

(No Model.)

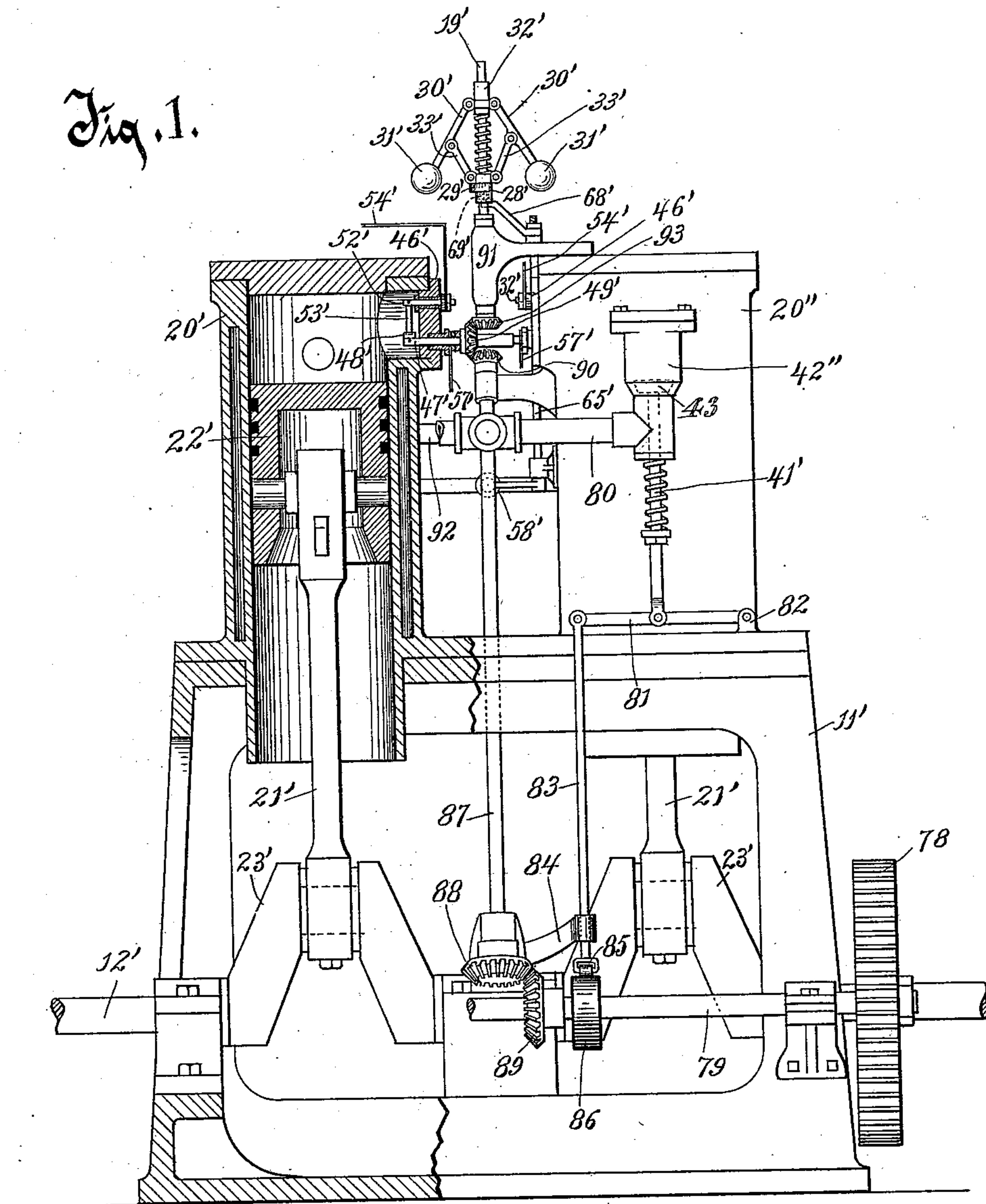
2 Sheets—Sheet 1.

L. J. MONAHAN & J. D. TERMAAT.
GAS AND GASOLINE ENGINE.

No. 561,123.

Patented June 2, 1896.

Fig. 1.



Witnesses.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

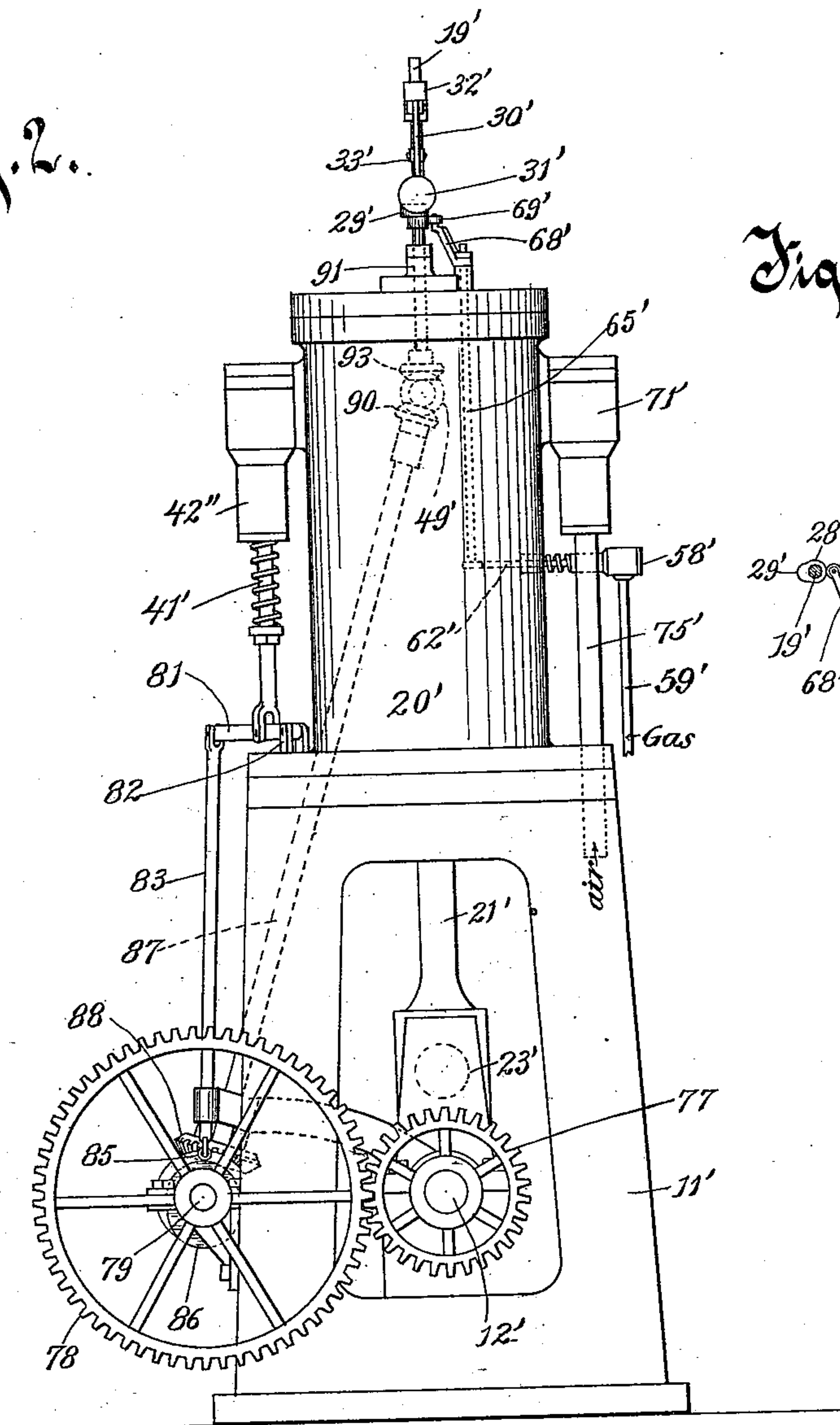
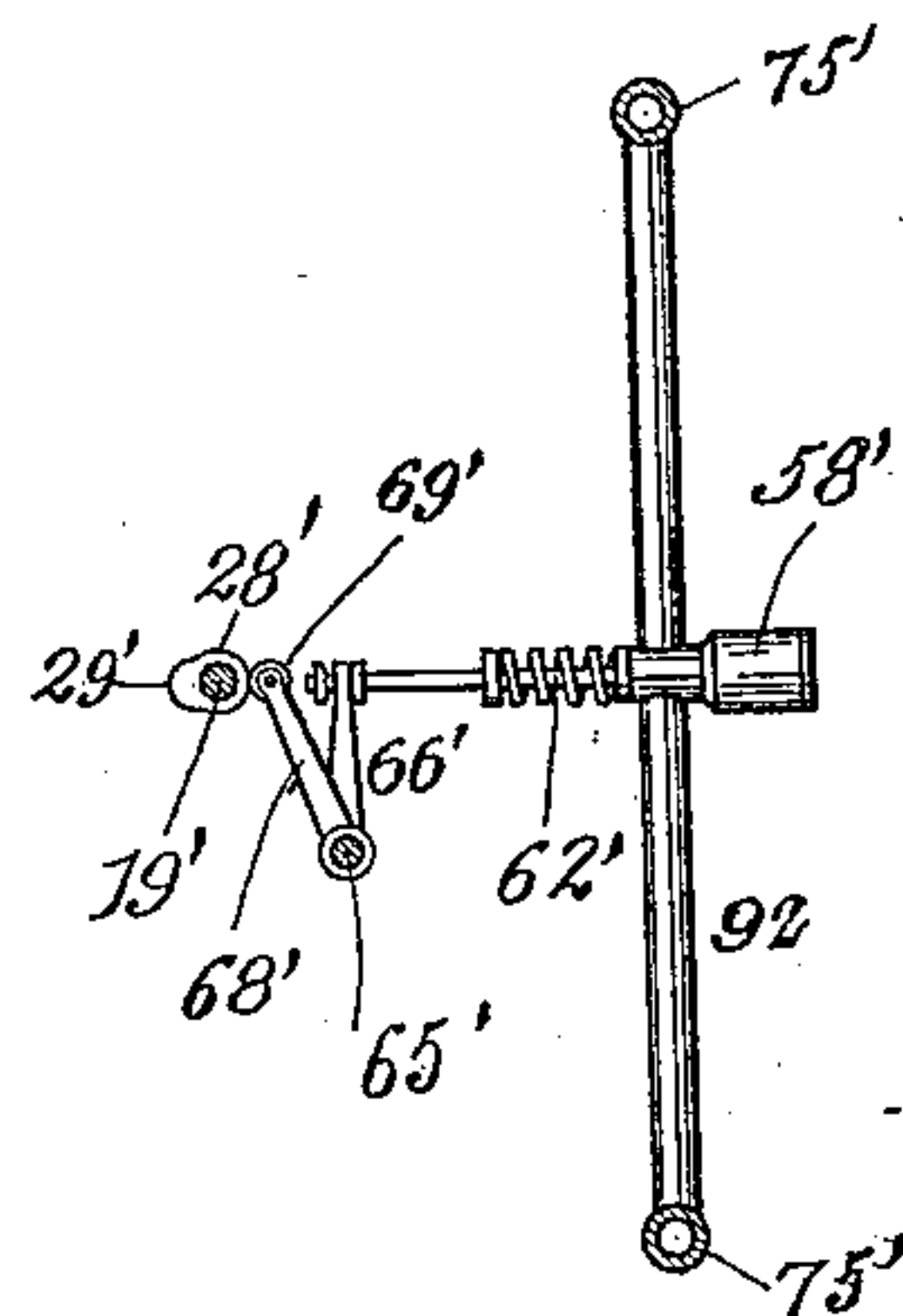


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

LOUIS J. MONAHAN AND JOHN D. TERMAAT, OF OSHKOSH, WISCONSIN.

GAS AND GASOLENE ENGINE.

SPECIFICATION forming part of Letters Patent No. 561,123, dated June 2, 1896.

Application filed June 24, 1895. Serial No. 553,831. (No model.)

To all whom it may concern:

Be it known that we, LOUIS J. MONAHAN and JOHN D. TERMAAT, of Oshkosh, in the county of Winnebago and State of Wisconsin, have invented a new and useful Improvement in Gas and Gasolene Engines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

Our invention has relation to improvements in gas and gasolene engines.

The objects of the invention are to provide simple mechanism for regulating the charge of gas to the cylinder and its exhaust therefrom, and also mechanism for operating the igniter.

With the above main objects in view the invention consists of the devices and parts or their equivalents, as hereinafter set forth.

In the accompanying drawings, Figure 1 is an elevation of the engine, one-half being in vertical section. Fig. 2 is an elevation at right angles to Fig. 1, and Fig. 3 is a plan view of the inlet-valve and the cam mechanism for operating the same.

Referring to the drawings, the numeral 11' indicates the supporting frame or base, in which is mounted the double crank-shaft 12', which crank-shaft carries near one end a spur-gear 77, which spur-gear meshes with a larger spur 78 on a counter-shaft 79. Mounted upon the frame or base are two cylinders 20' and 20'', in which cylinders pistons 22' work, the piston-rods 21' thereof extending through the lower open ends of the cylinders and connecting with the cranks 23' 23' of the crank-shaft.

The exhaust-valve casings 42'' are located in front of the cylinders and are connected by means of a connecting-pipe 80. Extending into these casings are valve-stems 41', the valves 43 thereof acting to close the valve-openings of the casings. The lower ends of the valve-stems 41' are pivotally connected to medial points of levers similar to 81, each of said levers being pivoted at one end to a lug 82 and having its opposite end connected to an arm 83, the lower end of said arm passing through a bearing 84. At the extremity of the arm is carried an antifriction-roller 85, which is adapted to bear upon a cam-collar 86, fixed on the counter-shaft 79.

The numeral 87 indicates a shaft, which at

its lower end is provided with a miter-gear 88, which gear meshes with a similar gear 89 on the counter-shaft. The shaft 87 extends upwardly at an incline to bring its upper end centrally between the two cylinders 20' 20'', near the upper ends of said cylinders. The upper extremity of shaft 87 is provided with a miter-gear 90, which meshes with a similar gear 49', carried by the transverse igniter-shaft 47'. This igniter-shaft has its ends passing through plates 46' 46', secured to each cylinder, and carries upon its ends within the cylinders the contact-points 48'. Shafts 52' 52' also pass through the plates 46' and carry at their inner ends the depending contact-arms 53', which arms are adapted to be contacted with by the rotating contact-points. Electrical conductors 54' 54' extend to the shafts 52' and return-conductors 57' 57' lead from the plates 46'.

The governor-shaft 19' is journaled in a bearing 91, which bearing is connected to the cylinder 20''. Upon this shaft is mounted the fixed collar 32', to which are pivotally connected arms 30' 30', said arms carrying at their outer ends governor-balls 31' 31'. Also mounted upon the governor-shaft, revolubly therewith, is the sliding sleeve 28', which sleeve is connected up to the arms 30' 30' by means of links 33' 33'. Extending along the inner side of cylinder 20'' and journaled in suitable bearings projecting from said cylinder is a rock-shaft 65'. At the upper end of this shaft is carried a tappet 68', in the end of which is journaled an antifriction-roller 69', which roller is adapted to bear on the sliding sleeve and when said sleeve is in one adjustment to contact once in every revolution of the governor-shaft with a cam projection 29' on the sliding sleeve 28'.

The numeral 58' indicates the gas-inlet-valve casing, which is provided interiorly with a regulating-valve. (Not shown.) The lower end of the rock-shaft 65' connects with the outer end of the valve-stem 62' of the valve of the gas-inlet casing through an arm 66' and regulates the inflow of the gas.

The numeral 71' indicates valve-casings for the commingled gas and air, one for each cylinder, said casings having interior valve mechanism of the usual form. These casings have depending therefrom air-pipes 75', and

each casing at its upper end connects with its respective cylinder. The depending air-pipes 75' are connected by a transverse pipe 92, with which transverse pipe the gas-inlet casing 5 communicates.

The governor-shaft 19' derives rotation through the means of a miter-gear 93, which meshes with a corresponding gear 49' on the igniter-shaft.

10 In the operation of the machine an initial turn or impetus is given to the crank-shaft in a direction necessary to draw the pistons downwardly and to thereby suck in gas and air. When the pistons are subsequently 15 forced upwardly, the valves controlling the inflow to the cylinders are closed and the mixture is pressed in the space above the pistons. Now just as the cranks pass their centers the revolving contact-points 48' of the igniting 20 devices snap by the contact-arms 53' and produce large sparks, which explode the mixtures, and this of course forces the pistons down. As the two cranks upon the crank-shaft point in the same direction when the two pistons 25 are thus forced downwardly by the explosion of the ignited gas, rotation is necessarily imparted to the crank-shaft. When the pistons have reached the end of their strokes, the exhaust-valves open and allow the pressure to 30 escape during the upward stroke, and so on continuously through the operation of the machine.

While the machine is operated in the manner above explained, as the governor-shaft is 35 revolved by the intermeshing gears 49' and 93 the antifriction-roller 69' rides over the cam projection 29' of the sleeve 28' once in every revolution of the governor-shaft and has the effect of turning the rock-shaft 65' 40 and, through the connecting-arm 66', forcing the valve-stem 62' inwardly to unseat the valve, and thereby allow for the free inflow of the gas. In this manner the inflow of a charge of gas on the downstroke of the piston 45 is regulated. When the speed increases, the governor-balls will by centrifugal force fly outwardly and have the effect of sliding the sleeve 28' on the shaft, so that the antifriction-roller 69' will no longer engage the projec- 50 tion 29' and so that the inlet-valve will remain closed and no further charges of gas be admitted to the cylinders until the speed of the engine has sufficiently slowed up to allow the balls to again swing inwardly toward the shaft, 55 when of course the sleeve will be slid in the opposite direction on the governor-shaft and the cam projection 29' once more brought into alinement with the antifriction-roller.

The revolving contact-points 48' are revolved by reason of the gear 90 of shaft 87 meshing with the gear 49', fixed on the shaft 47' of said revolving contact-points.

The exhaust-valves are regulated to open when the pistons reach the limit of their 65 downstrokes. This is accomplished by the pivoted levers 81 engaging the piston-stems 41', said levers being connected to the up-

per ends of arms 83, the lower ends of said arms carrying antifriction-rollers, which bear against cam-sleeves 86 on the counter-shaft 70 79. From the above description it will be seen that we provide most simple mechanism for regulating the inflow of the charge of gas to the cylinder, adapting the cylinder to take a full charge of gas, or none at all. We also 75 provide simple mechanism in connection therewith for operating the igniters and for regulating the exhaust-valves.

The air, it will be understood, is taken by the pipes 75'. The gas enters the pipe 59' of 80 the gas-inlet-valve casing, and after the valve of said casing is forced away from its seat the gas enters one of the air-pipes 75', and by the connecting-pipe 92 is conducted to the opposite air-pipe, and the gas and air then in their 85 commingled state, when the valves of the valve-casings 71' are raised by the suction created by the pistons on their downstrokes, are free to enter the main cylinders. The valves of the valve-casings 71' of course on 90 the upstrokes of the pistons are again forced to their seats.

The horizontal form of engine illustrated on Sheets 1 and 2 of the drawings is not intended to be used for more than two-horse 95 power, while the vertical double form just described is intended for use where a greater power is required.

Having thus described our invention, what we claim, and desire to secure by Letters Pat- 100 ent, is—

1. The combination of a cylinder, a piston therein, a driven shaft, a second shaft receiving motion from the driven shaft, an igniter-shaft rotatably connected with said second 105 shaft, the igniter-shaft extending into the cylinder and having a contact-point on its inner end, a contact-arm within the cylinder with which the contact-point is adapted to engage upon the rotation of the igniter-shaft, an elec- 110 trical feed-wire, an electrical return-wire, a gas-inlet-valve casing having communication with the cylinder, the valve thereof provided with a projecting valve-stem, a governor-shaft rotatably connected with the igniter- 115 shaft, governor-ball mechanism carried by the governor-shaft, and a connection between the governor-ball mechanism and the valve-stem of the gas-inlet-valve casing, whereby the valve of said stem is raised from and low- 120 ered to its seat, substantially as described.

2. The combination, of cylinders, pistons therein, a driven shaft, another shaft rotatably connected with said driven shaft, an igniter-shaft rotatably connected with said 125 other shaft, and having its opposite ends extending into the cylinders, and carrying within the cylinders contact-points, contact-arms within the cylinders with which the contact-points are adapted to engage upon the rota- 130 tion of the igniter-shaft, an electrical feed-wire, and an electrical return-wire, substantially as described.

3. The combination, of a shaft, cylinders,

pistons therein, valve-casings communicating
with the cylinders, said casings provided with
projecting air-pipes, a transverse pipe con-
necting said projecting air-pipes, valves with-
5 in the casings, said valves adapted to be op-
erated, so that on one stroke of the pistons
the casings are opened up to the cylinders,
and on the opposite stroke of the pistons com-
munication between the casings and the cyl-
10 inders is closed, a gas-valve casing commu-
nicating with the transverse connecting-pipe,
a valve within said gas-valve casing, and
means for operating the valve at the proper
time to provide for the admission of the gas

from the gas-valve casing to the transverse 15
connecting-pipe, said gas flowing from said
transverse connecting-pipe to the air-pipes
whereby the air and gas are commingled prior
to passing into the cylinders, substantially as
described. 20

In testimony whereof we affix our signa-
tures in presence of two witnesses.

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Witnesses:

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