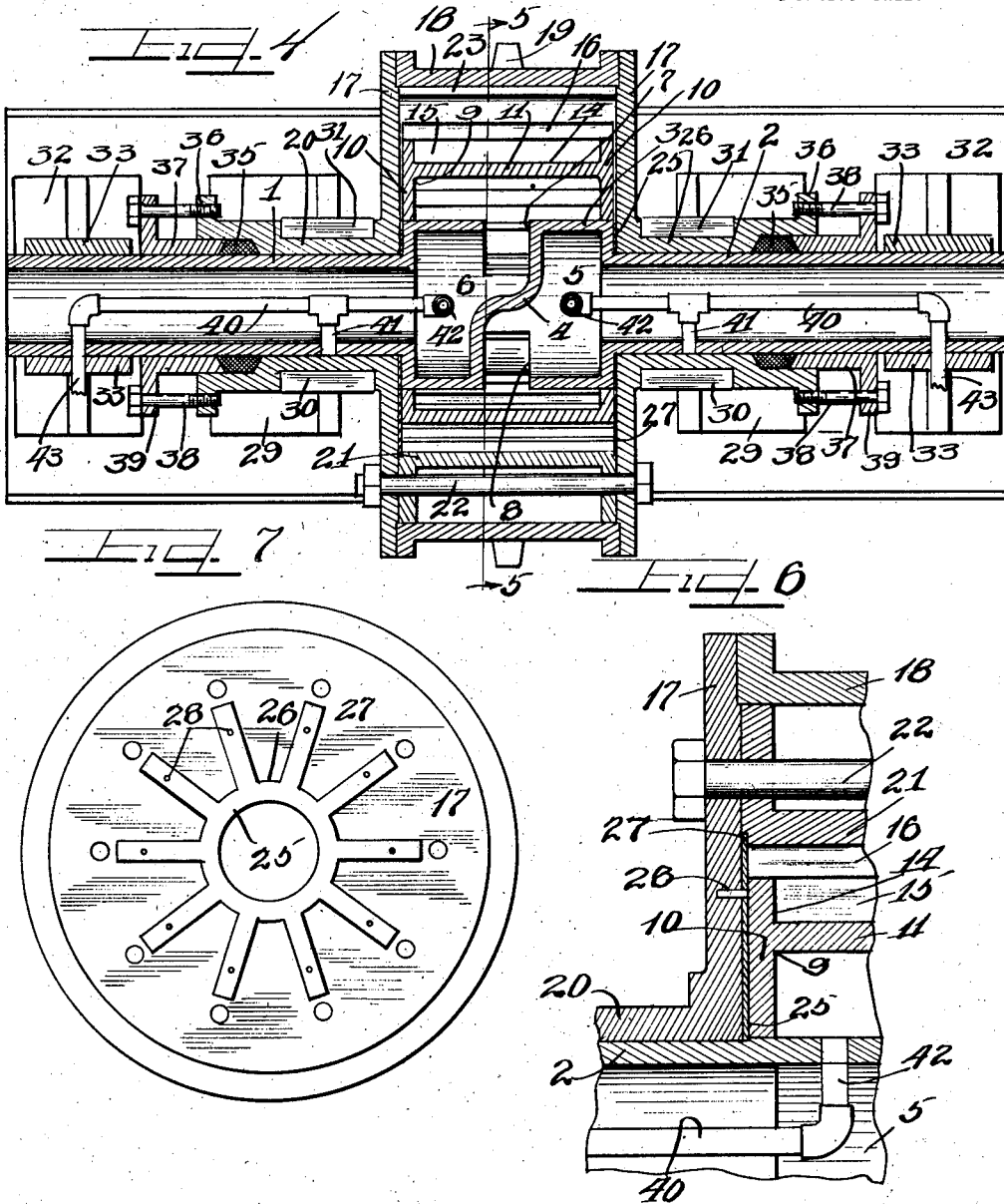
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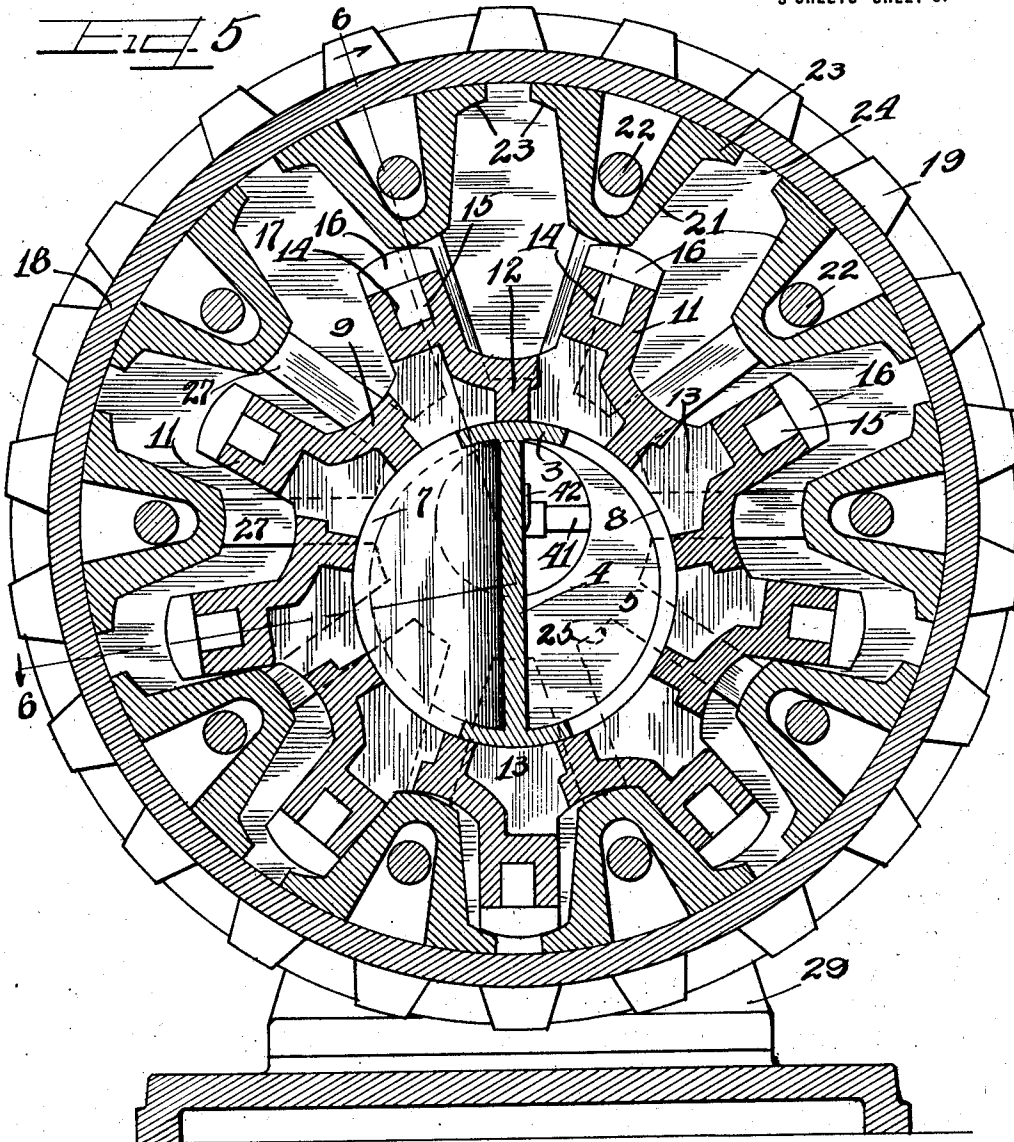
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UNITED STATES PATENT OFFICE.

ELICK H. GOLLINGS, OF CHICAGO, ILLINOIS.

ROTARY POWER DEVICE.

1,361,046.

Specification of Letters Patent.

Patented Dec. 7, 1920.

Application filed September 19, 1918. Serial No. 254,779.

To all whom it may concern:

Be it known that I, ELICK H. GOLLINGS, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rotary Power Devices; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

My invention has reference more particularly to a rotary power device which may be used either as a pump or motor, and wherein an externally toothed member is mounted eccentrically in an internally toothed member and both arranged to rotate and have the teeth thereof engage so as to form intake and discharge compartments and transfer fluid from the former to the latter, and my invention has reference to a device of the character forming the subject matter of my application filed April 22nd, 1918, Serial No. 230,094.

An object of my invention is to provide an improved rotary power device of this character having resilient tips on the ends of the teeth to afford a convenient and inexpensive means to effect a tight joint and prevent leakage from one compartment to the other.

Another object of my invention is to provide a device of this character having an improved construction to eliminate wear and friction and permitting replacement of wearing parts between the side walls of the inner and outer rotors.

Another object of my invention is to provide a device of this character with auxiliary pockets or extensions from the compartments between the teeth to accommodate foreign matter that may be introduced into the device and prevent same from interfering with the efficient operation of the device.

Another object of my invention is to provide improved means for oiling the bearing surfaces of the device.

Another object of my invention is to provide improved means for supporting and mounting the parts of the device to provide ample bearings which are placed so as to effectively support the device.

My invention also has other important objects which will appear from the following

specification and the accompanying drawings, in which I have described and illustrated my invention in a preferred form.

On the drawings:

Figure 1 is a side view of a device embodying my invention.

Fig. 2 is an end view thereof.

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

Fig. 4 is a horizontal longitudinal sectional view on the line 4—4, of Fig. 1.

Fig. 5 is an enlarged sectional view on the line 5—5 of Fig. 4.

Fig. 6 is an enlarged fragmentary sectional view on the line 6—6 of Fig. 5.

Fig. 7 is a view of the inner face of one of the side plates of the drum.

As shown on the drawings:

The reference numerals 1 and 2, indicate a pair of hollow shafts or pipes which are arranged in alinement and connected at their inner ends with a hollow cylinder or hub 3, which is arranged eccentrically with reference to the shafts 1 and 2, and has a zig-zag partition 4, dividing the interior of the hub 3, into two compartments, one of which, indicated at 6 communicates with the hollow shaft 1, and the other of which, indicated at 5, communicates with the hollow shaft 2, and there is an arcuate opening 7, from the compartment 6 at one side of the hub, and a corresponding opening 8, from the compartment 5, at the other side of the hub.

A wheel 9, is mounted to rotate on the hub 3, and comprises a pair of side plates 10, spaced apart so that the outer surfaces thereof are flush with the end faces of the hub 3, and connected together by means of a plurality of teeth 11, and cross partitions 12, as shown in Fig. 5, which partitions extend inwardly from the teeth to the central opening of the wheel so that the inner ends thereof engage against the periphery of the hub 3, and divide the wheel into a plurality of passages 13, which communicate with the openings 7 and 8, through the wall of the hub 3, and open outwardly into the spaces between the adjoining teeth 11, so that fluid may be supplied from the interior of the hub 3, out through one of the openings to the space between the teeth 11, and may also be passed in the reverse direction from the space between the teeth inwardly through the other opening to the interior of the hub 3. The outer end of each tooth 11, is provided with a transverse groove or socket 14,

to receive the shank 15, of the resilient cap 16, which is secured thereby to and forms the tip of the tooth 11, for the purpose to be hereinafter more fully explained.

5 A plate 17, is clamped close to each side of the wheel 9, and the end of the hub 3, and these plates have the annular ring 18, clamped therebetween to form a drum or cylindrical casing inclosing the wheel 9, and
10 this ring is provided externally with teeth 19, which are peripherally arranged and serve to impart power to the device when it is used as a pump and to transmit power therefrom when it is used as a motor. Each
15 of the plates 17, has a hub extension 20, on the outer face embracing the respective hollow shaft 1 or 2, and rotatable thereon, and as the wheel 9, is mounted upon the hub 3, and the hub is eccentrically arranged with reference to the shafts 1 and 2, the casing
20 17-18, is therefore eccentrically arranged with respect to the wheel 9, as shown in Fig. 5, a plurality of teeth 21, are mounted on the inner face of the annular ring 18, to co-
25 operate with the teeth 11, of the wheel 9, to afford intake and discharge compartments within the casing 18. The number of teeth 21, exceeds the number of teeth on the wheel 9, and the teeth 21, project inwardly a suit-
30 able distance so that the teeth 11, of the wheel 9, at one side of the ring 18, entirely mesh with the teeth 21, thereon and at the opposite side are withdrawn from the meshing engagement therewith and have a slid-
35 ing engagement with the tips thereof to afford the lost motion necessitated by the difference in the number of teeth on the wheel 9, and the ring 18.

The teeth 21, are hollow and formed with
40 a wall at each end through which the bolts 22, are passed to hold the teeth in place and also to combine the ring 18, and the end plate 17, and there is a lateral flange 23, at the base of each tooth engaging the inner sur-
45 face of the ring 18, to hold the tooth in upright position and serve as an abutment to be engaged by the outer ends of the teeth of the wheel 9, when the teeth are entirely
50 meshed, and the flanges 23, of the adjoining teeth are separated to provide a pocket or recess 24, therebetween for sand or other foreign matter which may pass through the device and prevent impairing the operation of the device.

55 In practice it has been found that the wheel 9, is caused to bear with a greater pressure against one of the side walls 17, than the other and offers a considerable degree of frictional resistance as well as op-
60 portunity for wear, and in order to eliminate the friction and provide for replacement in case of wear I have provided a spider 25, on the inner face of each plate 17, comprising a central ring 26, encircling the
65 shafts 1 or 2, respectively, and having a plu-

70 rality of arms 27, radiating therefrom, the outer ends of each of which project under the inner end of one of the teeth 21, so that there is a flat strip 27, extending inwardly from each tooth 21. The spider 25, is held
75 in the proper position by the engagement of the ends of the arms under the teeth 21, and displacement is further avoided by pins 28, which are passed through the arms 27, and engage in the wall of the plates 17.

For supporting the device there is a stand-
80 ard 29, at each side of the casing 18, and in close proximity thereto, which has a semi-circular bearing 30, at the upper end, which engages a wide annular groove 31, in the
85 hub 20, and there is also a standard 32, at the outer end of each of the shafts 1 and 2, and formed of two half sections with clamp members 33, at the upper end adapted to be
90 drawn into tight engagement with the shafts 1 and 2, by means of the bolts 34, so as to hold the shafts 1 and 2, and the hub 3, in a stationary position.

Each hub 20, beyond the bearing 30, is bored out to a larger internal diameter to
95 provide a chamber for packing 35, and there is an annular flange 36, at the outer end of each hub. A packing bushing 37, is inserted in the enlarged opening of the hub against the packing 35, and is held in place and ad-
100 justed against the packing by means of the bolts 38, which are passed through a flange 39, of the bushing and have a threaded engagement with the flange 36, of the hub.

For oiling the bearing surfaces of the de-
105 vice there is a pipe 40, extending inwardly through each hollow shaft 1 and 2, and provided with a lateral branch 41, extending out through the wall of the hollow shaft at the point where same is engaged by the hub 20,
110 and at the inner end of each pipe 40, is an upright branch 42, projecting through the wall of the hub 3, where the wheel 9, is journaled thereon. The extensions 42, extend upwardly instead of laterally so that the
115 outlets therefrom are intermediate of the intake side and the discharge side of the device so that the lubricant will flow naturally out through the pipe 42, without the influence of the suction or compression.
120 The outer ends of the pipes 40, are connected with a laterally extending branch 43, which may project through the wall of the hollow shafts 1 or 2, the bearing 33, thereof and the outer ends are provided with some suitable
125 means for providing lubricant to the bearing surfaces.

The operation is as follows:

The eccentric arrangement of the wheel 9, and the casing 18, and the coöperation of the
130 teeth thereof divides the casing 18, diametrically into an intake chamber at one side and a discharge chamber at the other side, and the engagement of the teeth effects a transfer of fluid from the one side to the

other so that the device may operate as a pump to transfer fluid from one place to another, or may be used as a motor by applying fluid under pressure to the device.

5 When used as a pump fluid is drawn in through the hollow shaft 2, into the compartment 5, of the hub 3, and the enlargement of the chamber at the intake or suction side of the device draws the fluid out from
10 the compartment 5, through the passageways 13, into the spaces between the teeth 11 and 21. As the tips of the teeth 11 and 21, engage at the top of the device a quantity of fluid is pocketed between a pair of adjoining
15 teeth 21, of the casing and a pair of adjoining teeth 11, of the wheel and carried over to the other side of the device and forced out through the openings 13, into the compartment 6, and from there out through the
20 pipe 1.

An effective engagement of the ends of the teeth 11, with the tips of the teeth 21, and also with the flanges 23, is insured by reason of the resilient caps 16, with which each of
25 the teeth 11, is provided and when the teeth 11, are in engagement with the bottom of the pockets between the teeth 21, a space 24, is provided therebelow to accommodate any sand or foreign material that may be passing
30 through the device, such material when taken in being thrown outwardly by centrifugal force into the space 24, and at the discharge side being removed therefrom by the outflow of the fluid.

35 The bearings 29, are arranged close against the plates 17, so as to effectively support the device and take the weight of the casing 18, from the shafts 1 and 2, and are adapted to support the device when it is
40 desired to remove the standards 32, to permit repacking of the joint between the hub 20, and the shafts 1 or 2.

It will be noted that by using the spider 25, on the inner face of each plate 17, the
45 frictional engagement of the wheel 9, is greatly reduced and an effective separation of the intake and discharge sides of the device is maintained by the arrangement of the ribs 27, to extend inwardly from each
50 tooth 21, and in case of excessive wear the spider 25, may be readily replaced at a small cost.

While I have shown and described my invention in a preferred form, I am aware
55 that various changes and modifications may be made therein without departing from the principles of my invention, and I therefore do not purpose limiting the patent granted hereon otherwise than necessitated by the
60 prior art.

I claim as my invention:

1. In a rotary power device the combination of a casing having a plurality of internally projecting teeth, a rotary member
65 mounted eccentrically in the casing and

provided with a less number of teeth than the casing and projecting radially therefrom so as to cooperate with the teeth of the casing to divide the casing into an intake compartment and a discharge compartment.
70 and to effect a transfer of fluid from one compartment to the other, the said internal teeth of the casing being provided with shoulders therebetween adapted to be engaged by the tips of the teeth of the rotary
75 member and having a pocket formed between the shoulders to form a chamber beyond the outer end of the tooth of the rotary member when said tooth is engaged against the shoulders of the adjoining teeth
80 of the casing.

2. In a rotary power device the combination of a casing having internal teeth, a rotary member mounted eccentrically in the casing and provided with a less number of
85 teeth than the casing and projecting radially therefrom so as to cooperate with the teeth of the casing to divide the casing into an intake compartment and a discharge compartment and to effect a transfer of fluid
90 from one compartment to the other, and a spider at each side of the casing between the side wall thereof and the side wall of the rotary member having an arm extending radially outward to each internal tooth.
95

3. In a rotary power device the combination of a casing having internal teeth, a hollow hub eccentrically arranged in the casing and having an inlet pipe at one side of the casing and an outlet pipe at the
100 other side of the casing both arranged concentrically of the casing, a rotary member in the casing mounted on said hub and provided with a less number of teeth than the casing and adapted to cooperate with the
105 teeth of the casing to divide the casing into an intake compartment and a discharge compartment and to effect the transfer of fluid from one compartment to the other, a bearing at the side of the casing and a
110 pipe for lubricating material extending inwardly through one of the pipes which communicates with the drum, said pipe for lubricating material having an outlet for lubricating the said bearing and an outlet for
115 lubricating the surface of the hub upon which the rotary member is mounted.

4. In a rotary power member the combination of a casing having a plurality of internal teeth, a hub arranged eccentrically
120 therein and having an inlet pipe and an outlet pipe extending therefrom and positioned concentrically of the casing, a hub on the casing at each side thereon encircling the pipe leading from the hub, a rotary
125 member mounted on the hub and provided with a less number of teeth than the casing and projecting radially therefrom so as to cooperate with the teeth of the casing to divide the casing into an intake com-
130

partment and a discharge compartment and
effect a transfer of fluid from one compart-
ment to the other, means for stationarily
supporting the hub and inlet and outlet
5 pipes therefrom, and means adjacent the
casing for rotatably supporting the casing
independently of the hub and pipes there-
from.

In testimony whereof I have hereunto
subscribed my name in the presence of two 10
subscribing witnesses.

ELICK H. GOLLINGS.

Witnesses:

EARL M. HARDINE,

CHARLES W. HILLS, Jr.