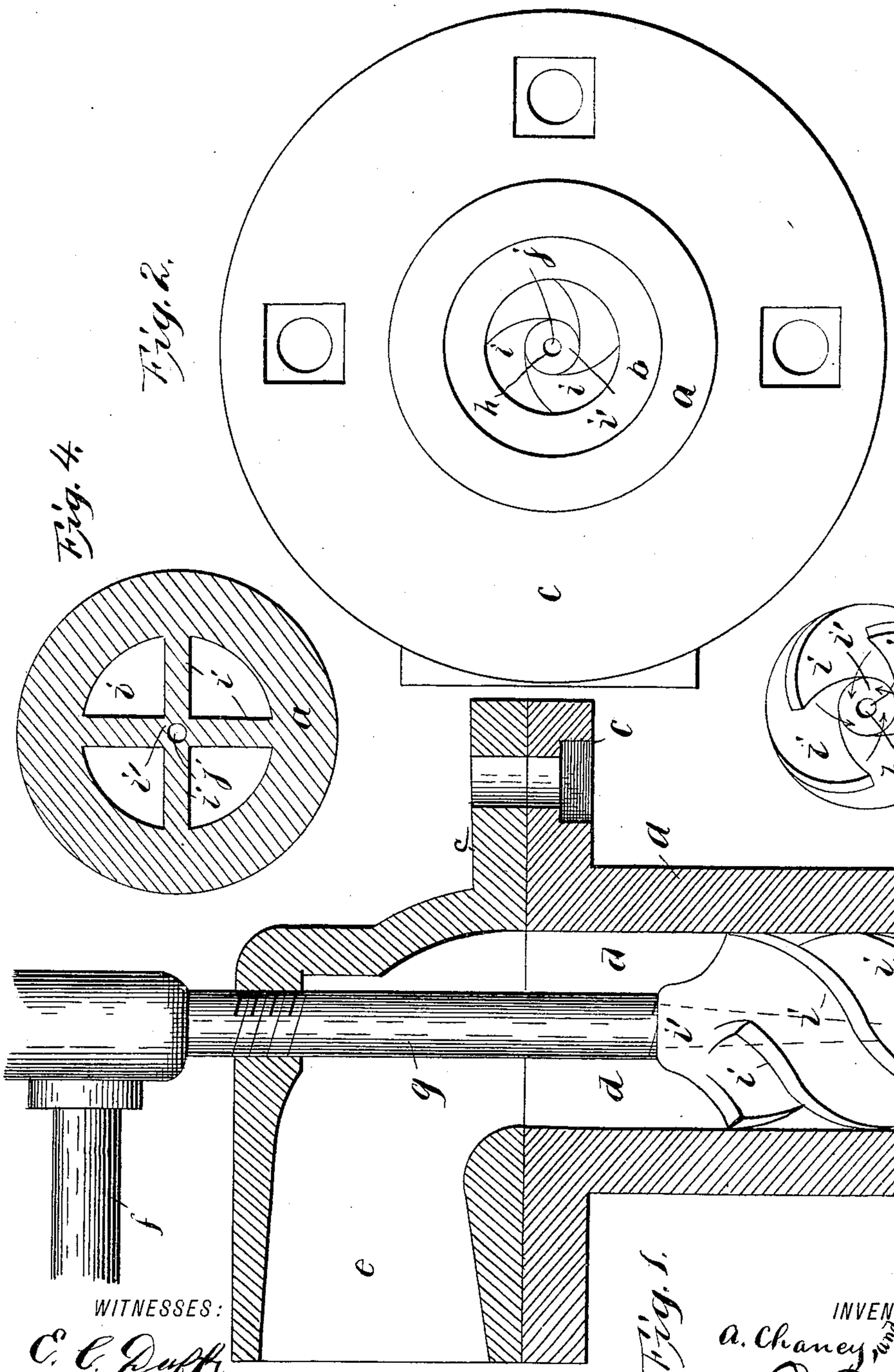
(No Model.) 2 Sheets—Sheet 1.

A. CHANEY & E. T. WIRES.

HYDROCARBON BURNER.

No. 481,088. Patented Aug. 16, 1892.



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(No Model.) 2 Sheets—Sheet 2.

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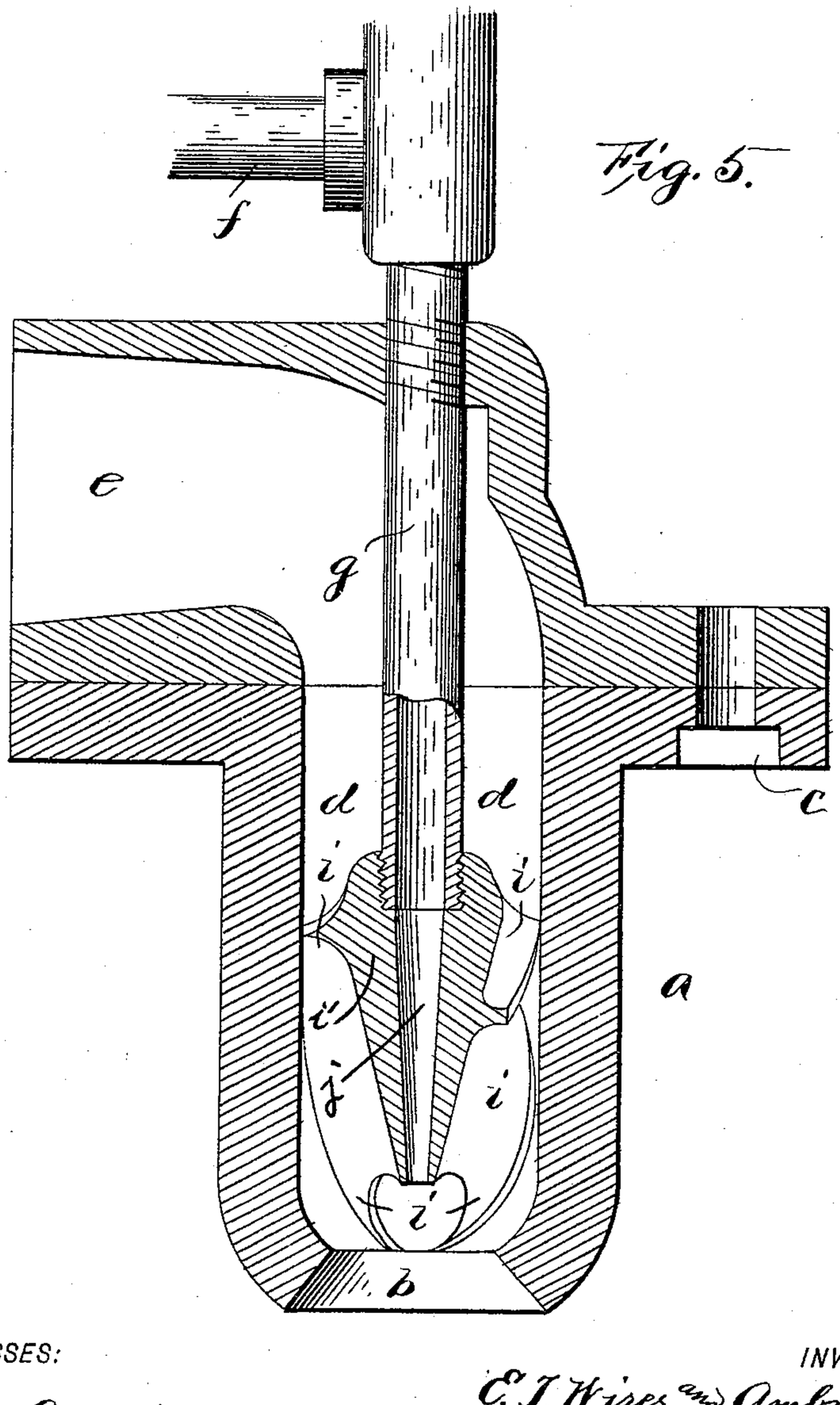
Fig. 5.



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UNITED STATES PATENT OFFICE.

AMBROSE CHANEY AND EDWARD T. WIRES, OF TERRE HAUTE, INDIANA.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 481,088, dated August 16, 1892.

Application filed January 12, 1892. Serial No. 417,864. (No model.)

To all whom it may concern:

Be it known that we, AMBROSE CHANEY and EDWARD T. WIRES, of Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Hydrocarbon-Burners; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in hydrocarbon-burners, more particularly to the kind known as "injector-burners."

The object of the invention is to provide an improved hydrocarbon-burner provided with improved means whereby a rotary blast of steam or air is produced, which more thoroughly and completely atomizes the hydrocarbon fluid and distributes the same evenly within the furnace in several directions, whereby a more perfect combustion is produced with a more even distribution within the furnace.

Our invention consists in certain novel features of construction and in combinations of parts, more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a longitudinal section of the improved burner. Fig. 2 is an end view of the burner. Fig. 3 is an end view of the spiral webs within the burner-shell. Fig. 4 is a sectional view showing a modification wherein the spiral webs are cast integral with the shell and extending completely across the same. Fig. 5 is a longitudinal section of the burner, taken centrally through the spiral flanges.

In the drawings, reference-letter *a* indicates the cylindrical or other shaped shell of the burner, having an outwardly-flared flame-opening *b*. The shell is preferably cast in two pieces, as shown, each with a flange *c*, which flanges are suitably secured together. However, I do not limit myself to any specific construction of shell.

Steam or air is admitted to the interior expansion-chamber *d* through an induction-opening *e* at the rear end of said chamber. The hydrocarbon fluid is fed in through pipe *f* into oil-passage *g*, extending centrally and longitudinally of the expansion-chamber.

The expansion-chamber of the burner is provided with one or more spiral webs, flanges, or plates *i*, preferably located at the discharge end thereof. These spiral webs are formed around a central core *i'*, so that the webs and core are formed somewhat like an ordinary wood-auger. The core has a central longitudinal passage *j* and is fitted on the end of pipe *g*, so that said passage forms a continuation of the oil-pipe toward the discharge end of the shell. The blades or webs *i* project somewhat beyond the open discharge end *h* of the passage of the core, which end is located centrally in rear of opening *b*. The series of webs or blades are formed parallel around their central body or core, so as to form spiral blast-passages between them within the discharge end of the expansion-chamber, which open on opposite sides of the discharge end of the expansion-chamber and discharge in different directions. Hence the oil and air or steam are discharged laterally in different directions, and a somewhat flat or spread flame is formed. Any suitable number of spiral blades or webs can be used to form a desirable number of spiral passages. Each spiral passage passes and extends beyond and is in connection with the open end of the oil-passage. The blades or webs completely fill and extend across the expansion-chamber, so that the blast, whether of air or steam, is forced to pass through the spiral passages and have the rotary movement imparted thereto. Said spiral webs or flanges can be cast integral with their core and fitted in the expansion-chamber on the end of the pipe, or they can be cast with the shell, as shown in Fig. 4, and the oil-pipe fitted into the same after an oil-duct has been drilled through the central part of the spiral web.

We do not limit ourselves to the peculiar construction of the spiral flanges in connection with the core.

In operation the air or steam blast entering the expansion-chamber is divided into several distinct currents by the plates, and each current is given a whirling twisting motion and is discharged through the opening *b* in such a way as to form a spread whirling or twisting frame. These twisting spiral currents catch

the oil and thoroughly atomize it. By the use of these spiral plates a complete rotary blast is obtained without straight currents, and the oil is evenly scattered over a large area, so that a large and spread flame is obtained. Where a straight blast is used, the oil is caught off the end of the pipe and thrown to the opposite side of the furnace in uneven quantities and with a small flame. Because of the different currents discharged in opposite directions we obtain a large spread flame which is even, by which most perfect combustion is obtained. Even when spiral flanges are formed projecting in from the inner surface of the shell toward but not all the distance to the oil-pipe, a central space is left, through which straight air-currents flow, which neutralizes the effects of the spiral blast, so that the disadvantages of the straight are not obviated.

It should be observed that the spiral webs or partitions project beyond the end *h* of its oil-passage, as shown, so that a small space is left around said end, across which and the end *h* the currents of air or steam shoot in different directions, thereby thoroughly and completely atomizing the oil. The currents pass each other in different directions. Hence the oil is completely and thoroughly atomized. The arrows in Fig. 3 show the different currents.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. In an oil-burner, the combination of the shell, the oil-passage in the shell having its open discharge end in rear of the open end of the shell, and the series of separate spiral webs extending completely across the open space in the shell around said passage and projecting beyond the open end of the passage, so as to direct the air across said open end, as described.

2. In an oil-burner, the combination of the shell having an end opening, a core centrally in the shell having a longitudinal oil-passage with an oil-discharge end in rear of said end opening, an oil-supply pipe entering the opposite end of said core, and the spiral ribs integral with said core and extending across the space within the shell around the core and projecting forwardly beyond said oil-discharge end, and thereby forming spiral passages discharging in different directions across said oil-discharge end, substantially as described.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

AMBROSE CHANEY.
EDWARD T. WIRES.

Witnesses:
FRANK M. DUNKIN,
F. H. SCHEUERMAN.