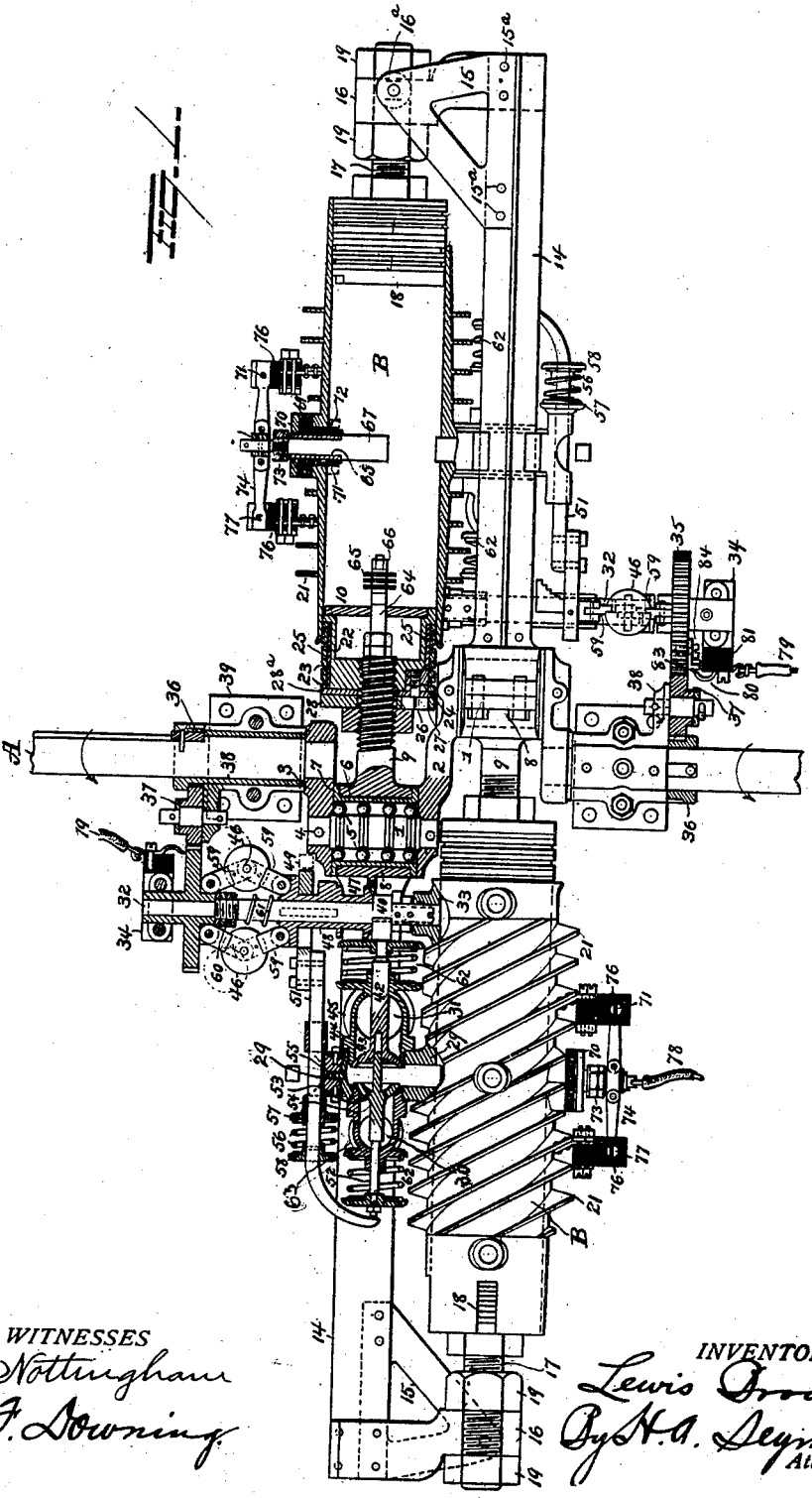
No. 676,933. Patented June 25, 1901.

L. BROWN.

MOTOR OR ENGINE.

(No Model.) (Application filed Dec. 4, 1899.)

3 Sheets—Sheet 1.



WITNESSES
E. J. Nottingham
G. F. Downing

INVENTOR
Lewis Brown
By H. A. Seymour
Attorney

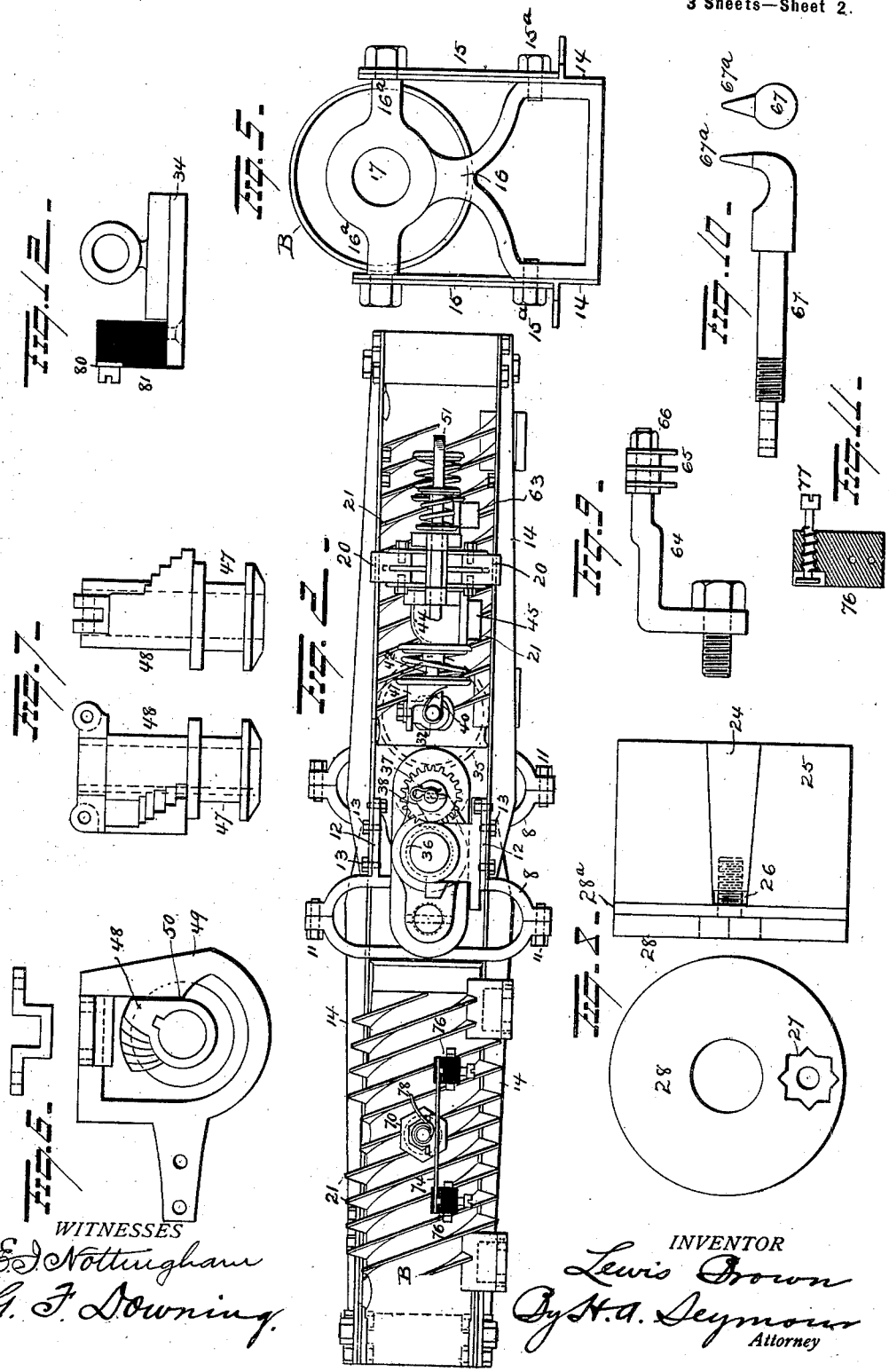
No. 676,933. Patented June 25, 1901.

L. BROWN.

MOTOR OR ENGINE.

(No Model.) (Application filed Dec. 4, 1899.)

3 Sheets—Sheet 2.



WITNESSES
E. J. Nottingham
G. F. Downing.

INVENTOR
Lewis Brown
By H. A. Seymour
Attorney

No. 676,933. Patented June 25, 1901.

L. BROWN.

MOTOR OR ENGINE.

(No Model.) (Application filed Dec. 4, 1899.)

3 Sheets—Sheet 3.

Fig. 3.

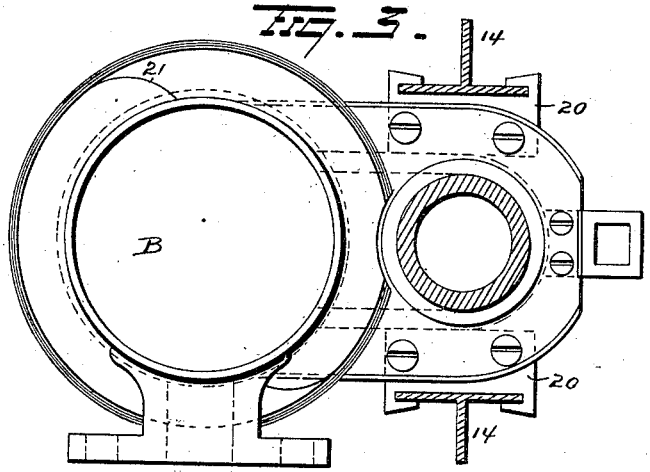


Fig. 13.

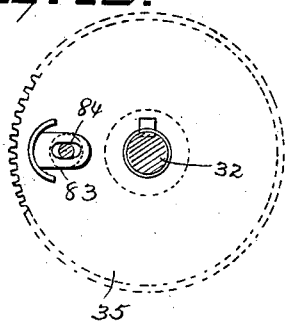


Fig. 4.

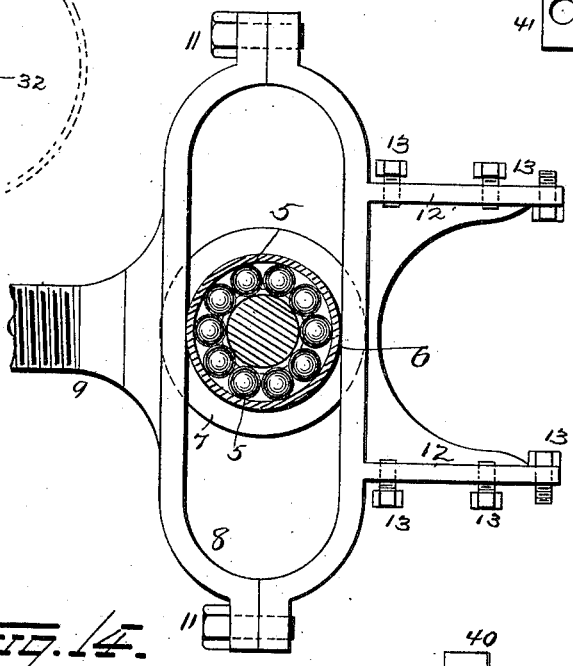


Fig. 15.

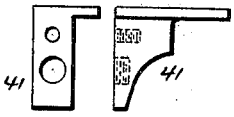
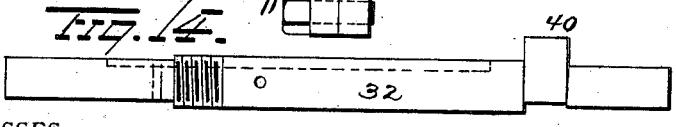


Fig. 14.



WITNESSES

E. J. Nottingham

G. F. Downing.

INVENTOR

Lewis Brown

By H. A. Seymour

Attorney

UNITED STATES PATENT OFFICE.

LEWIS BROWN, OF SLIDE MOUNTAIN, NEW YORK.

MOTOR OR ENGINE.

SPECIFICATION forming part of Letters Patent No. 676,933, dated June 25, 1901.

Application filed December 4, 1899. Serial No. 739,156. (No model.)

To all whom it may concern:

Be it known that I, LEWIS BROWN, a resident of Slide Mountain, in the county of Ulster and State of New York, have invented certain new and useful Improvements in Motors or Engines; and I 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.

My invention relates to an improved motor or engine, an object of the invention being to provide a motor which will transform the heat into energy with the greatest rapidity mechanically allowable, reduce the contact between the hot gases and cylinder-walls to the smallest amount possible, and also to reduce the wall-surface of the compression-space or combustion-chamber to the smallest possible area in proportion to the required volume.

A further object is to provide a motor which will permit of an economical and wide variation of speed and consequent power.

A further object is to provide a motor with improved means for radiating the heat and dispense with a water-lining which has been found most inconvenient for motors, especially those employed on automobiles.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view, partly in section, illustrating my improvements. Fig. 2 is a side view on a line through the center of crank-shaft, with part of valve-gearing cut away to show shape of exhaust-valve, cam, and operating mechanism. Fig. 3 is an end view. Fig. 4 is an enlarged detail view of one of the yokes. Figs. 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15 are enlarged detail views of various parts of the motor.

A represents a crank-shaft having two wrists 1, connected to crank-shaft by attached cranks or webs 2 and 3, all of which are preferably removable, being held from turning by suitable pins 4. However, the outer webs 3 may be forged with crank-shaft, if desired, leaving intermediate one, 2, detachable in order to mount ball-bearings, which will now be explained. The wrists 1 are provided with a series of annular grooves or runways for balls 5, and a sleeve 6 is mounted on said balls and is provided at each end with a peripheral flange 7 to form a guide for a yoke 8, one half of which is made integral with a screw-threaded rod 9, to which a piston 10, mounted in one of the cylinders B, is secured. The other half of the yoke is secured to the first-mentioned half at its upper and lower ends by means of suitable bolts or screws 11 passing through alined holes in lugs or enlargements on the sections of yoke. The last-mentioned half of the yoke is made with parallel arms 12, to which are secured, by means of bolts or screws 13, two T-shaped parallel angle-irons 14. An angular bracket 15 is secured to each angle-iron 14 by bolts 15^a and are provided with alined holes for the reception of threaded projections or lugs 16^a on a head 16, secured to the angle-irons 14 by means of the bolts or screws 15^a and disposed on a screw-threaded rod 17, to which is secured a piston 18, mounted in the end of the cylinder opposite the piston 10. The head 16 is adjustably secured on the rod 17 by means of suitable nuts 19, and the T-shaped angle-irons 14 are disposed in suitable guides 20, secured, preferably, to the spiral ribs 21 on the cylinder. The ribs 21 extend throughout practically the whole length of the cylinder, and it will be seen that owing to the fact that they are practically one continuous spiral rib will permit of a free circulation of air to radiate the heat generated and keep the cylinder cool and will at the same time greatly strengthen the cylinder where strength is most needed—namely, at the point of explosion.

It will be seen that with my improved construction the pistons are provided with rigid rods, which give to them a straight thrust, thus dispensing with rocking and pounding of the pistons against the sides of the cylinders, as is the case when the usual method of attaching the pistons to the crank-shaft is employed—namely, by a short rocking piston-rod which causes the piston to take the side thrusts, which in a short time will wear it and the cylinder ovally or out of round, and thereby cause a leakage and thumping within the cylinder by its loose fit, which cannot be taken up. By the construction I have adopted this

is overcome and makes possible a tighter fitting, better wearing, and obviously more efficient piston and consequent running engine, being also easily adjusted as to its compression by simply adjusting the nuts 19.

Each piston 10 and 18 comprises a frame 22, on which is mounted a series of packing-rings 23. A split ring 25 is disposed on the frame 22, and a wedge-shaped block 24 is disposed between the beveled ends of said ring, and the packing or piston rings 23 are mounted on said split ring and block. A screw or bolt 26 is screwed into the wedge-shaped block 24 and bears against a washer 28ª, which in turn bears against the frame. Hence when the screw or bolt is turned it will move the wedge-shaped block to spread or contract the split ring, and hence tighten or loosen the packing-rings 23. A plate 28 is mounted on the piston-rod and is provided with an angular opening 27 therein, which when disposed over the angular head of the bolt will effectually prevent accidental turning of said bolt or screw.

Each cylinder B is provided with an outwardly-projecting valve-chamber 29. This can be cast with or otherwise suitably attached to and communicating with the cylinder, and to and in which are attached and provided both inlet-port 30 and exhaust-port 31 of the usual form; but the valves therefor are operated by improved means from a single shaft 32, as will now be explained. The shaft 32 is disposed parallel with the crank-shaft A and is mounted at one end in an enlarged bearing 33, integral with or secured to a cylinder B and at its other end in a suitable bracket 34. A gear-wheel 35 is mounted on the shaft 32 and is connected with a gear-wheel 36 on the crank-shaft by means of an idle gear 37, mounted on a bracket 38, projecting from the crank-shaft bearing 39. The shaft 32 is provided with a cam 40, adapted to engage a suitably-shaped block 41 on the valve-stem 42, to which is secured the exhaust-valve 43, mounted in a valve-chest 44, communicating with the exhaust-port 31. A pipe 45 communicates with a valve-chest 44 for carrying off the products of combustion. The inlet-port 30 is situated at the opposite side of the valve-chamber from the exhaust-port 31, and the valve 53 therefor is operated by a stepped slidable cam 48, held to rotate with the shaft 32 by a feather or key, but permitted to slide longitudinally along the shaft 32 when caused to by the action of governor-balls 46 or lever (not shown) attached to the projection 47 on cam 48 by a split collar, (not shown,) by which the speed may be controlled at will by the operator and independent of the governor-balls. The stepped cam 48 is encircled by a frame 49, (having a shoulder 50 therein to be engaged by the cam,) attached to one end of a rod 51, bent at its other end to engage a valve-stem 52, to which the inlet-valve 53, mounted in the valve-chest 54, is integral. The valve-stems 42 and 52 are each provided with springs 62 to normally hold the valves closed. The rod 51 is mounted in a guide 55, and a spring 56 bears, respectively, against a peripheral shoulder 57 on the guide 55 and a peripheral shoulder 58 on the rod 51 to normally hold said rod in its outward position. The governor-balls 46 are connected to the gear-wheel 35 and cam 48, respectively, by links 59, and the shaft 32 is provided with screw-threads near the gear-wheel 35 for the reception of a threaded collar 60, and a coiled spring 61 is mounted on said shaft 32, between the cam 48 and collar, to hold the links 59 and balls 46 at the proper tension, and it can be readily seen that the collar 60 can be adjusted on the shaft to regulate the tension of said spring 61.

It will be seen that as the cam 48 is stepped when it is moved toward the gear-wheel 35 it will bring in contact with the shoulder 50 on the frame 49 a step of the cam 48, having a longer bearing or contact surface proportionally to the distance it is moved, and consequently a longer period to hold the inlet-port 30 open on the compression-stroke of the piston. Hence the farther the cam is moved toward the gear-wheel the less the compression, smaller the charge, and consequent less explosive effect until the extreme is reached, when it gives its minimum power, and the reverse or greater power is attained when moved in the opposite direction until the extreme is reached, when the engine or motor will be giving out its maximum power.

The pipe 63 (shown in Fig. 2) is for conducting the explosive mixture from any suitable source to the inlet-valve chest.

The sparking means consists of a bent rod 64, one end of which is secured to the rod 9 or to the piston 10, the other end being reduced and provided with several (preferably three) thin plates 65, spaced apart and held in place by a nut 66, and which are adapted to make and break contact with a shaft 67, projecting into the cylinder when the piston is moved to its inward position. The shaft 67 is made with a downwardly-projecting tooth 67ª on its outer end to be engaged by the plates 65 and is provided with an insulated bearing through the cylinder-wall, consisting of a sleeve 68, forming the bearing proper, one end of which has a ring and the other a threaded portion and by aid of the insulating-ring 69 and nut 70 holds the insulating-sleeve 71 (which has a head projection 72 inside the cylinder) in place. The shaft 67 is further provided with a threaded portion for the reception of locking-nuts 73 to securely hold the shaft in proper longitudinal position to be engaged by the plates 65. The outer end of the shaft 67 is contracted and connected centrally between the ends of the spring 74 by a collar 75, secured to said contracted portion of the shaft, and the ends of the spring 74 are connected to blocks 76, secured to and

insulated from the ribs on the cylinder by means of screws 77, and it will be seen that by simply tightening or loosening said screws 77 the tension of said spring is regulated to normally hold the tooth 67^a in its vertical position. One wire 78 in any approved electric circuit is connected with the outer end of the shaft 67 and the other wire 79 of said circuit with a contact-plate 80, adjustably secured to an insulated block 81 on the bracket 34 by a screw 82. Said plate 80 is adapted to be engaged by a lug 83, adjustably connected to the gear-wheel 35 by a screw 84.

Various slight changes might be resorted to in the general form and arrangement of the several parts described without departing from the spirit and scope of my invention, and hence I would have it understood that I do not wish to limit myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a motor or engine, the combination with a cylinder and a shaft having two cranks, of two pistons in said cylinder and adapted to operate at the respective sides of the center thereof, a rod rigid with and in line with the axis of one of said pistons and having an elongated bearing on one of the cranks of the shaft, a rigid longitudinally-movable bar disposed parallel to the other piston and the cylinder and having a rigid connection at one end with the last-mentioned piston and having an elongated bearing on the other crank of said shaft.

2. In a motor or engine, the combination with a cylinder and a shaft disposed in proximity to one end of said cylinder and having two cranks, of a rod in line with the axis of and rigid with one of said pistons and provided with a head having an elongated slot for the reception of one of the cranks on said shaft and a rigid bar mounted to move longitudinally alongside of and parallel with the cylinder and provided at one end with a head having an elongated opening for the reception of the other crank on the shaft, the other end of said rigid bar having connection with the other piston.

3. In a motor or engine, the combination with two cylinders disposed in parallel planes, of a shaft mounted between said cylinders and having two cranks, two pistons in each cylinder and connections between the pistons in each cylinder and both of said cranks.

4. In a motor or engine, the combination with two cylinders disposed in parallel planes, of a shaft disposed between the adjacent ends of the cylinders, two cranks on said shaft in line with the respective cylinders, two pistons in each cylinder, the inner pistons in the respective cylinders connected with the respective cranks and connections between the outer piston in each cylinder and the cranks with which the inner pistons are connected.

5. In a motor or engine, the combination with a crank-shaft, a wrist-pin connected to said shaft by removable webs projecting beyond the wrist-pin, of a sleeve on said wrist-pin and spaced therefrom by ball or roller bearings, a peripheral flange on said sleeve at each end thereof, a vertically-disposed elongated yoke on said sleeve and mounted between said peripheral flanges thereon, a piston-rod secured to one side of the yoke centrally between the ends thereof and a piston mounted in the cylinder and secured to the piston-rod.

6. In a motor or engine, the combination with a crank-shaft and a cylinder disposed on each side of the crank-shaft, of a piston in each end of each cylinder, yokes on the crank-shaft, a piston-rod secured to each piston, one side of said yokes connected with the pistons nearest thereto in the respective cylinders and the other side of said yokes connected with the pistons farthest therefrom in the respective cylinders.

7. In a motor or engine, the combination with a crank-shaft and a cylinder disposed at each side thereof, of a piston in each end of each cylinder, a piston-rod secured to each piston and projecting from the cylinder, yokes on said crank-shaft, one side of said yokes secured to the piston-rods nearest thereto of the respective cylinders, angle-irons secured to the other sides of said yokes and projecting beyond the free ends of the respective cylinders, guides for said angle-irons, and brackets connecting the free ends of said angle-irons with the piston-rods of the respective cylinders farthest from the crank-shaft.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LEWIS BROWN.

Witnesses:
ROBERT C. RIDDICK,
LUTHER B. DURHAM.