The Genesis of an Industry

- Jean Joseph Étienne Lenoir (1860)
- Pierre-Constant Hugon (1865)
- Alexis de Bisschop (1870)
- Louis Charles Errani och Richard Anders (ca 1870)
- Julius Hock (ca 1870-1880)
- Francisque Million (1861)

Jean Joseph Étienne Lenoir (1860)

Världens första produktions I-C motor. Förbränning istf explosion.

Elektriskt tändsystem.

ca 0.5-6 hp.

Borrning 5.5 tum, Slaglängd 8.5 tum

4-5% verkningsgrad

Bränsleförbrukning: 100 $feet^3$/hph (3850 lit/kWh)

Troligen < 500 byggda.

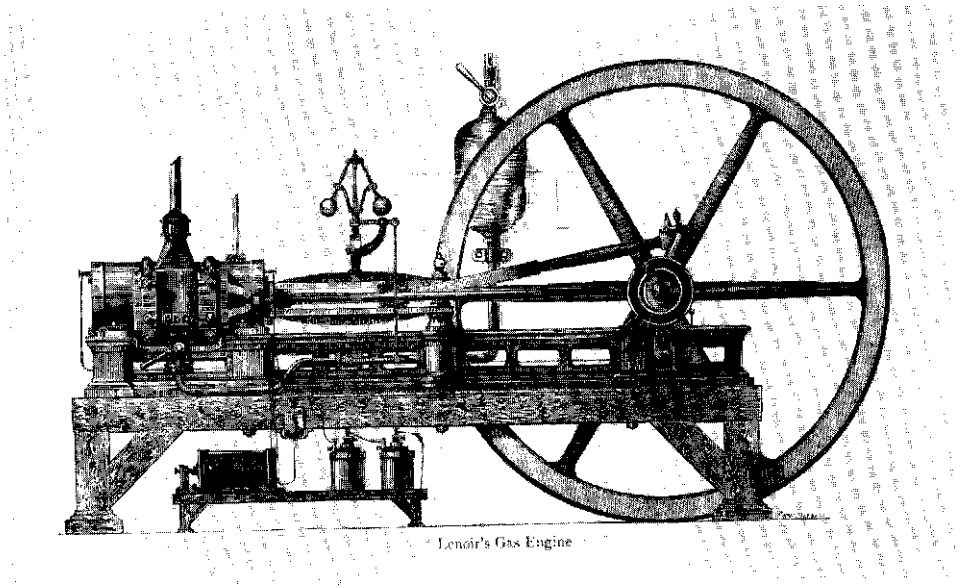
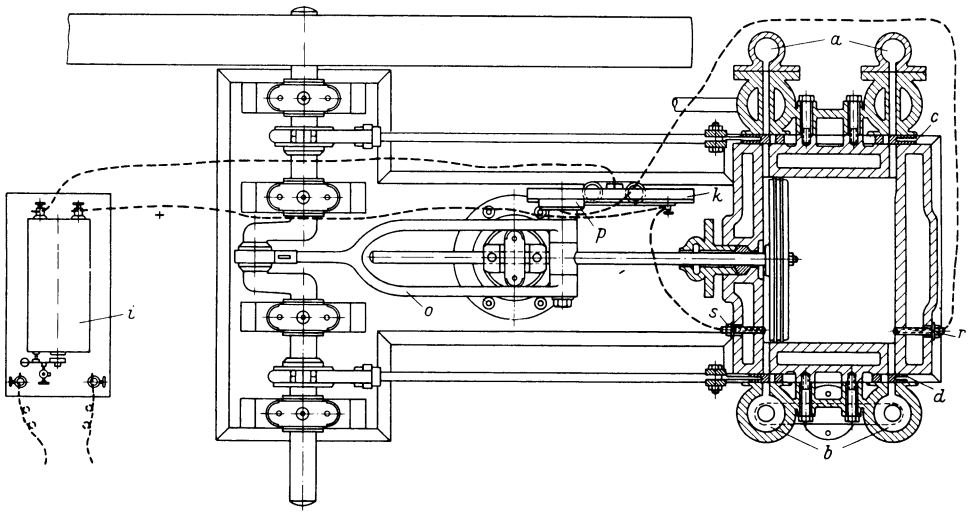
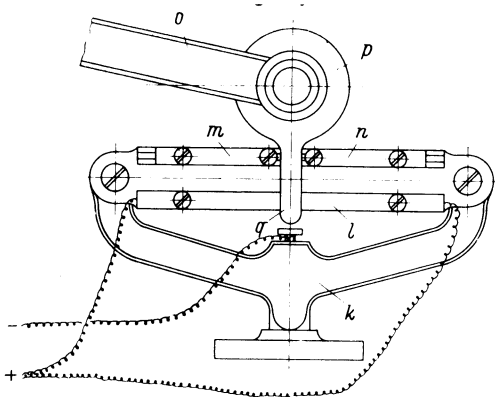


Fig. 7-2 Lenoir non-compression engine, 1861. (Clerk, *The Gas and Oil Engine*, 1896)



a – Gas supply; b – Exhaust outlets; c – Intake slide-valve; d – Exhaust slide-valve; i – Induction coil; k – Sliding-type ignition distributor; o – Connecting rod; p – Distributor slider in crosshead; r, s – Spark plugs.

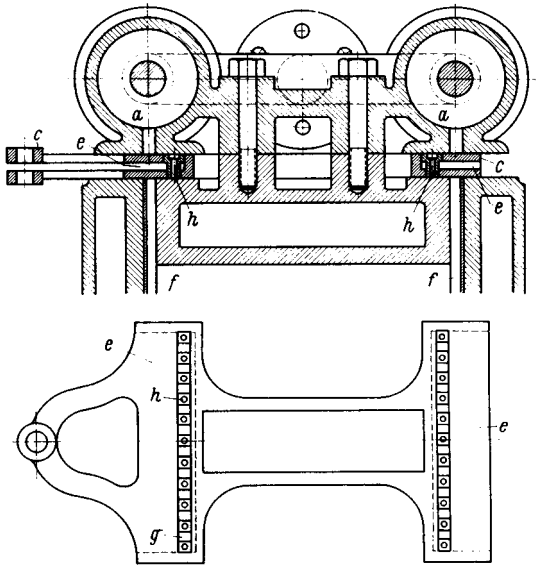
Section through cylinder



k – Frame with ground terminal; l – Full length, lower contact strip; m & n – Contact strips for timing the sparking at plugs; p – Slider mount on crosshead; q – Slider contact tongue.

Slider-type electric distributor.

Fig. 7-4 Lenoir engine, (Sass, *Gaschichte des deutschen Verbrennungsmotorenbaues,* 1962)



a – Gas supply; c – Slide-valve; e – Slots for air supply;
f – Inlet ports to cylinder; g – Openings for air;
h – Gas supply orifices.

Fig. 7-6 Lenoir intake slide-valve and gas-air induction system.
(Sass, *Geschichte . . .*)

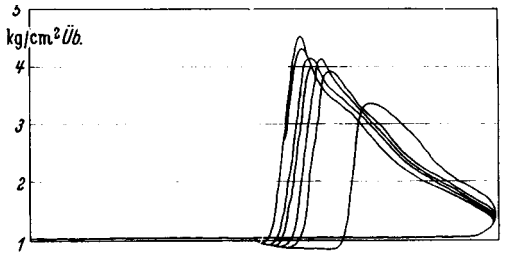


Fig. 7-7 Lenoir pressure-volume diagram. 4.2 kg/cm² = 60 psi
(Sass, *Geschichte . . .*)

Pierre-Constant Hugon (1865)

Först gasexplosions “vatten motor”, sedan “vanlig” gasmotor.

Mest känd för slidventil kopplad till vevaxeln.

0.5 - 3 hp (0.5 hp @ 75 rpm => 220 lp ft)

20% lägre bränsleförbrukning jämfört med Lenoir.

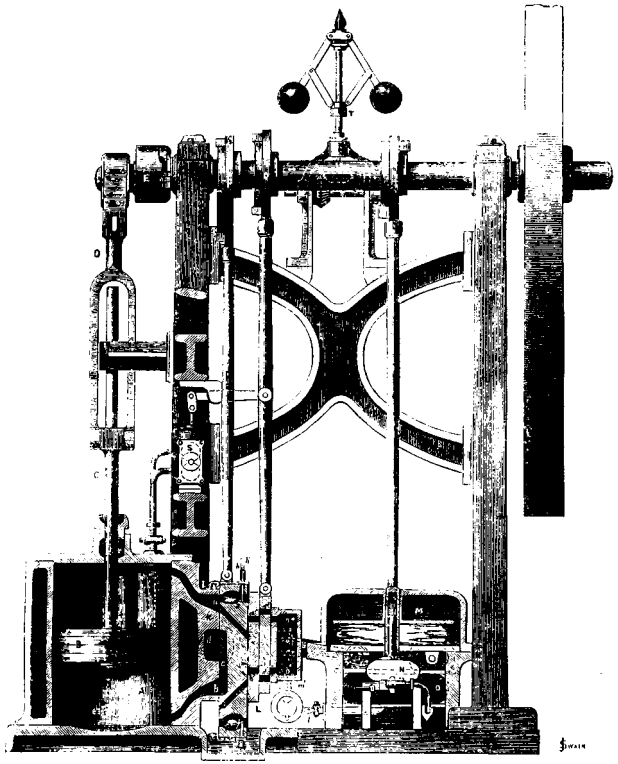


Fig. 7-10 Hugon vertical engine, cross-section. (*The Engineer,* March 1867)

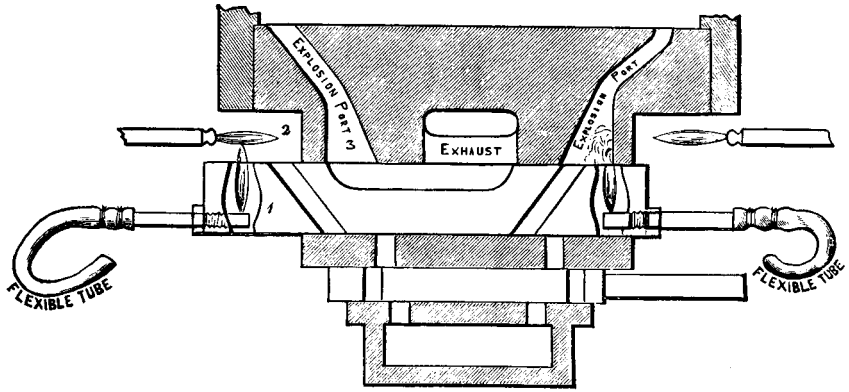


Fig. 7-11 Slide-valve flame igniter, Hugon engine. (Clerk, *The Gas and Oil Engine,* 1896)

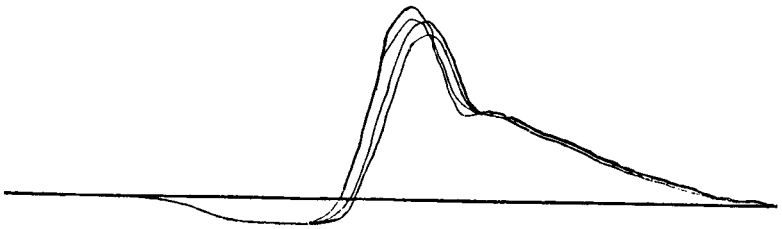


Fig. 7-13 Pressure-volume diagram from Hugon engine. 1/2 Hp at 75 rpm. (Clerk, *The Gas and Oil Engine,* 1896)

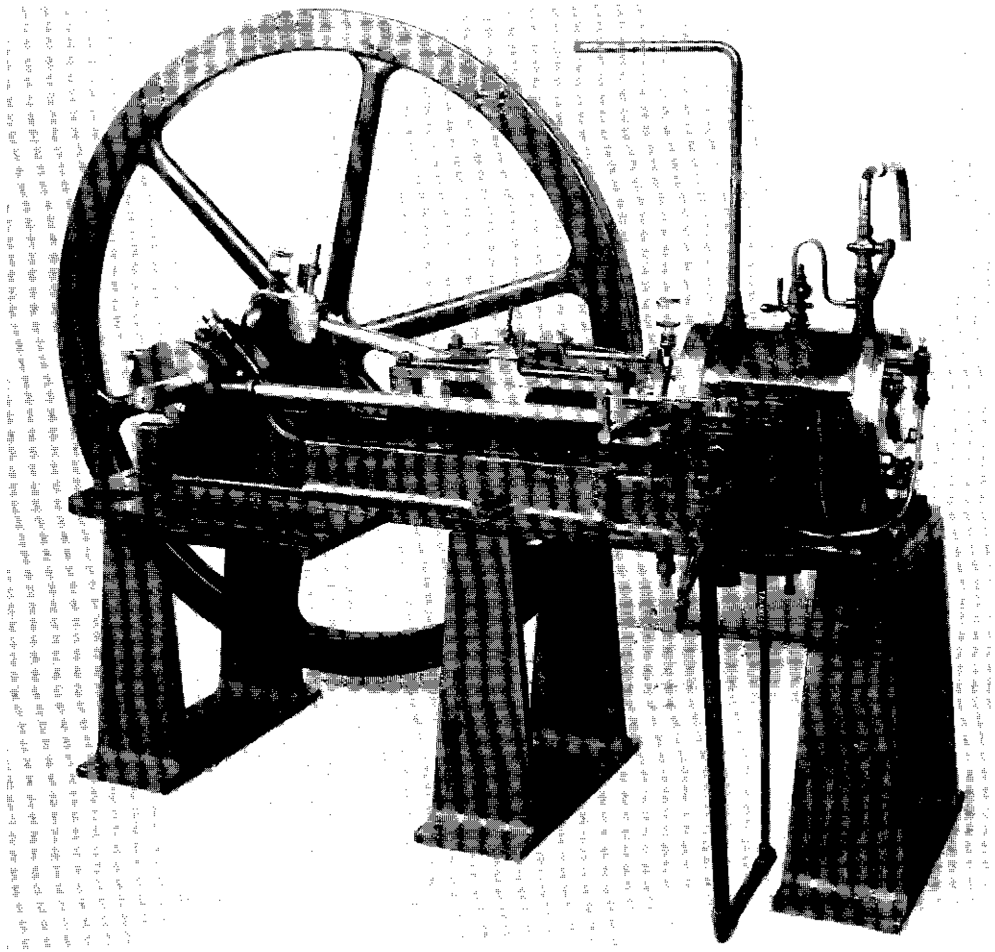


Fig. 7-12 Hugon 1/2 hp. horizontal gas engine, 1867. (The Science Museum, London)

Alexis de Bisschop (1870)

Mest framgångsrika ickekompressionsmotorn.

Enkelverkande, billig, pålitlig, kompakt, utan behov av vattenkyln.

Mestadels 1/3 hp. sfc 150 $feet^3$/hph. (3* Otto Langen)

Inga kolvringar, men lågt tryck < 25 psi (1.72 bar)

En Bisschopmotor gick 47 dagar utan stopp.

Borrning 10 cm, slaglängd 29 cm, total höjd 1.15m, 110 rpm.

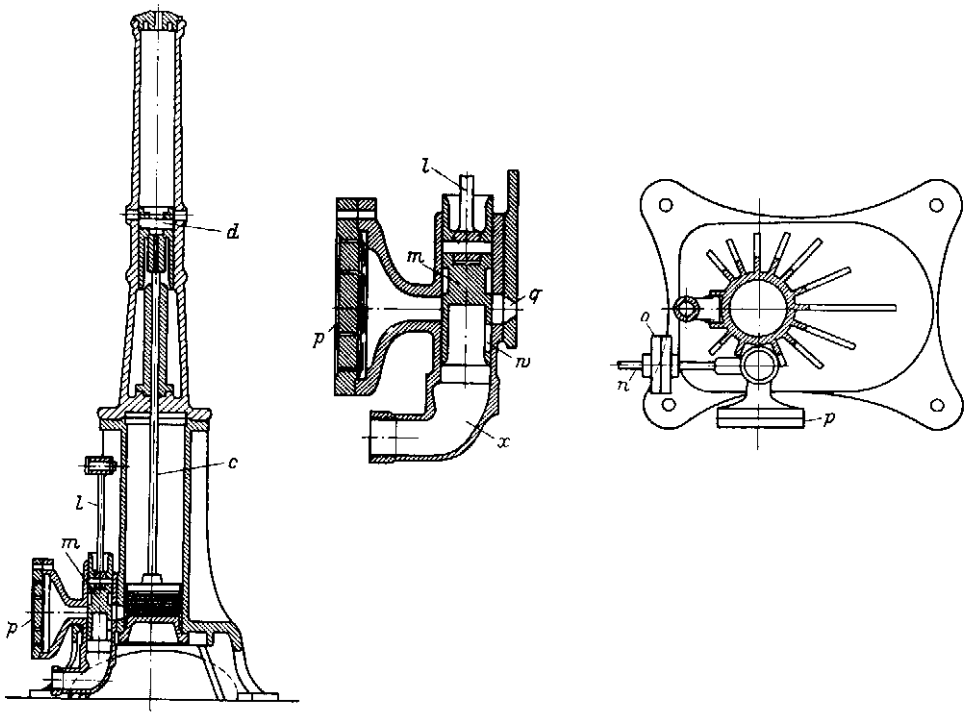


Fig. 7-15 Bisschop engine; air-gas supply and exhaust control by a spool valve. (Sass, *Geschichte . . .*)

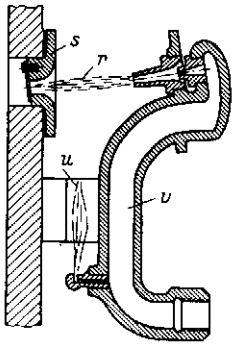


Fig. 7-16 Bisschop gas flame ignition system. (Sass, *Geschichte . . .*)

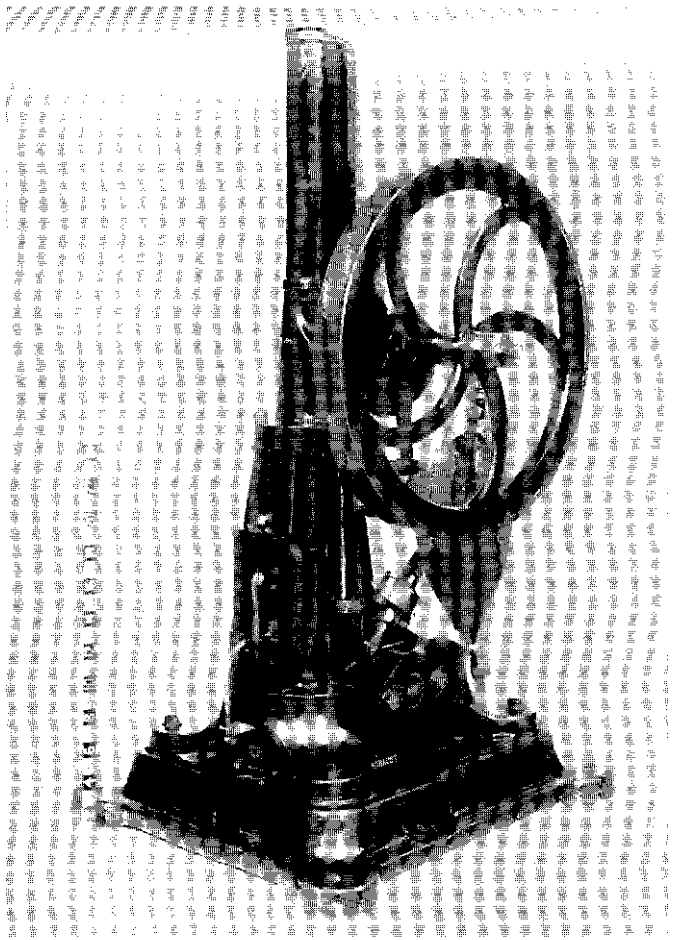


Fig. 7-9 Bisschop non-compression engine, 1870. (The Science Museum, London)

Louis Charles Errani och Richard Anders (ca 1870)

Icke kompressions motor med flytande bränsle.

Bränslet blandas med luft först i cylindern.

Elektrisk tändning.

Expansion som Lenoir och Hugon.

Producerades aldrig.

Julius Hock (ca 1870-1880)

Ungefär samma fast flamtändning.

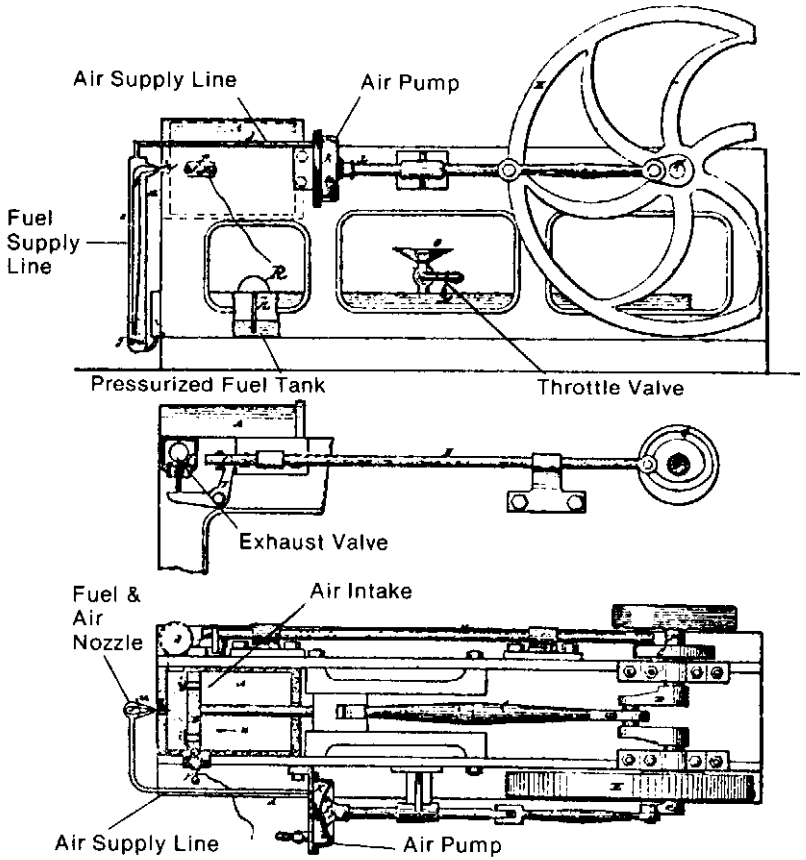


Fig 7-17 Errani and Anders non-compression gasoline engine, 1873. (From their U.S. patent drawings)

Francisque Million (1861)

Kompressionsmotor.

Osäkert om den byggdes.

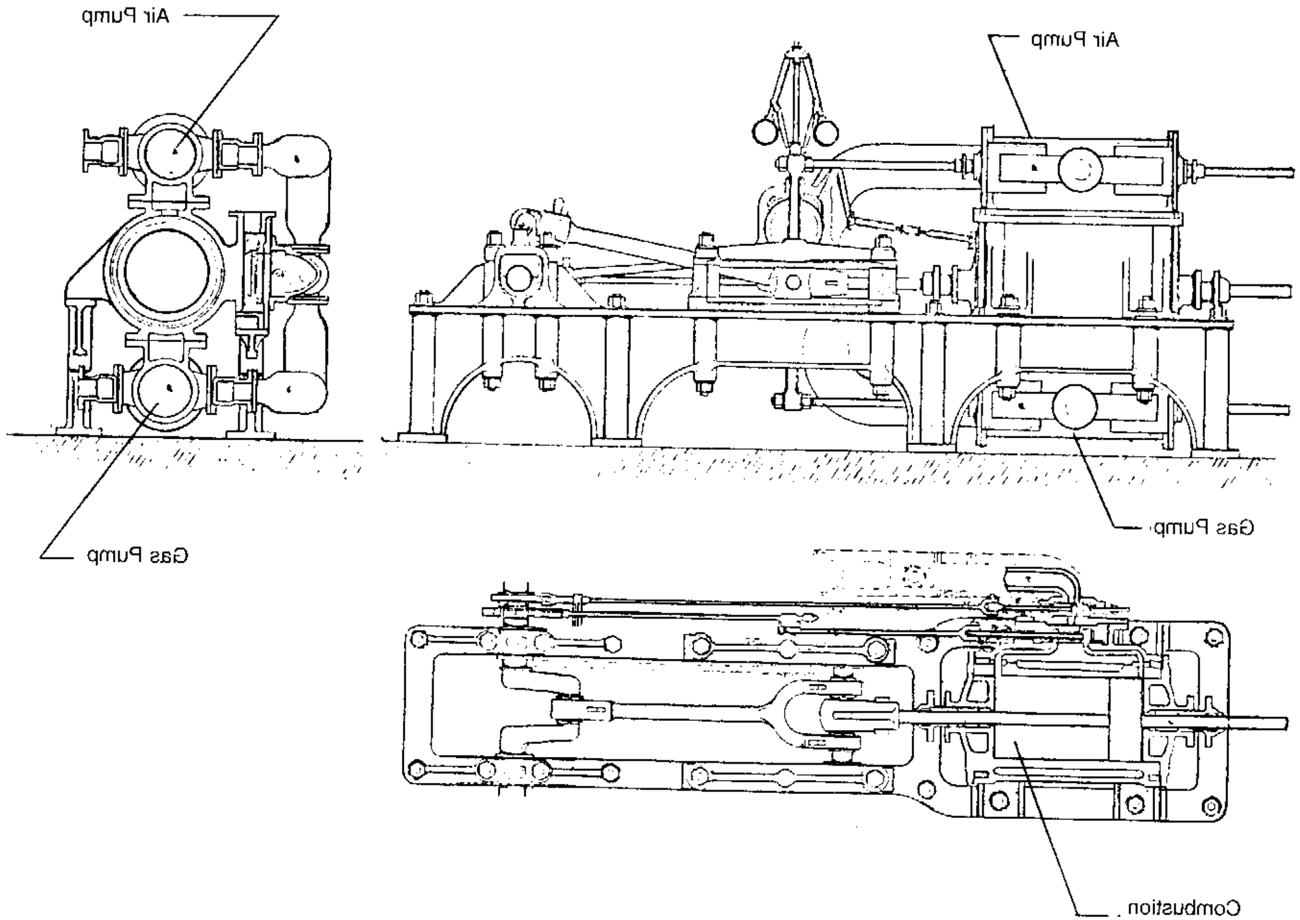


Fig. 7-24 Million "Compression Engine" – 1861. (From the drawings of his British patent)