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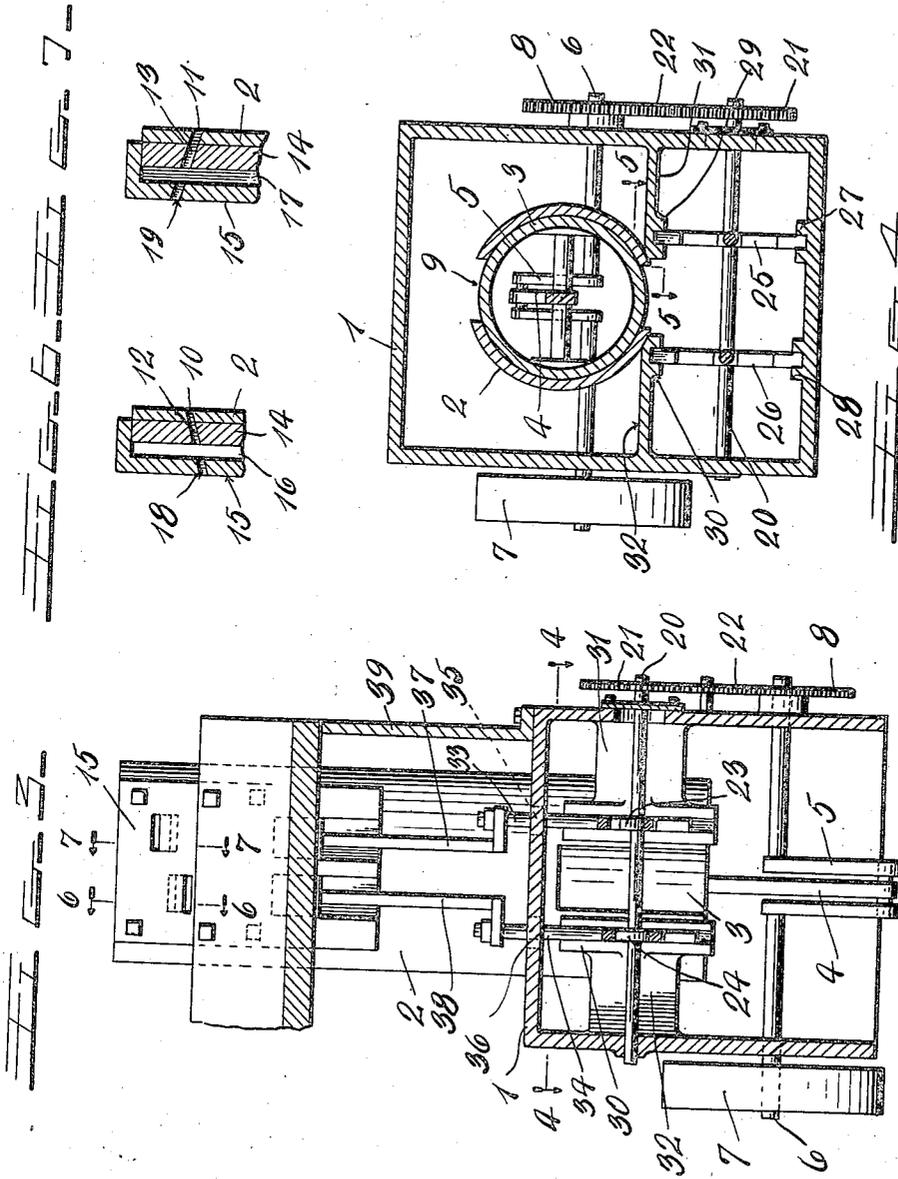
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A. SCHAEFER

INTERNAL COMBUSTION ENGINE

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2 Sheets-Sheet 2.



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# UNITED STATES PATENT OFFICE.

ADOLPH SCHAEFER, OF VALLEJO, CALIFORNIA.

INTERNAL-COMBUSTION ENGINE.

Application filed November 8, 1920. Serial No. 422,473.

*To all whom it may concern:*

Be it known that I, ADOLPH SCHAEFER, a citizen of the United States, residing at Vallejo, in the county of Solano and State of California, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

My invention relates to internal combustion engines and has particular reference to an improved engine embodying a novel valve mechanism therein.

The primary object is to provide an improved engine of the slide valve type, in which all parts are so disposed as to give the greatest efficiency in operation and in the production of power. With this, and such other objects in view as will be apparent from the description, the invention resides in the novel construction, combination and arrangement of parts, described in the specification and illustrated in the accompanying drawings, in which;

Fig. 1, is a side elevation of the preferred embodiment,

Fig. 2, a central vertical section thereof,

Fig. 3, a section on line 3—3 of Fig. 2,

Fig. 4, a section on line 4—4 of Fig. 3.

Fig. 5, a detail view on line 5—5 of Fig. 4,

Figs. 6 and 7, sections on the lines 6—6 and 7—7 of Fig. 3, respectively.

In detail, the engine comprises a base casing 1, carrying a cylinder 2 having the piston 3 and connecting rod 4 connected to a crank 5 disposed on the crank shaft 6 which projects through the casing 1 at its ends and carries the fly wheel 7 and gear 8 respectively thereon. At its lower end the cylinder extends into the casing, and its walls are diametrically slotted from the bottom, as at 9, a sufficient length and width to provide a clearance for the crank and connecting rod and permitting of an efficient splash lubrication of the piston 3 through the slots 9. The wall of the cylinder is provided with a downwardly inclined intake port 10 and upwardly inclined exhaust port 11 arranged side by side and in the same plane at the interior of the cylinder. These ports register with similarly inclined transverse perforations 12 and 13 in a valve block 14 mounted on the exterior wall of the cylinder. Secured on the outer face of the valve block is a plate 15, of inverted L shape, with the short arm abutting the wall of the cylinder over the top of the valve block, and the long

arm spaced laterally from the face of the block to provide a casing for the slide valves 16 and 17. Plate 15 is provided with ports 18 and 19 in alignment with the intake and exhaust passages described and is adapted to have secured thereon the intake and exhaust manifold (not shown).

Journalled in the casing 1 above the crank shaft and at one side of the cylinder is a cam shaft 20, having a gear 21 mounted on its outer end in mesh with a pinion 22 driven from the crank shaft gear 8. Cam shaft 20 carries disc cams 23 and 24 operating in yokes 25 and 26 slidably mounted in guides 27 and 28 formed on the wall of the casing, and guides 29 and 30 formed on the ends of opposed castings 31 and 32 extending inwardly of the casing adjacent the cylinder. These castings terminate adjacent the cylinder to provide a clearance therebetween for the connecting rod and crank shaft operating through the adjacent slot 9. Each yoke carries a stem 33, 34, projecting through the top of the casing and working in stuffing boxes 35 and 36. Valve stems 37 and 38 are bolted on the ends of the yoke stems and are connected to the slide valves 16 and 17 respectively. For the protection of the valves and stems from dirt and outside interference, an arcuate cover 39 is suitably secured to the casing 1 and plate 15. The engaging walls of valve block 14 and plate 15 are provided with lubricating wells 40, and for a similar purpose the guides 30 and 31 are provided with transverse perforations 41 for splash lubrication of the yokes.

The cams are so disposed on the shaft 20 and the ratio of the gearing is such, that the requisite movement will be imparted to the slide valves 16 and 17. By the distribution and arrangement of the yokes and guides with respect to the crank shaft and connecting rod, a highly efficient lubrication of all working parts is obtained.

While I have described and illustrated certain specific details which enter into the construction and operation of the engine, I desire it to be understood that I do not limit myself to these, but that any changes may be made therein that will fall within the scope of the invention as claimed.

I claim:—

The combination in an internal combustion engine having a crank shaft, of a base casing, a vertical cylinder, an extension on said cylinder disposed within the casing and

having diametrically opposed slots, of a valve operating mechanism disposed within said casing including a pair of oppositely disposed castings extending inwardly from 5 opposed walls of said casing parallel with said crank shaft and terminating adjacent opposite sides of one of the slots in the cylinder extension, vertically outwardly extending guide flanges formed adjacent said 10 ends of the castings, the portion of the castings intermediate the guide flanges being perforated to permit lubrication, coating

vertical guide flanges on the opposite wall of the casing for each set of guides on the castings, yokes slidably mounted in said 15 guides and disposed on opposite sides of the adjacent slot in the cylinder extension, a cam shaft extending through said yokes, cams carried thereby and disposed within said yokes, vertical stems carried by the 20 yokes, and vertically movable slide valves connected with the stems.

In testimony whereof I affix my signature.

ADOLPH SCHAEFER.