Jan. 2, 1923.

1,441,036.

B. SKIDMORE, JR.

FLUID DISPLACING APPARATUS.

FILED MAY 26, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

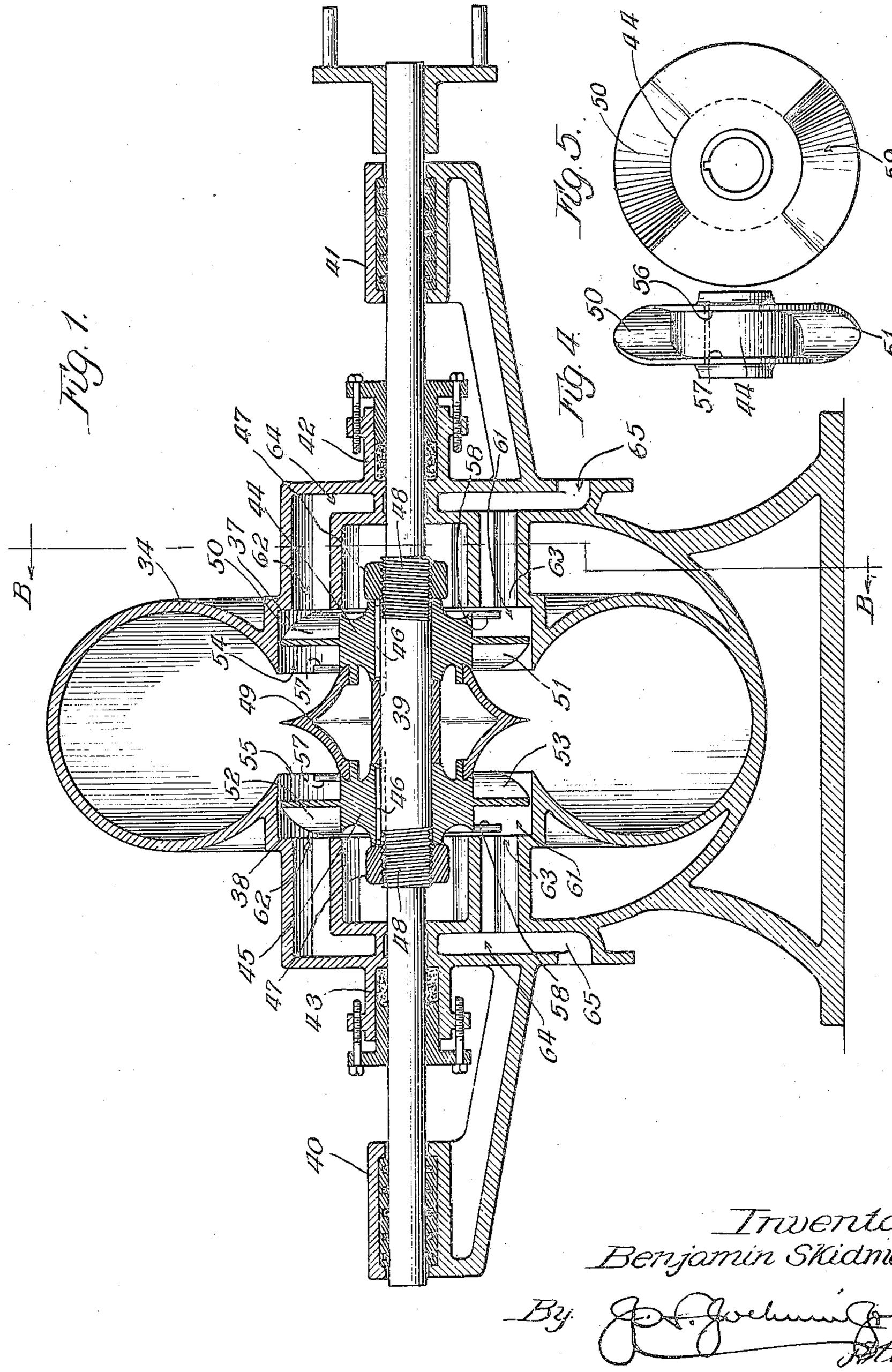

Fig. 5.

Fig. 4.

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Fig. 2.

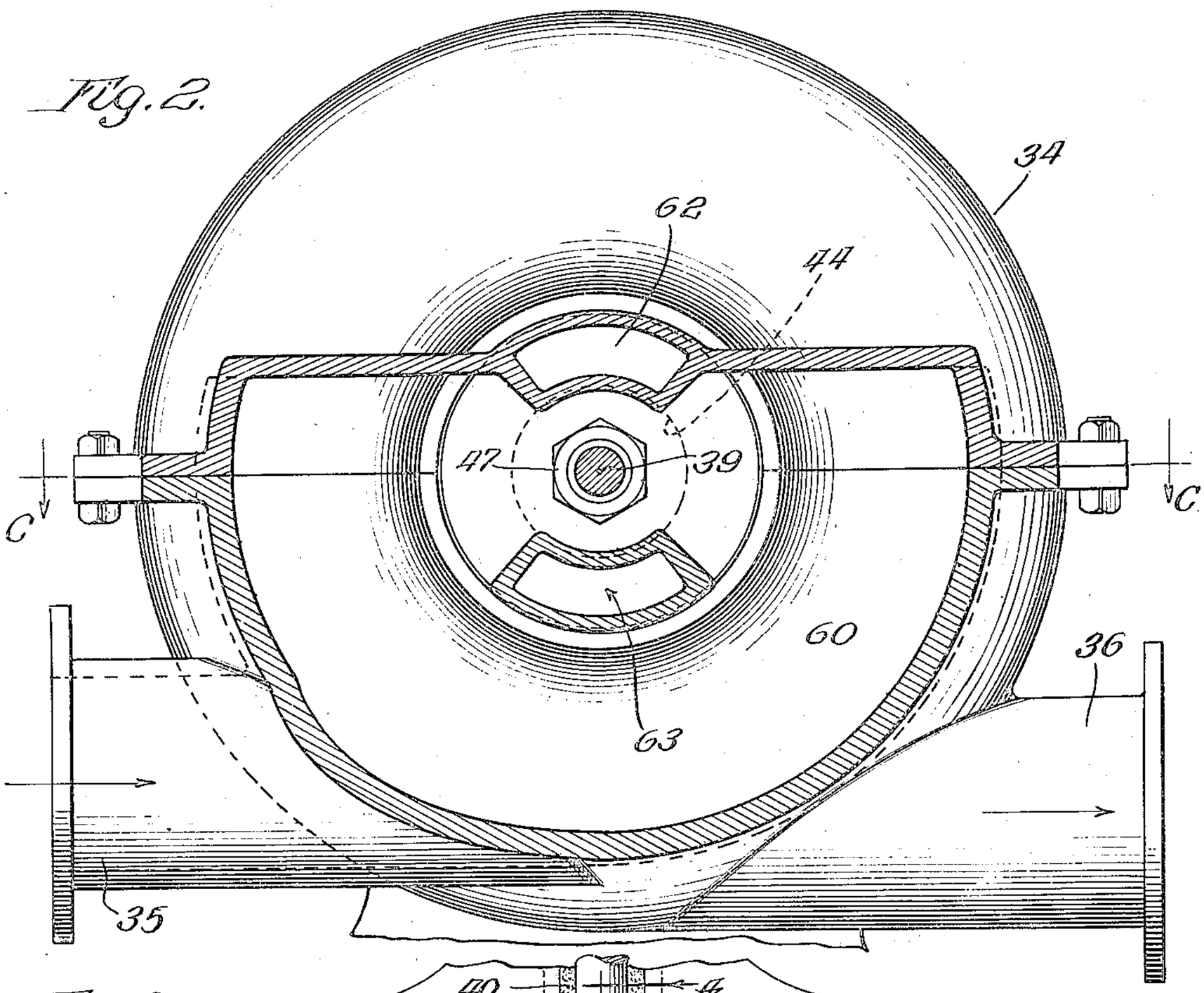
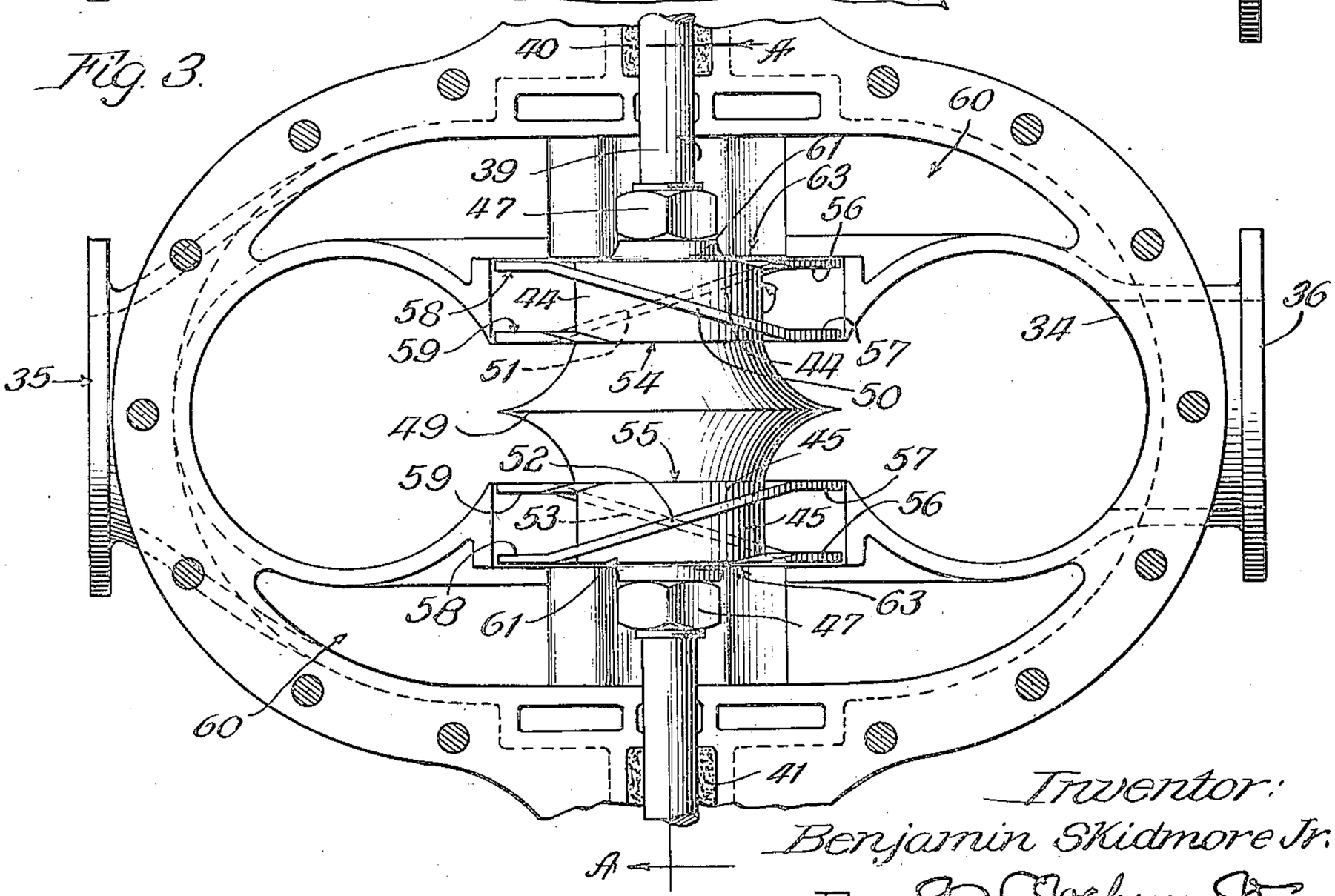


Fig. 3.



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Patented Jan. 2, 1923. 1,441,036

UNITED STATES PATENT OFFICE.

BENJAMIN SKIDMORE, JR., OF CHICAGO, ILLINOIS.

FLUID-DISPLACING APPARATUS.

Application filed May 26, 1921. Serial No. 472,793.

To all whom it may concern:

Be it known that I, BENJAMIN SKIDMORE, Jr., a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fluid-Displacing Apparatus, of which the following is a specification.

This invention relates to improvements in fluid displacing apparatus, particularly adapted, though not necessarily limited in its use for creating a suction or pressure, and one of the objects of the invention is to provide an improved apparatus of this character embodying one or more rotors operating upon the liquid in such a manner that the slugs of liquid which are picked up by the rotor blades will be maintained substantially quiescent and will act as stationary pistons and will be maintained in substantially an unchanged form or shape at all times while in the passages between the rotor blades, thereby obviating the flattening or breaking up of the liquid slugs.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which

Figure 1 is a vertical longitudinal sectional view as taken on line A—A, Figure 3.

Figure 2 is a sectional view taken on line B—B, Figure 1.

Figure 3 is a sectional view taken on line C—C, Figure 2.

Figure 4 is an end elevation of Figure 5.

Figure 5 is a side elevation of one of the rotors.

Referring more particularly to the drawings the numeral 34 designates a casing having a liquid inlet opening 35 and a discharge outlet opening 36.

The casing may be of any desired size and configuration and is preferably provided with chambers 37—38 having communication with the interior of the casing.

Passing through the casing and also through the chambers 37—38 is a shaft 39 which is mounted in suitable bearings 40—41 and the shaft also passes through suitable stuffing boxes 42—43, power being applied to the shaft 39 from any suitable source and in any suitable manner.

Arranged within the chambers 37—38 are rotors 44—45 which are secured to the shaft 39 for rotation therewith in any suitable manner preferably by means of keys 46, and nuts or collars 47, which engage threaded portions 48 on the shaft 39. The rotors substantially fill the respective chambers 37—38 and are laterally spaced from each other, a suitable deflector 49 being arranged in the space between the rotors. This deflector 49 may be of any desired size and configuration and held in position in any suitable manner so as to operate to deflect the fluid which is discharged from the rotors 44—45, into the casing 34.

The rotors 44—45 embody a body portion of any desired length and diameter and arranged about the periphery of the rotor 44 are blades 50—51 while blades 52—53 are arranged about the periphery of the rotor 45. The blades of each rotor are arranged about the body portion thereof, and are laterally spaced from each other to form fluid passages therebetween and the blades terminate short of each other so as to form lateral discharge outlet openings 54—55 on the opposite sides of the deflector 49 and in directions towards the deflector and opposed to each other.

The blades of each rotor may be spaced from each other for any desired distance and the ends or portions 56—57—58—59 of the respective blades are arranged substantially concentric with the axis of rotation of the rotor and are substantially parallel, while the portions of the blades intermediate the said parallel portions are arranged spirally about the axis of rotation of the rotor. The portion of the liquid confined in the passages between the blades will remain in a substantially quiescent condition with the result that as the rotor is actuated the walls of the passages will advance with respect to the liquid confined in the passages, until the spirally arranged portion of the blades operate upon the liquid to impart a lateral flow thereto towards the deflector 49.

During the operation of the rotor the inlets 61 of the passages between the blades will successively pass outlet openings 62—63 of passages 64 formed in the casing 34, and which passages 64 are provided with inlet openings 65 for admitting fluid into the

[redacted]

passages therebetween having lateral discharge outlets, the portions of proximate blades adjacent the outlets of the respective passages being substantially parallel and substantially concentric with the axis of rotation of the rotor whereby the liquid between the blades will be maintained in a substantially quiescent condition, the portions of the blades intermediate the said parallel portions extending spirally about the rotor in directions lengthwise of the axis of the rotor, the said rotors operating in opposition to each other.

6. An apparatus of the character described embodying a casing having a liquid inlet and a discharge outlet, laterally spaced rotors in the casing, and means for imparting a high speed of rotation to the rotors, each of said rotors embodying a plurality of blades extending about the periphery of the respective rotors, the blades of each rotor being spaced laterally to form fluid passages therebetween having lateral discharge outlets, the portions of proximate blades adjacent the outlets of the respective passages being substantially parallel and substantially concentric with the axis of rotation of the rotor whereby the liquid between the blades will be maintained in a substantially quiescent condition, the portions of the blades intermediate the said parallel portions extending spirally about the rotor in directions lengthwise of the axis of the rotor, the said rotors operating in opposition to each other and alternately delivering fluid into the casing.

7. An apparatus of the character described embodying a casing having a liquid inlet and a discharge outlet, laterally spaced rotors in the casing, means for imparting a high speed of rotation to the rotors, each of said rotors embodying a plurality of blades extending about the periphery of the respective rotors, the blades of each rotor being spaced laterally to form fluid passages therebetween having lateral discharge outlets, the portions of proximate blades adjacent the outlets of the respective passages being substantially parallel and substantially concentric with the axis of rotation of the rotor whereby the liquid between the blades will be maintained in a substantially quiescent condition, the portions of the blades intermediate the said parallel portions extending spirally about the rotor in directions lengthwise of the axis of the rotor, the said rotors operating in opposition to each other, and a deflector interposed between the rotors and adjacent the path of movement of the outlets of the said passages for deflecting the fluid in the casing.

8. An apparatus of the character described embodying a casing having a liquid inlet and a discharge outlet, a rotor mounted in the casing, means for imparting a high speed of rotation to the rotor, said rotor embodying a plurality of blades extending about the periphery of the rotor, said blades being spaced laterally to form fluid passages therebetween having lateral discharge outlets, the portions of proximate blades adjacent the outlets of the passages being substantially parallel and substantially concentric with the axis of rotation of the rotor whereby the liquid between the blades will be maintained in a substantially quiescent condition, the portions of the blades intermediate the said parallel portions extending spirally about the rotor in directions lengthwise of the axis of the rotor, and a conduit having one or more outlet openings adjacent the path of movement of the inlets of the said passages, the relative movement of the said passages and the liquid therein operating to cause a suction in the said conduit.

9. An apparatus of the character described embodying a casing having a liquid inlet and a discharge outlet, laterally spaced rotors in the casing, and means for imparting a high speed of rotation to the rotors, each of said rotors embodying a plurality of blades extending about the periphery of the respective rotors, the blades of each rotor extending about the rotor in directions opposite to each other, the blades of each rotor being spaced laterally to form fluid passages therebetween having lateral discharge outlets, the portions of proximate blades adjacent the outlets of the respective passages being substantially parallel and substantially concentric with the axis of rotation of the rotor whereby the liquid between the blades will be maintained in a substantially quiescent condition, the portions of the blades intermediate the said parallel portions extending spirally about the rotors in directions lengthwise of the axis of rotation of the respective rotors, the said rotors operating in opposition to each other.

In testimony whereof I have signed my name to this specification, on this 23rd day of May, A. D. 1921.

BENJAMIN SKIDMORE, JR.