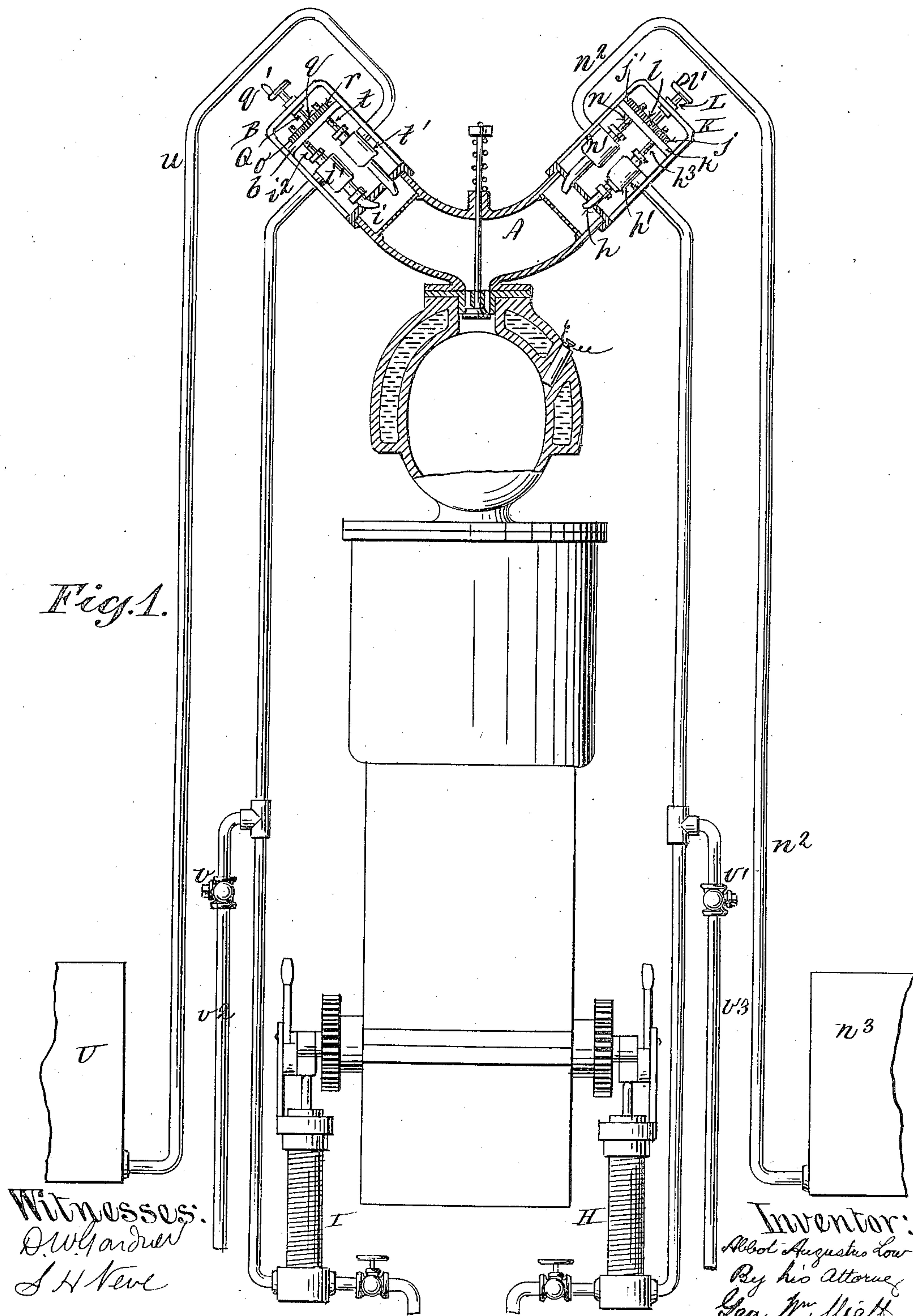


No. 812,860.

PATENTED FEB. 20, 1906.

A. A. LOW.  
HYDROCARBON MOTOR.  
APPLICATION FILED DEC. 19, 1904

2 SHEETS—SHEET 1.



Witnesses:  
D. W. Gardner  
J. H. Keve

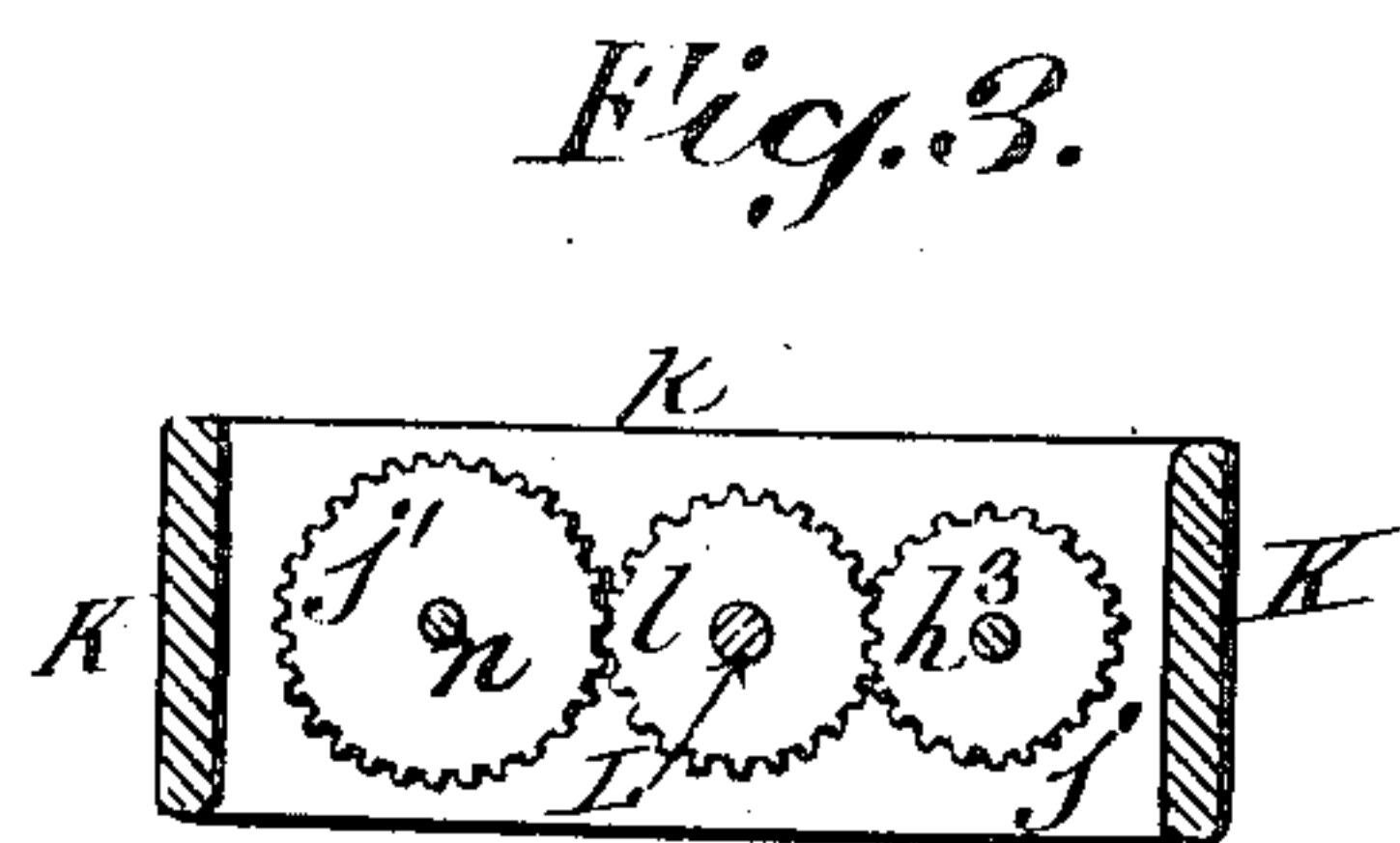
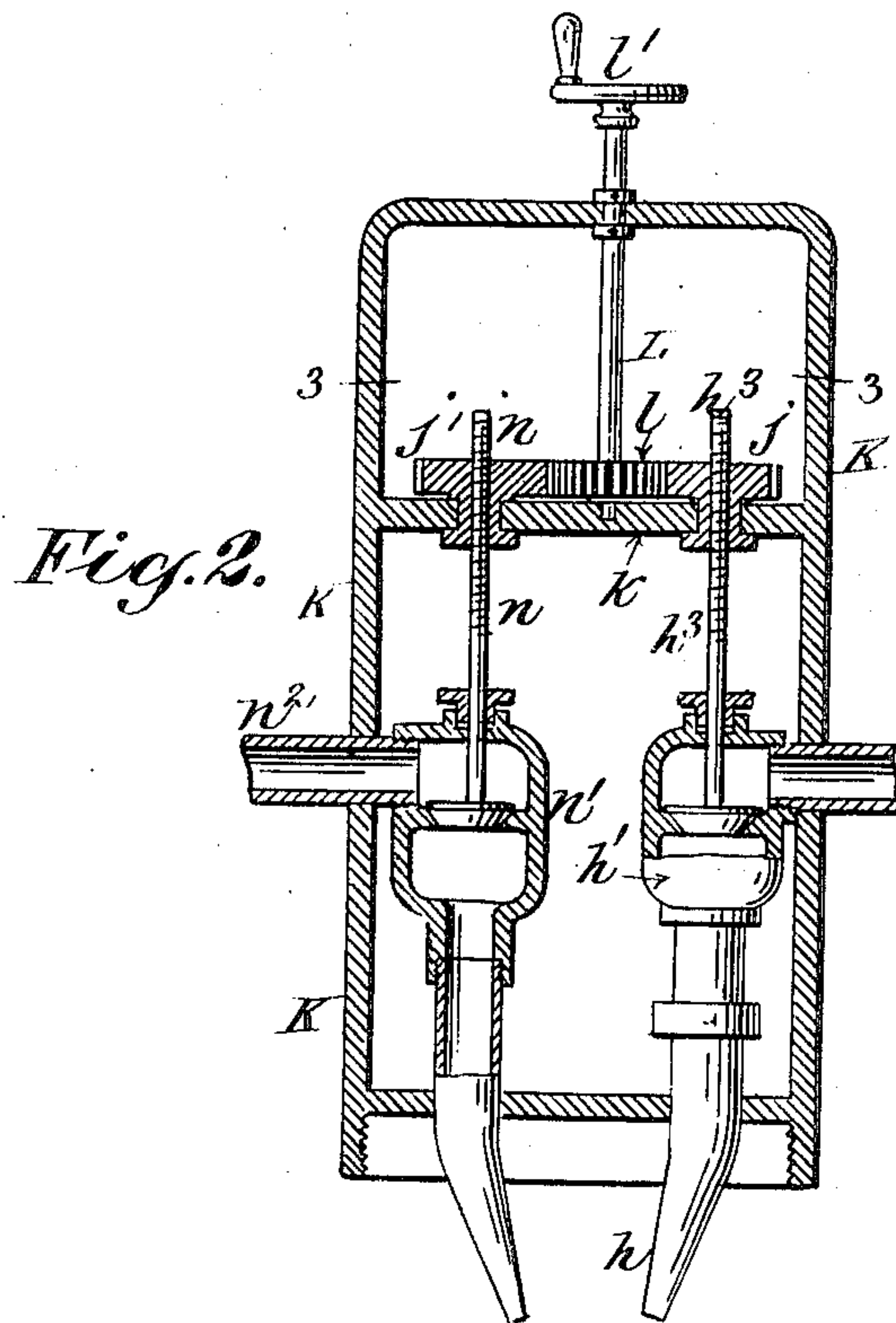
Inventor:  
Albot Augustus Low  
By his Attorney  
Geo. W. Malt

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2 SHEETS—SHEET 2.



Witnesses:  
D. W. Anderson  
S. H. Neve

Inventor:  
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By his Attorney  
Geo. W. Heath



# UNITED STATES PATENT OFFICE.

ABBOT AUGUSTUS LOW, OF HORSESHOE, NEW YORK.

## HYDROCARBON-MOTOR.

No. 812,860.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed December 19, 1904. Serial No. 237,368.

*To all whom it may concern:*

Be it known that I, ABBOT AUGUSTUS LOW, a citizen of the United States, residing at Horseshoe, St. Lawrence county, State of New York, have invented certain new and useful Improvements in Hydrocarbon-Motors, of which the following is a specification.

My present invention relates to the feed of hydrocarbon-motors, and is an improvement upon that set forth in my concurrent application, Serial No. 235,138, in which provision is made for introducing oil or other form of hydrocarbon mixed with air simultaneously with alcoholic vapor, also admixed with air, into a common mixing-chamber preparatory to the admission of the combined charge into the combustion-chamber, the arrangement being such that either the hydrocarbon or the alcohol can be used separately and independent of the other when desired.

The invention consists in the construction and arrangement of parts herein described and claimed specifically, whereby the feed of either oil and air or alcohol and air, or both, may be regulated simultaneously in due and prescribed proportion substantially as hereinafter set forth.

In the accompanying drawings, Figure 1 represents diagrammatically and in sectional elevation parts essential in carrying out my invention. Fig. 2 is a detail view upon an enlarged scale. Fig. 3 is a transverse section taken upon plane of line 3 3, Fig. 2.

The supply of hydrocarbon to the injector  $h$  is regulated through the medium of the valve  $h'$ , the stem  $h^3$  of which is threaded and engages with a rotatable nut-gear  $j$ , mounted in the cross-bar  $k$  of the yoke K. The nut-gear  $j$  engages with a pinion  $l$  upon the shaft L, mounted on the yoke K and rotatable by means of a crank or wheel  $l'$ . Another nut-gear  $j'$ , also mounted on the cross-bar  $k$  of the yoke K, likewise meshes with the driving-pinion  $l$  and engages the threaded stem  $n$  of a valve  $n'$ , communicating with the mixing-chamber A on one side, and with a pipe  $n^2$ , communicating with a compressed-air reservoir  $n^3$  or other means of supplying air under pressure. The screw-threads on the valve-stems  $h^3$  and  $n$  are reversed with relation to each other, so that on the rotation of the shaft L and driving-pinion  $l$  they will be raised or lowered simultaneously with relation to their respective valve-seats; but this motion will not be uniform for the reason that the nut-gear  $j'$  is of less diam-

eter than the nut-gear  $j$ . Thus in simultaneously opening the valves  $n'$   $h'$  the area of the air-valve will be increased relatively in proportion to the area of the hydrocarbon-valve in accordance with the requirements and in a definite and prescribed proportion. Instead of a difference in diameter between the nut-gears  $j$   $j'$  the difference in motion of the valve-stems may be effected by a different pitch of the threads upon the valve-stems  $h^3$   $n$ . In either case the result is the same, the supply of air being regulated and proportionate to the supply of hydrocarbon, relatively more air being admitted with every increase in the oil-feed. In like manner the supply of alcohol to the injector  $i$  is regulated through the medium of the valve  $i'$ , the stem  $i^2$  of which is threaded and engages with a rotatable nut-gear  $o$ , mounted on a cross-bar  $b$  of the yoke B. The nut-gear  $o$  engages with a pinion  $q$  upon the shaft Q, mounted upon the yoke B and rotatable by means of a crank or wheel  $q'$ . Another nut-gear  $r$ , also mounted on the cross-bar  $b$  of the yoke B, likewise meshes with the driving-pinion  $q$  of the shaft Q and engages with the threaded stem  $t$  of a valve  $t'$ , communicating with the mixing-chamber A on one side, and with a pipe  $u$ , communicating with a compressed-air reservoir U or other means of supplying air under pressure. The screw-threads on the valve-stems  $i^2$  and  $t$  are reversed with relation to each other, so that on the rotation of the shaft Q and driving-pinion  $q$  they will be raised or lowered simultaneously with relation to their respective valve-seats; but, as in the case of the oil-supply, this motion will not be uniform for the reason that the nut-gear  $r$  is of less diameter than the nut-gear  $o$ . Thus in simultaneously opening the air and alcohol valves the area of the air-valve will be increased relatively in proportion to the area of the alcohol-valve in accordance with requirements and in a definite and prescribed proportion. As in the case of the hydrocarbon-supply instead of a difference in diameter between the nut-gears a like result may be attained by a difference in screw-pitch.

Relief-valves  $v$   $v'$  are preferably interposed in the oil and alcohol pipes and arranged to conduct the overflow from the injectors back through pipes  $v^2$   $v^3$  to the forcing mechanism H L.

By the differential and simultaneous adjustment of the supply of air under pressure



with relation to the amount of the fuel-feed definite and accurate results may be obtained and the operation of the motor controlled with greater delicacy and economy.

5 Wire screens or equivalent intersticed partitions *p p* are arranged in the mixing-chamber A in such position as to receive the impact of the air and fluids from the injectors, and thereby insure a positive and thorough break-  
10 ing up and admixture of the same prior to their passage into the ignition-chamber. Thus the hydrocarbon is so thoroughly impregnated with oxygen that combustion is instantaneous and complete, and there is no  
15 residual deposit of unconsumed carbon.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a hydrocarbon-motor, the combination of a combustion-chamber, a mixing-  
20 chamber, an inlet-valve interposed between said combustion-chamber and mixing-chamber, an intersticed screen in said mixing-chamber, means for injecting a jet of hydrocarbon fuel against said screen, means for in-  
25 jecting a jet of compressed air against said screen, and means for effecting a simultaneous but differential adjustment of the quantity of fuel and compressed air injected against said screen in the mixing-chamber,  
30 for the purpose described.

2. In a hydrocarbon-motor, the combination of a combustion-chamber, a mixing-  
35 chamber, an inlet-valve interposed between said combustion-chamber and mixing-chamber, an intersticed screen in said mixing-chamber, means for injecting a jet of hydro-

carbon fuel against said screen, means for injecting a jet of compressed air against said screen, and means for simultaneously increasing or diminishing the quantity of fuel and  
40 compressed air injected against said screen in the mixing-chamber, for the purpose described.

3. In a hydrocarbon-motor, the combination of a combustion-chamber, a mixing-  
45 chamber, an inlet-valve interposed between said combustion-chamber and mixing-chamber, an intersticed screen in said mixing-chamber, means for injecting a jet of hydrocarbon fuel against said screen, means for in-  
50 jecting a jet of compressed air against said screen, the injectors being arranged convergently with relation to each other so that the jets of hydrocarbon and compressed air impinge against each other at or near the center  
55 of said screen, and means for effecting a simultaneous but differential adjustment of the quantity of fuel and compressed air injected against said screen in the mixing-chamber,  
60 for the purpose described.

4. In a hydrocarbon-motor, the combination with a mixing-chamber communicating with the combustion-chamber, of means for simultaneously supplying alcohol, and hydrocarbon to said mixing-chamber, and means  
65 for varying and adjusting the supply of compressed air thereto in a differential but prescribed proportion, for the purpose set forth.

ABBOT AUGUSTUS LOW.

Witnesses:

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