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GB 0424256

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F1B

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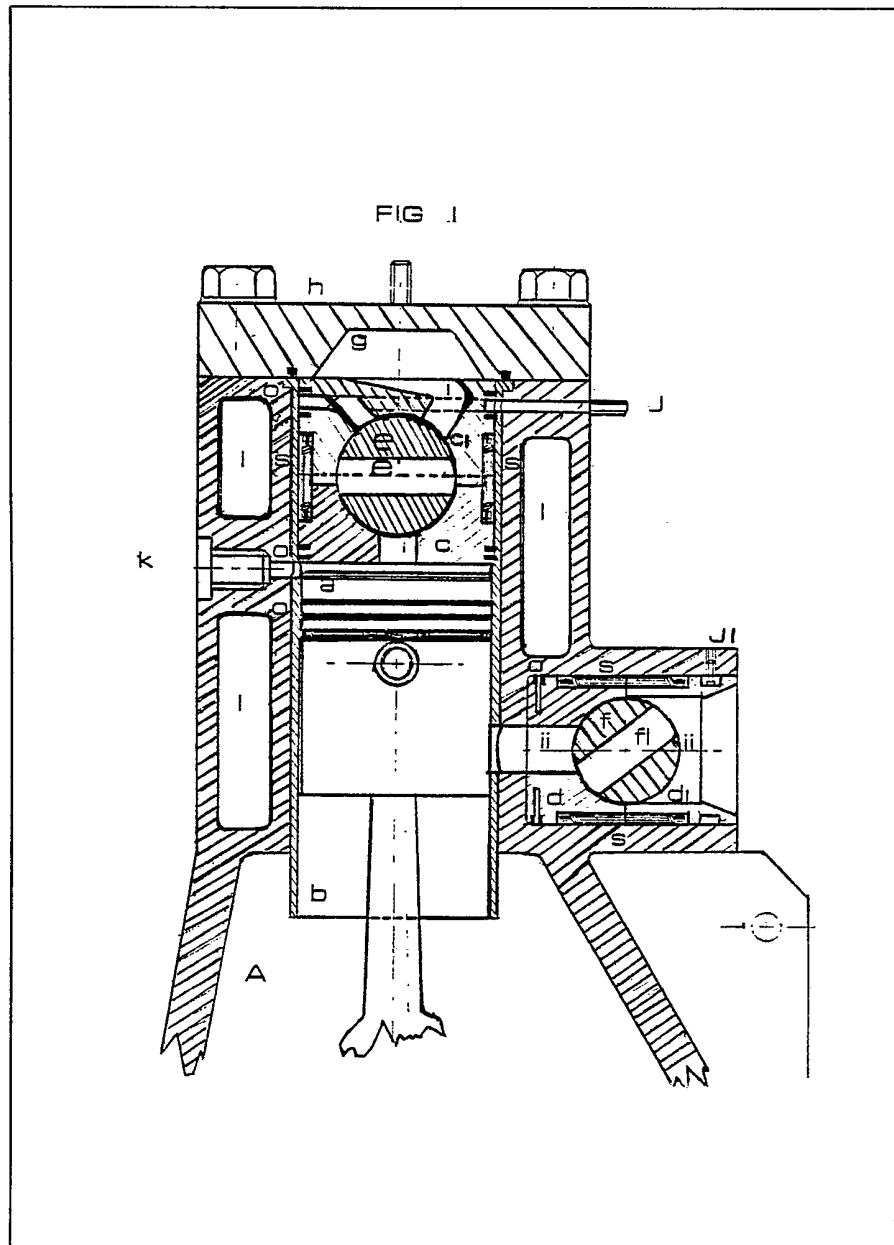
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(54) I.C. engine with rotary valve gear

(57) The inlet valves of a reciprocating-piston I.C. engine are formed by ported rotary valve

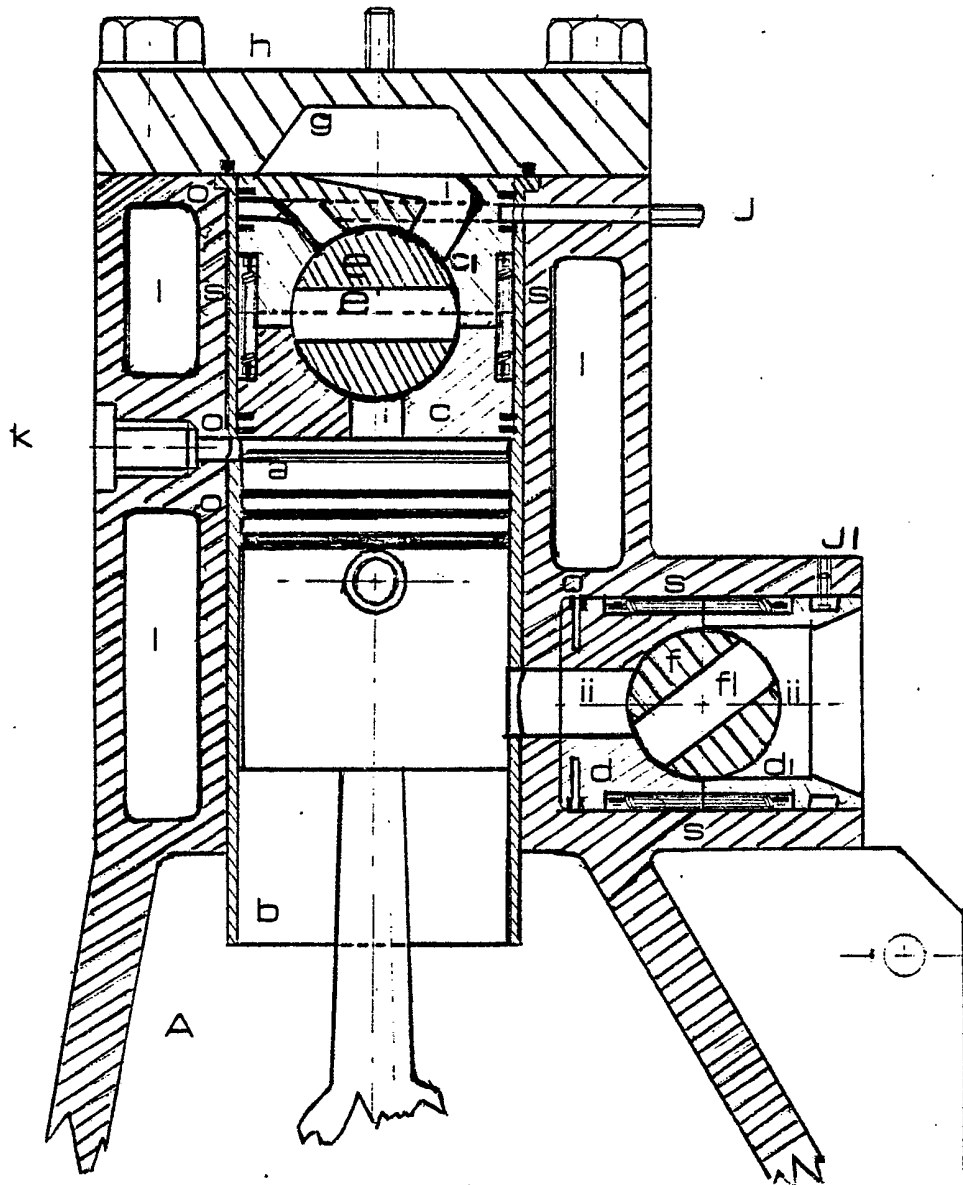
members located in axial extensions of the associated cylinders. The exhaust valves are of similar form but are located downstream of piston-controlled exhaust ports in the cylinder walls.



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DRAWING 1

FIG. 1



DRAWING 2

FIG 2

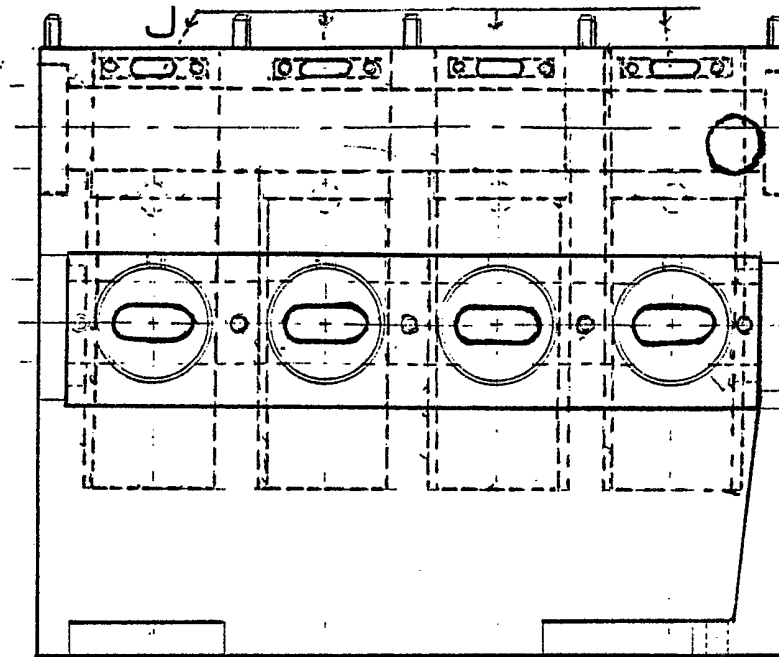


FIG 3

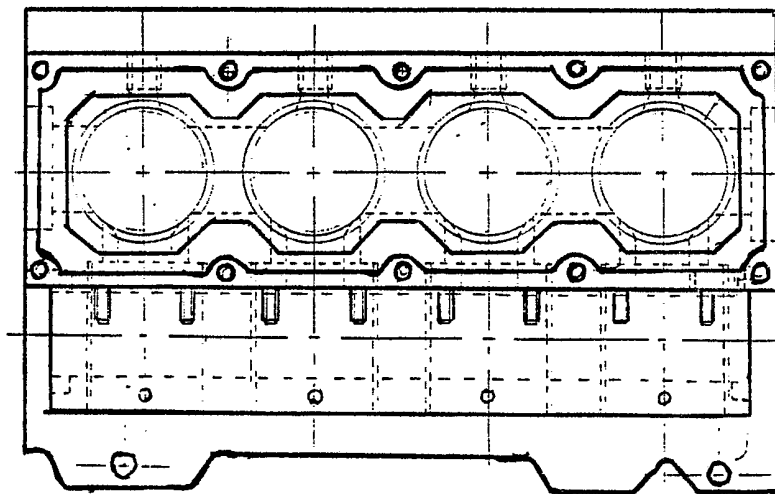
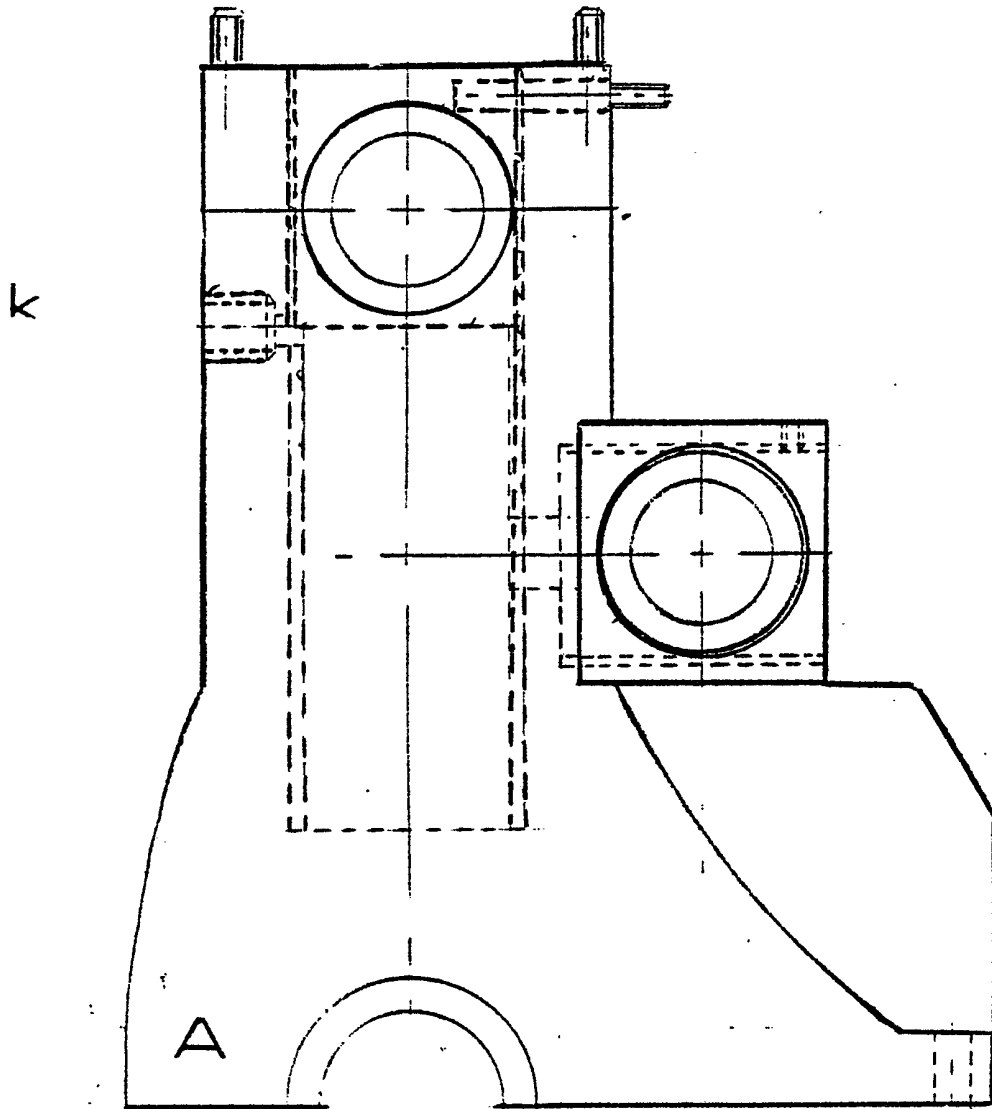
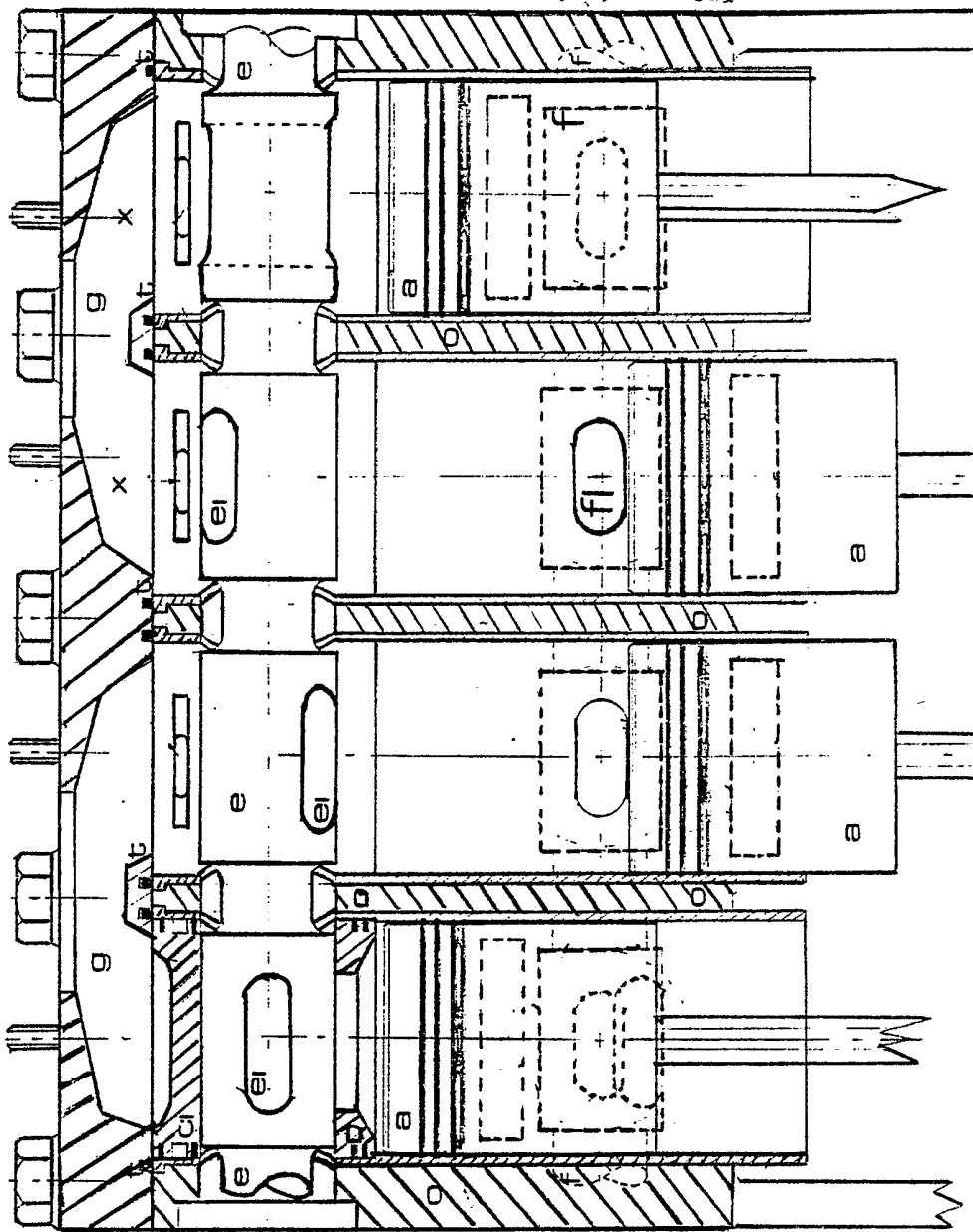


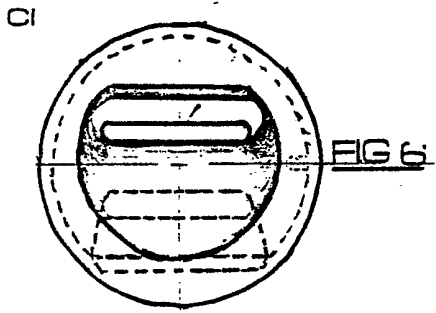
FIG 4 DRAWING 7



DRAWING 3

FIG 5





DRAWING 4

FIG 6c

FIG 6a

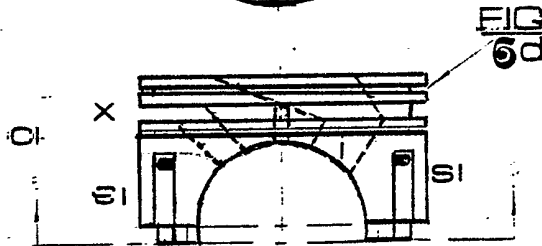
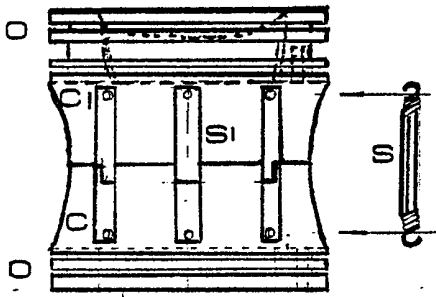
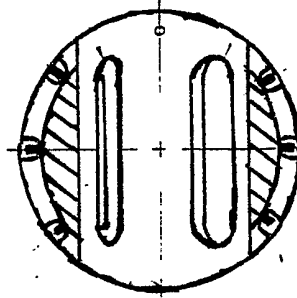


FIG 6b

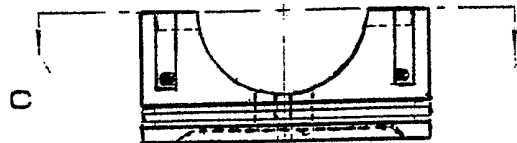
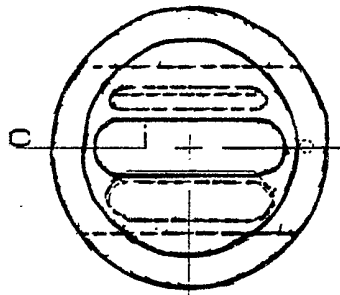
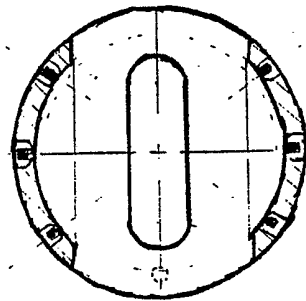


FIG 6



DRAWING
4a.

FIG 7a

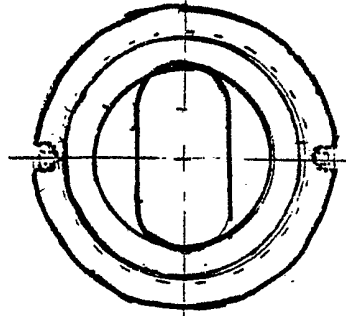


FIG 7

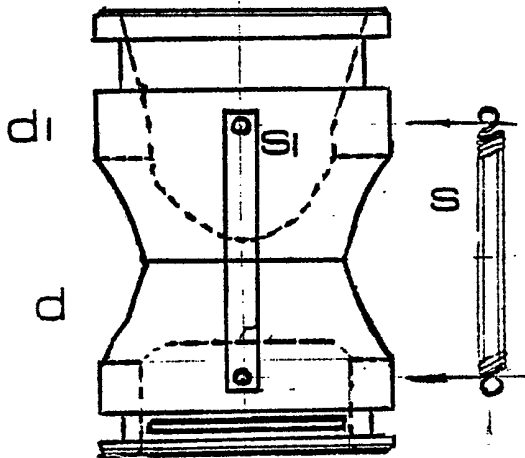


FIG 7b

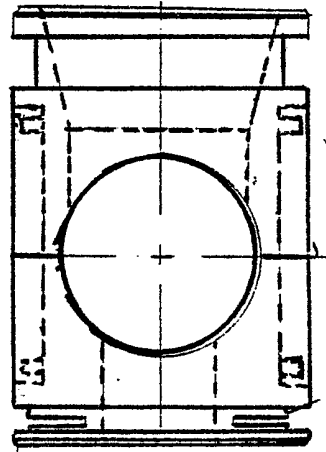
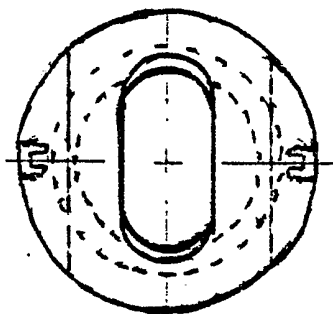
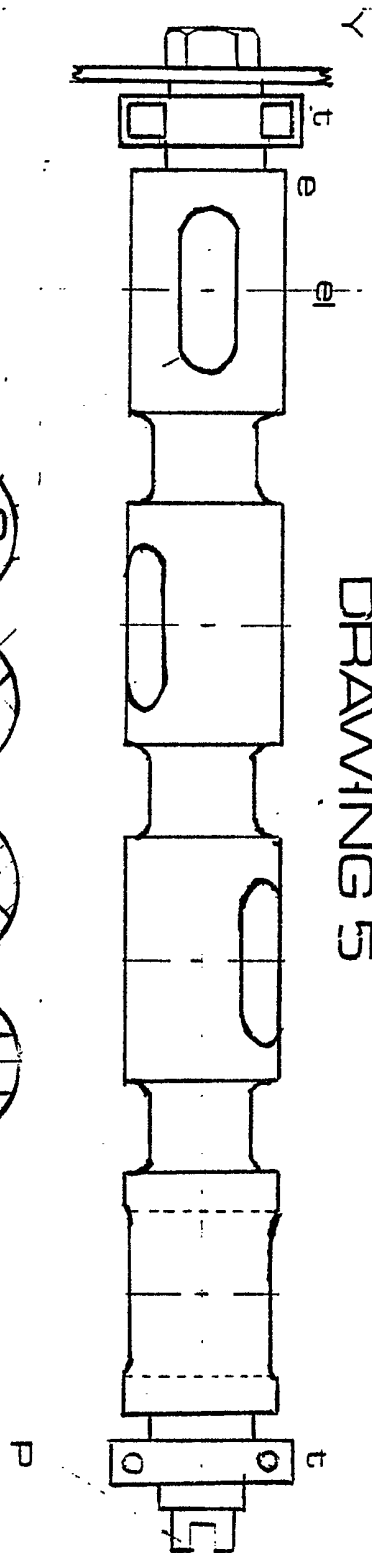
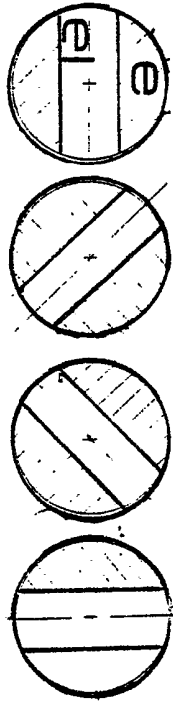
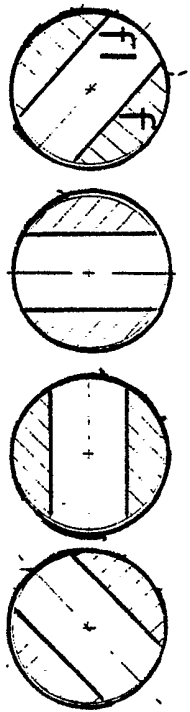
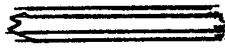
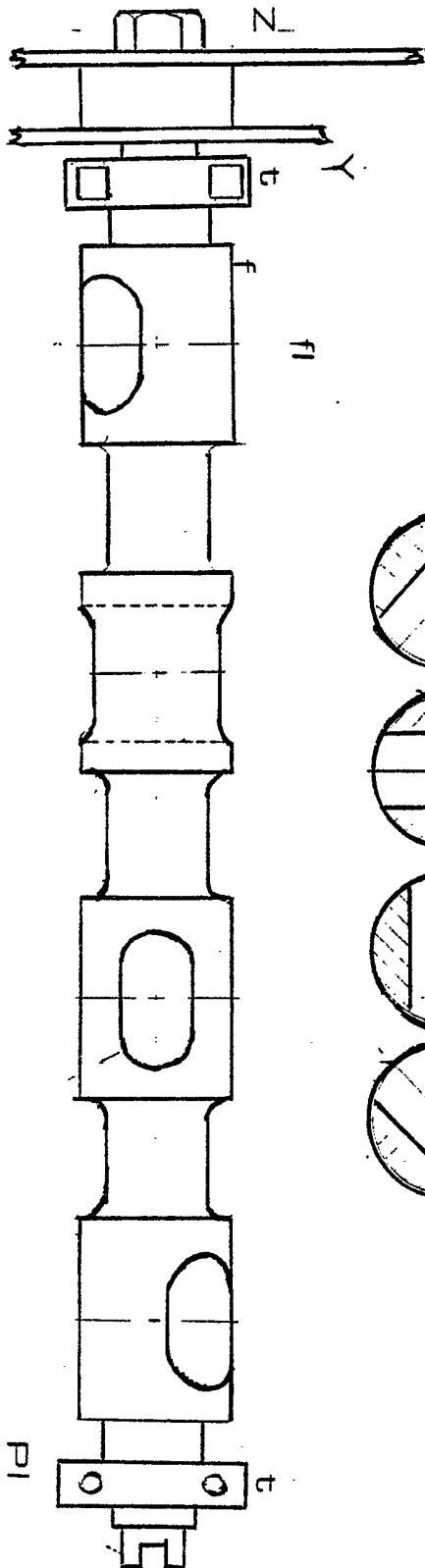


FIG 7c

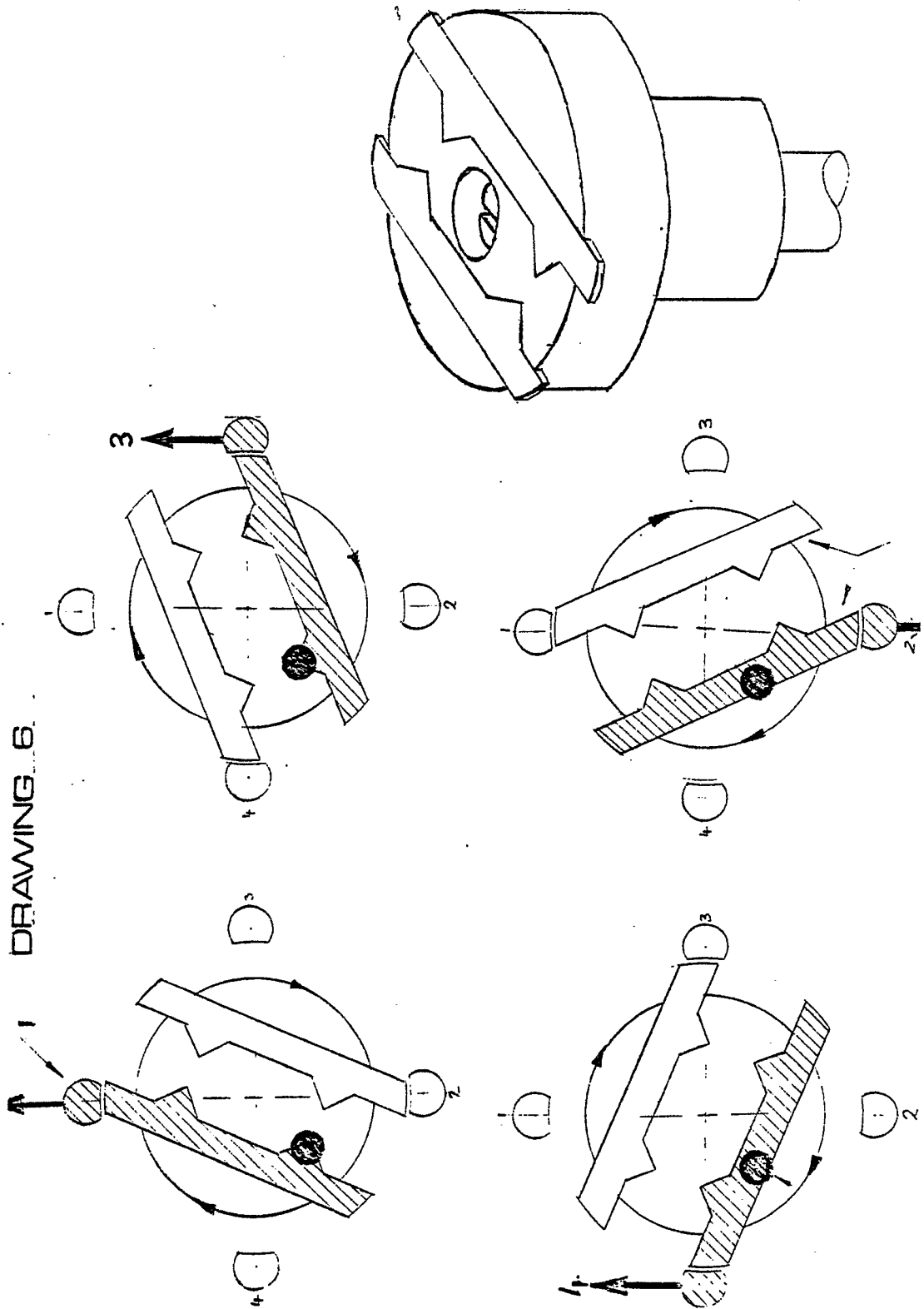


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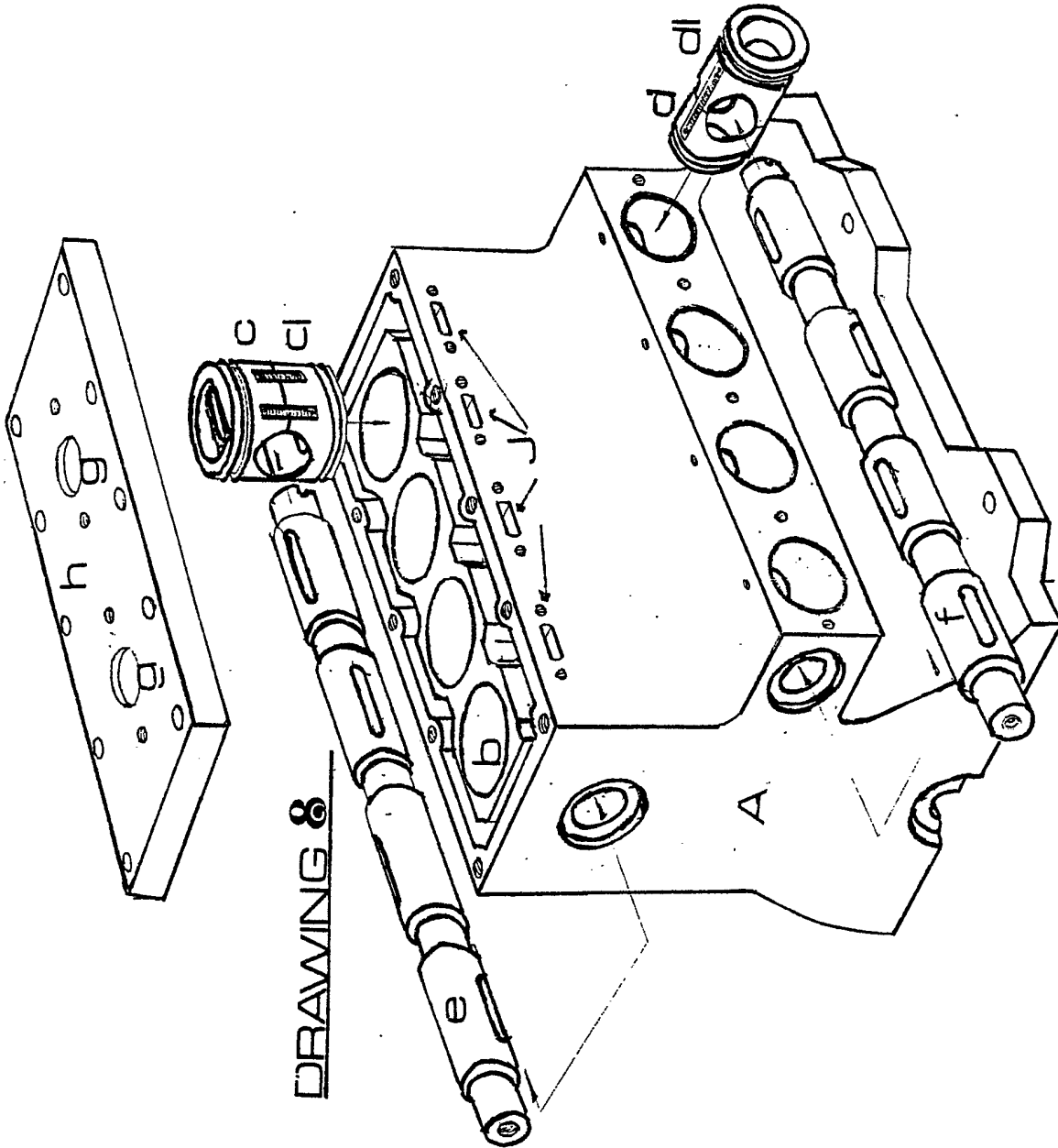


DRAWING 5

DRAWING 6



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SPECIFICATION

Four/stroke-internal combustion engine

Fuel: Petrol and/or Diesel

- The purpose of the invention is to fulfill all requirements of a four/stroke internal combustion engine, without the need of a cylinder head complete with poppet valves and auxilliary equipment.
- The invention would be the elimination of these components, show a reduction in frictional losses, more balanced power output, and cut manufacturing costs, together with lower servicing charges.
- The engine would use normal crankshaft, connecting rod, and piston assembly. The initial departure from standard practice would be to free the combustion chamber from having both induction and exhaust valves side by side, and leave the induction valve to occupy the full area, required for combustion purposes.
- The necessity of sealing the cylinder is carried out as follows:— The cylinder block is extended in height above the piston crown at the top dead centre position, still maintaining cylinder bore size.
- Combustion space requirements are taken into consideration, and the cylinder increased further in height until sufficient to allow the insertion of a specially formed cylindrical piston type valve. This is sealed to the cylinder bore, ported for induction purposes, and works in conjunction with a ported shaft in a central position, and on the same plane as the crankshaft, the movement of the shaft is one complete revolution to four of the crankshaft. This reduced speed of one revolution to four of the crankshaft, still allows a true cycle of a four stroke engine, due to the porting arrangement of induction valve and shaft combination. This arrangement will now accept the induction manifold whether of single and/or multiple design, together with down draught carburettor immediately above, without the use of a cylinder head gasket as no special sealing requirements are needed.
- This special piston type induction valve working together with ported shaft would carry out one other operation:— i.e. scavenging of the cylinder after true exhaust has been completed, and is dealt with in paragraphs dealing with exhaust valve, the location of same is as follows:—
- The cylinder for exhaust purposes, is ported at a pre-determined position, so that the descending piston would uncover the port, and allow rapid discharge of gas, through to a controlling piston type valve operating in a sleeve and in conjunction with a ported shaft. This shaft similar to the induction shaft, operates at one complete revolution to four of the crankshaft, and is on the same plane.
- Both induction and exhaust shafts, protrude through the cylinder block, to enable a drive either by toothed sprocket, and/or endless rubber toothed drive to create movement on a timed cycle. The main drive being taken from the front end of the crankshaft to the exhaust shaft. At the

- 65 rear of the cylinder block the exhaust shaft drives a water impellor, whilst the induction shaft accepted the distributor and/or the drive for a diesel injector pump.

- Exhaust valve location and operation
- 70 That complete scavenging of the cylinder should take place during the full cycle of the exhaust stroke to prevent any malfunction to the incoming induction gas, the complete operation of the exhaust stroke is as follows:—
- 75 1. The piston descending on the power stroke uncovers the port in the cylinder liner at a pre-determined position. The shaft together with piston type valve, are open to facilitate rapid discharge. With the piston reaching bottom dead centre, the shaft/piston valve is returned to a closed position. When the ascending piston proper reaches the top edge of the port in the cylinder, the closure of this port becomes two fold effective as the moving exhaust shaft with piston valve also close.
- 80 2. At this stage, the final section of the exhaust cycle now takes place. An auxilliary valve opens in the induction valve which will remain open until the piston proper reaches top dead centre.
- 90 This auxilliary valve operated by the induction valve and shaft assembly transfers the final scavenging of remaining exhaust gas to one of the following as desired:—
- 95 (a) This scavenged gas direct to exhaust manifold.
(b) Uses the discharge to drive a turbo fan.
(c) re-channels the gas back into a chosen cylinder for the purpose of increasing the charge of the induction intake.

100 CLAIM

- A claim for patent is made for the originality of the above engine employing the four stroke principle and is based on its ability to dispense with the use of a cylinder head which embodies a combustion space and incorporating both induction and exhaust poppet valves, with attendant camshaft, push rods, and/or camshaft followers etc, and the requirement of a gas sealing cylinder head gasket. The claim is on the use of stationary piston type valves operating in harness with a ported rotating shafts for both induction and exhaust purposes. The stationary induction valve, complete with piston rings, and rotating ported shaft is situated in the cylinder bore of the main engine cylinder block, made possible by extending the height of the block above that required by the piston-connecting rod-crankshaft assembly when at a top dead centre position. (see Drawing Marked 1.)
- 110 The compression ratio of the engine being governed by the free space existing between the crown of the piston proper, and the lower face of the induction piston type valve, plus the capacity of the valve induction tract. Provision by the use of a by-pass is incorporated in the induction piston type valve, to scavenge the cylinder of any unrequired exhaust gas.

- As this induction valve occupies the full diameter of the cylinder bore, above the top dead centre position of the piston proper the exhaust is located in a pre-determined position down the cylinder bore. First by a port in the cylinder, which leads to a second piston type valve, and rotating shaft, (see drawing marked No. 1.) which operate in their respective housings. This two-stage operation is determined first by the piston-connecting rod-crankshaft assembly which will uncover, and close the port, in the cylinder, and secondly by the stationary piston type exhaust valve and ported rotating shaft which can determine the final duration of discharge.
- 5** cylinder bore. First by a port in the cylinder, which leads to a second piston type valve, and rotating shaft, (see drawing marked No. 1.) which operate in their respective housings. This two-stage operation is determined first by the piston-connecting rod-crankshaft assembly which will
- 10** connecting rod-crankshaft assembly which will
- 15** Both induction and exhaust shafts are driven by sprockets and chain coupled together, with a final drive from the exhaust shaft to the crankshaft. The ratio being four revolutions of the crankshaft to one revolution of both induction and exhaust
- 20** shafts.