

No. 728,873.

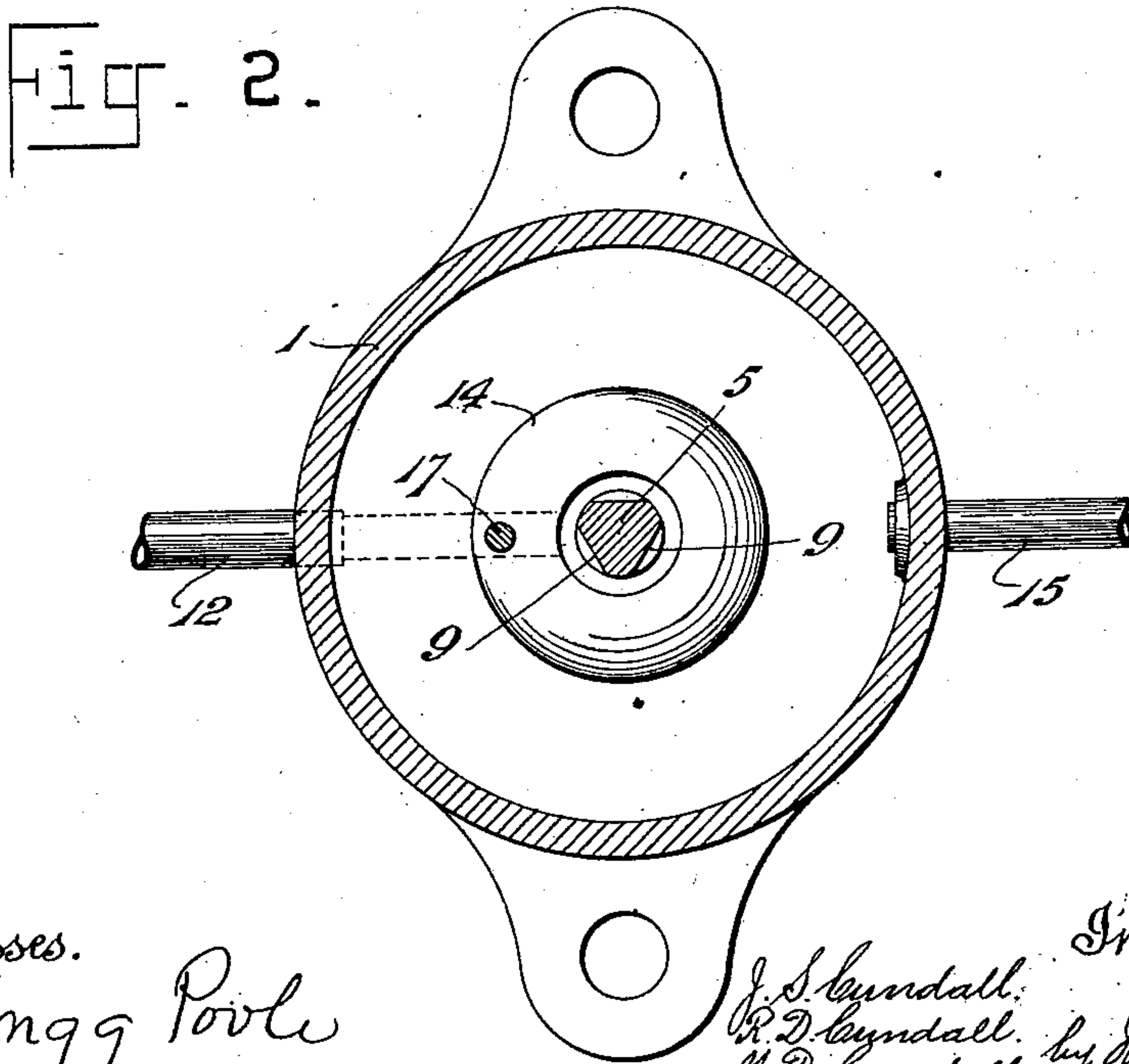
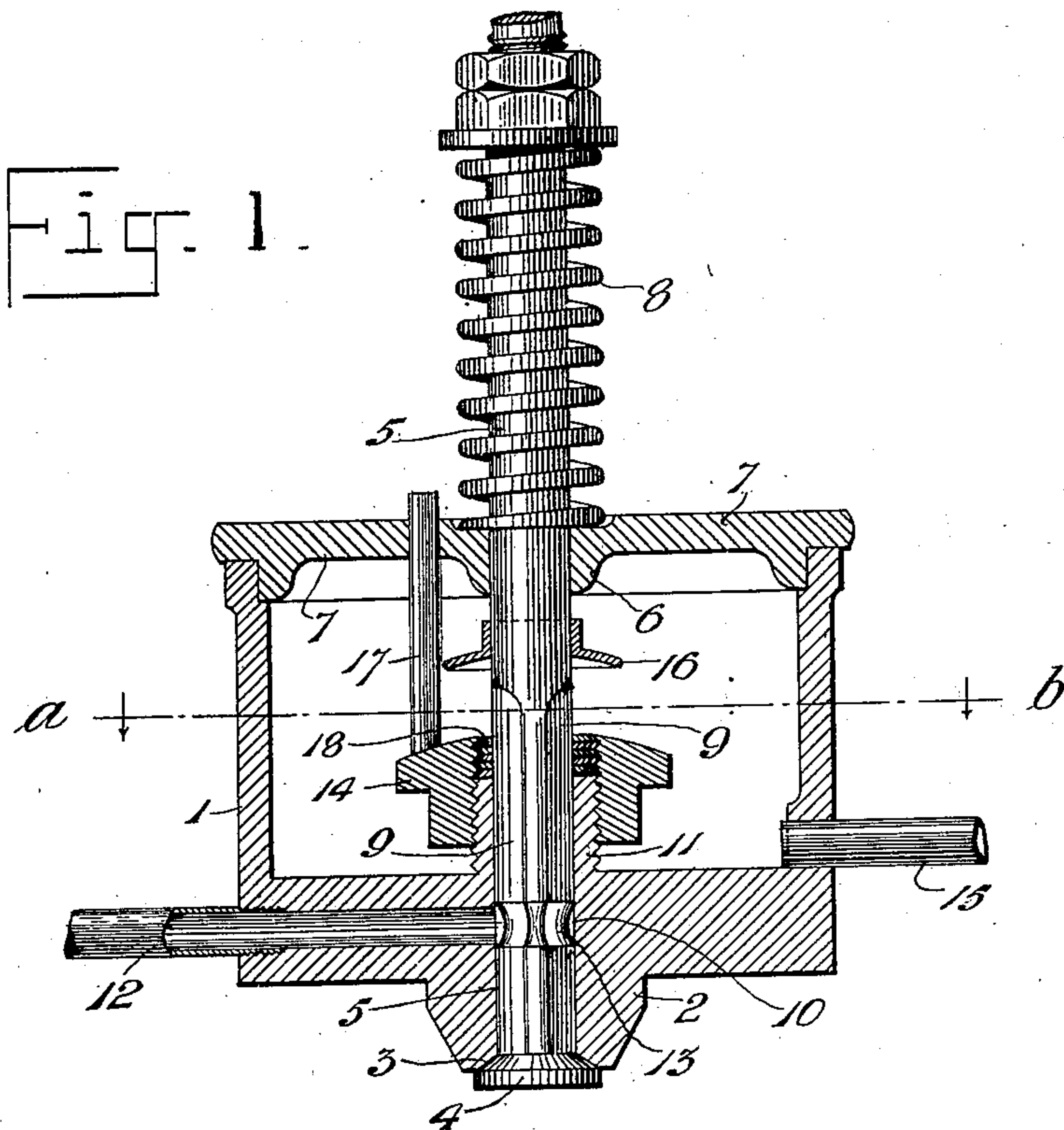
PATENTED MAY 26, 1903.

J. S., R. D., W. D. & H. C. CUNDALL.
OIL ENGINE.

APPLICATION FILED JUNE 16, 1902.

2 SHEETS—SHEET 1.

NO MODEL.



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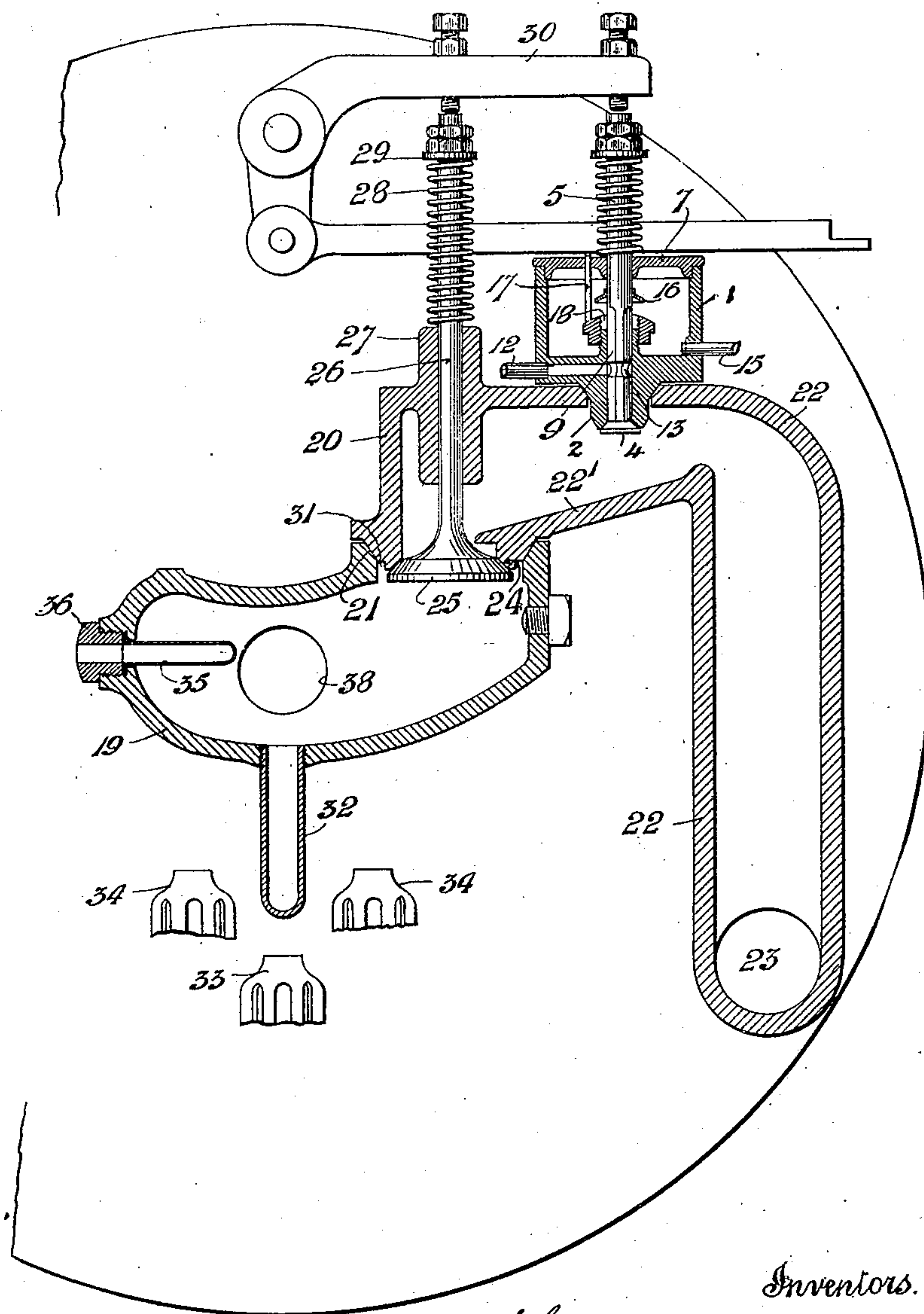
J. S., R. D., W. D. & H. C. CUNDALL.
OIL ENGINE.

APPLICATION FILED JUNE 18, 1902.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

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OIL-ENGINE.

SPECIFICATION forming part of Letters Patent No. 728,873, dated May 26, 1903.

Application filed June 16, 1902. Serial No. 111,858. (No model.)

To all whom it may concern:

Be it known that we, JOHN SAMUEL CUNDALL, ROBERT DINSDALE CUNDALL, WILLIAM DENTON CUNDALL, and HENRY CORDINGLEY CUNDALL, subjects of the King of Great Britain, residing at Baildon, in the county of York, England, have invented certain new and useful Improvements in and Relating to Oil-Valves for Hydrocarbon-Engines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain improvements in mechanism employed in oil-engines for supplying and regulating the quantity of oil or like liquid fuel supplied to the vaporizers of such engines and to the admission of oil and air together to the vaporizers.

Our invention consists of new and novel means and combination of parts for the aforesaid purposes, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a sectional elevation of an oil or liquid-fuel-feeding cup embodying our improvements therein. Fig. 2 is a sectional plan of same, taken on line *ab*. Fig. 3 is a sectional elevation of the vaporizer and oil and air inlet valve and aforesaid liquid-fuel-feeding cup constructed and arranged in accordance with our invention.

Referring to the drawings, in which like reference-numerals designate corresponding parts, 1 represents the oil or liquid-fuel cup or chamber, which may be secured to the vaporizer in the same manner as at present and in the same position or to the air-inlet pipe, as shown in Fig. 3. On the under side of the cup 1 or extension 2 at the bottom of said cup 1 is formed a valve-seating 3, on which is adapted to seat itself a valve 4, the spindle 5 of which extends upward through and is supported in a bearing in a boss 6 on the cap or lid 7, the said valve being opened by the action of the governor, which transmits motion through connections to a lever adapted to act upon the free end of the valve-spindle and whose movement when actuated depresses

the spindle and opens the valve, which is closed again on the lever being released by the retracting-spring 8, as ordinarily.

We will now describe our improvements in the mechanism for supplying and regulating the feed of oil to the vaporizer.

The valve-spindle 5 has flats 9 formed thereon for a portion of its length and passes through a circular hole 10, formed in the center boss 11. Communicating with the said hole 10 is a pipe 12 for supplying oil to the cup 1. When oil is forced through the pipe 12, it enters and passes around an annular groove 13, cut in the valve-spindle 5, filling the cavities formed by the flats 9, and any surplus oil fed thereto flowing over the top of the adjustable collar 14 into the bottom of the cup 1, from which it is conveyed by pipe 15. A flange 16 is preferably fitted on the valve-spindle 5 a little distance above the adjustable collar 14 to prevent the upward flow of oil issuing from the before-mentioned cavities coming in contact with the upper portion of the valve-spindle and cap or lid 7. By introducing oil through pipe 12 in such a manner that it impinges on the valve-spindle said valve-spindle is kept comparatively cool, so that when the valve 4 is opened, the valve-spindle and oil being cool, such oil is not driven back into the cup or chamber 1 by the heat, but enters the vaporizer more readily than is the case when supplied in the ordinary manner.

In order to regulate the quantity of oil to be admitted to the vaporizer on each operation of the valve 4, we secure to the adjustable collar 14, which is screwed onto the center boss 11, a spindle 17 of sufficient length to pass through an opening in the lid or cap 7 of the cup 1, which said lid or cap is capable of rotation by hand. By rotating the lid or cap 7 the adjustable collar 14 is partly unscrewed from or screwed farther down upon the boss 11 to raise or lower its position, and thereby regulate the depth of reservoir at 18 and the quantity of oil to be supplied for driving the load on the engine. The collar 14 is for the purpose of measuring the charge of oil, and for this purpose it is provided with

a measuring-chamber 18, formed by its upper portion, which projects above the boss 11 and which may be varied in capacity by screwing the said collar on the said boss, 5 thereby changing the height of the measuring-chamber.

The before-described improvements in the mechanism for supplying and regulating the quantity of oil to the vaporizer may be applied to oil-cups arranged to deliver into the vaporizer as ordinarily or in the manner shown in Fig. 3, in which the oil and air enter the vaporizer together through a valve common to both and in which novel arrangement we are enabled to reduce the amount of unconsumed oil by shutting it off by the admission-valve and retaining it until the next explosion is to take place. Referring to this part of our invention and to Fig. 3 of the drawings, we bolt to the ordinary vaporizer 19 a valve-box 20, making a ground joint 21 between the two parts. Extending outward from the side of said valve box or casing 20 and either integral therewith or bolted to same is the air-admission pipe 22, which from 25 the horizontal continues downward to and communicates at 23 with the ordinary air-chamber within the framing of the engine or engine-cylinder. (Not shown.) Within the valve-box or chamber 20 is a valve-seating 24 on which seats itself a valve 25, whose spindle 26 passes through the boss 27 at the upper end of the valve-box and is supported by and guided vertically in same, the projecting end 35 of said valve-spindle having a spiral spring 28 surrounding same and confined between the boss 27 and a collar 29. The spindle 26 is depressed to open the valve by the same lever 30 which opens the oil-admission valve 40 4 and the control of whose operation by the action of the governor is so well known as to be well understood by engineers without further explanation. The spring 28 retracts the valve-spindle and closes the valve immediately the pressure of lever 30 is removed. To the air-admission pipe 22, adjacent to the valve-box or casing 20, we bolt the oil-cup 1, which is constructed and operates as previously described with reference to Figs. 1 50 and 2, the valve 4 being located part way within the air-inlet pipe, as shown. The under portion of the admission-pipe from its vertical branch to the valve box or casing 20, as at 22', inclines downwardly and is projected slightly over the valve 25, the inclined plane insuring a proper flow of oil admitted through the valve 4 to, and the projecting lip delivering it direct onto, the upper surface of the valve 25, which is slightly conical toward the spindle or curved, as shown in Fig. 3, to direct the oil to the sides of said valve to pass same along with the air when the valve is open. Behind the valve-seating 24 is an annular channel or recess 31, which is 65 provided to cause the oil to fall direct into the vaporizer by preventing it reaching and

flowing down the walls of the valve box or casing. The valve 25 and oil-valve 4 are opened simultaneously, and the incoming oil being met by the current of air the mixture 70 of oil and air passes through valve 25 into the vaporizer 19 and being vaporized therein passes through the outlet 38 to engine-cylinder by suction stroke and is compressed and fired to drive the engine. Any unconsumed 75 oil is retained behind the valve 25 until the next explosion takes place and is then consumed, the evils of non-combustion being thus minimized. We find that the ordinary ignition-tube 32 for firing the combustible 80 mixture is liable to become ineffective for its purpose by the heavy gases given off by the lamps, said burner being choked up or coated and failing to fire the mixture and stopping the engine. We propose using said ordinary ignition-tube 32 for starting the engine only, and when started we turn out the center lamp 33 and use one or both side lamps 34 and employ a supplementary ignition-tube 35, composed of platinum or some inde- 90 structible metal, which extends into the vaporizer 19 and is secured thereto by the hollow-headed screw 36, said platinum tube being maintained by the combustion of the gases inside the vaporizer and engine-cylinder 95 at the requisite heat to fire the mixture, and by this means also we are enabled to use unrefined oil as a fuel.

The details of construction of our said invention may be varied, if desired. 100

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with an oil-cup, of a valve closing the outlet from the said cup and provided with a stem having a longitudinal oil-passage and a circumferential groove, said oil-cup being provided with an inlet-passage which delivers the oil direct into the said circumferential groove when the said valve is closed, substantially as set forth. 105 110

2. The combination, with an oil-cup provided with a screw-threaded boss, and an oil-inlet valve provided with a stem which slides in the said boss; of a screw-threaded collar engaging with the said boss and provided with an oil-measuring chamber above the boss and an operating-spindle, and a revoluble cap closing the oil-cup and engaging with the said spindle, substantially as set forth. 115

3. The combination, with an oil-cup provided with a screw-threaded boss, and an oil-inlet valve provided with a stem which slides in the said boss; of a screw-threaded collar engaging with the said boss and provided with an oil-measuring chamber above the boss and an operating-spindle, a deflecting-plate secured on the said valve-stem above the said collar, and a revoluble cap closing the oil-cup and engaging with the said spindle, substantially as set forth. 120 125 130

4. The combination, with an air and oil admission chamber having an inclined bot-

tom portion and a projecting oil-delivery lip at its lower part, of an air and oil admission valve seated under the said lip, and an oil-admission valve seated at the upper part of the said chamber over its said inclined bottom portion, substantially as set forth.

5 The combination, with an air and oil admission chamber having an inclined bottom portion, a projecting oil-delivery lip at its lower part, a valve-seat under the said lip, and a groove around the said seat; of an air and oil admission valve seated under the said lip on the said seat, and an oil-admission valve seated at the upper part of the said chamber over its said inclined bottom portion, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN SAMUEL CUNDALL.
ROBERT DINSDALE CUNDALL.
WILLIAM DENTON CUNDALL.
HENRY CORDINGLEY CUNDALL.

Witnesses to the signatures of John Samuel Cundall, Robert Dinsdale Cundall, and William Denton Cundall:

HERBERT NORMINGTON SMITH,
THOMAS H. BARRON.

Witnesses to the signature of Henry Cordingley Cundall:

HARRY A. WISE,
F. A. RINTOUL.