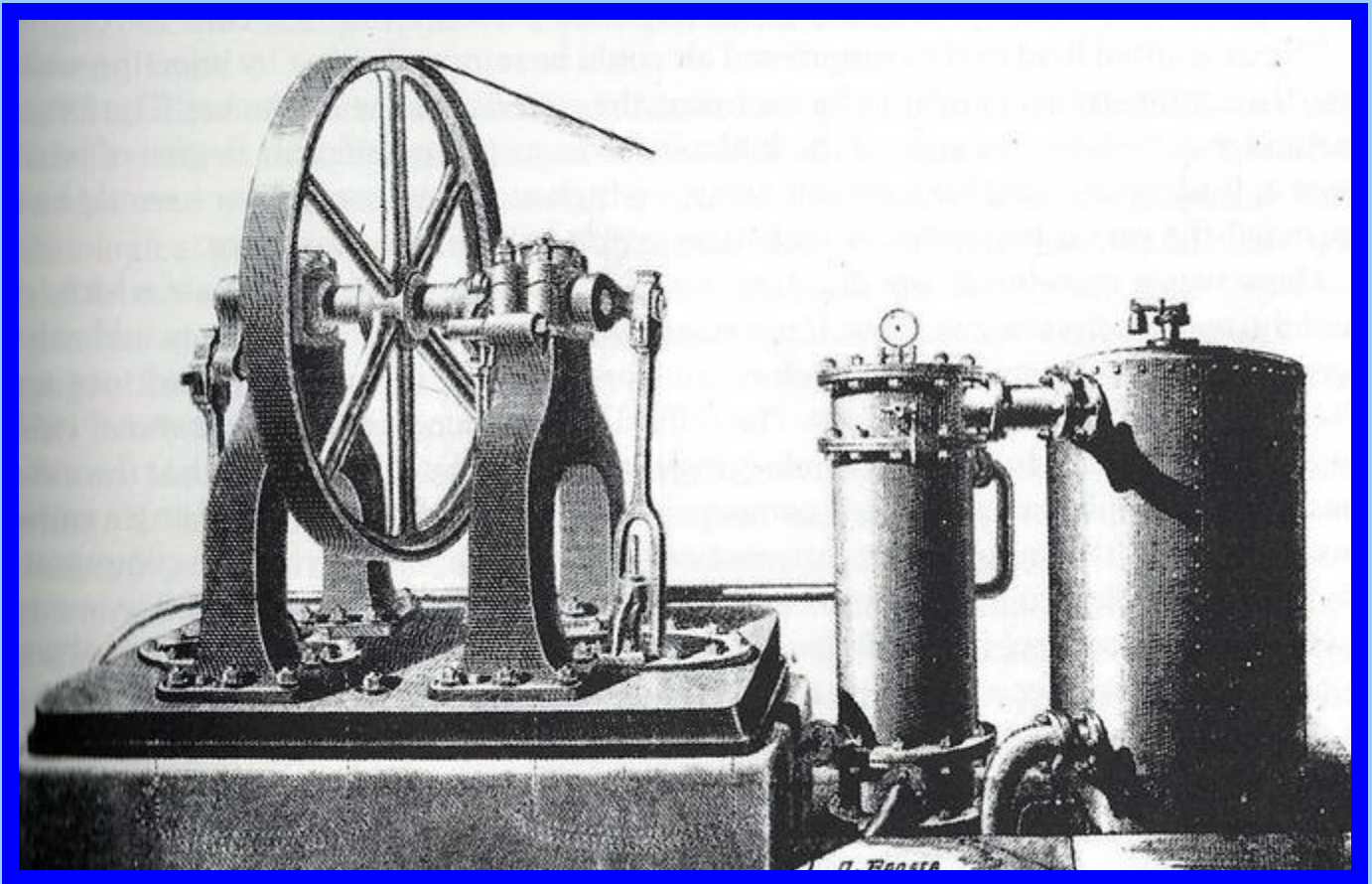


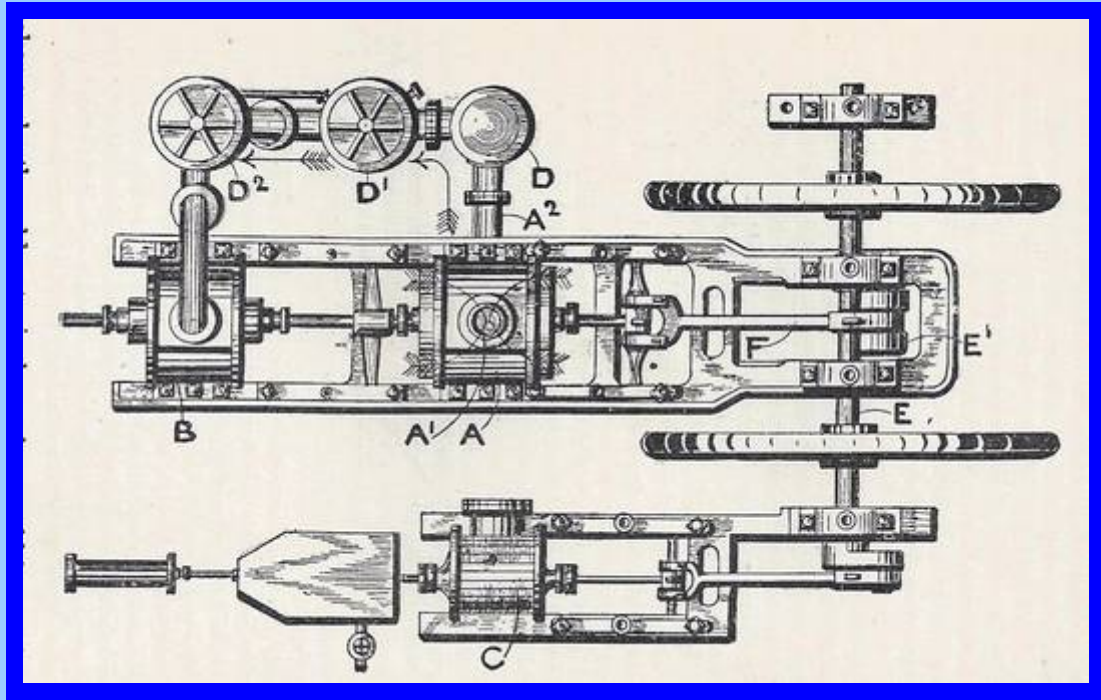
COLD AIR REFRIGERATING MACHINES

An early UK pioneer was J & E Hall of Dartford founded in 1785

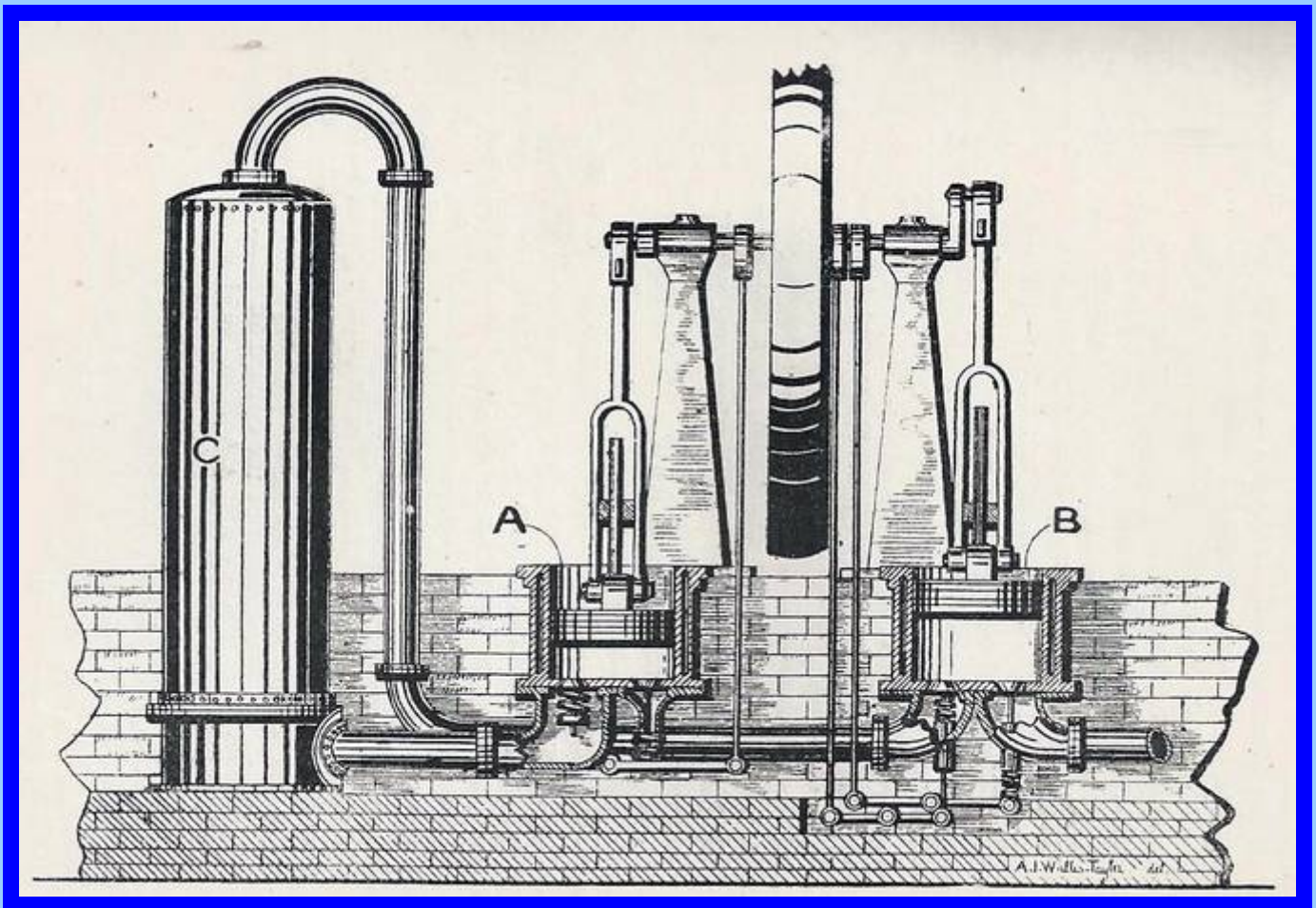


This cold-air machine was patented in France by Paul Giffard in 1873. It produced a cooling effect artificially by the compression and expansion of air. A Giffard machine was obtained by Everard Hesketh of Halls and adapted for the freezing and transporting of meat on board of ships.

(The invention of a cold-air machine has been ascribed to John Gorrie of Florida in 1844, being improved upon by Dr Alexander Kirk in 1863)



An early cold-air machine patented by Windhausen of Germany



Giffard's improved machine of 1877

J. & E. HALL'S COLD DRY AIR MACHINES (PATENT.)



BRONZE MEDAL, 1883.
London Offices: 23, ST. SWITHIN'S LANE.
Telephone No. 1846.

Engineers, Millwrights,

PRICE £125.
Approximate size of Cold Chamber 1,000 cubic feet.

GOLD MEDAL 1883.
Works: DARTFORD, KENT, ENGLAND.

Founders and Boilermakers.



FOR PRESERVING

MEAT	BUTTER
FISH	EGGS
POULTRY	FRUIT
MILK	VEGETABLES

FOR MAKING ICE, FOR BACON CURING,
FOR COOLING LIQUIDS, CHOCOLATE, BEER, &c.
FOR REFINING OIL,

and a variety of other purposes by means of **COLD DRY AIR ONLY** AND ENTIRELY WITHOUT THE AID OF DANGEROUS GASES OR EXPENSIVE CHEMICALS. These Machines effect

A SAVING IN WORKING EXPENSES. The cost of working them is less than that of using ice. In hot weather the difference will be found to be very considerable.

A SAVING OF SPACE. The space occupied by the ice is entirely saved.

A SAVING OF MEAT, &c. The air from the Machine being delivered perfectly dry no moisture is deposited on the meat as when ice is used—the meat does not therefore require to be trimmed, and a considerable saving is effected.

These machines can be applied to existing Refrigerating Rooms or Meat Safes, and entirely take the place of ice. They can be set to work at any time, and require but little attention. All trouble and expense in obtaining and carting the ice is avoided. **THEY ARE ALSO BEING MOST SUCCESSFULLY EMPLOYED FOR COOLING AND PRESERVING MILK, BUTTER, &c. &c.**

THE "Z" SIZE MACHINE driven by a 2-horse Gas Engine costs 3d. per hour only for gas in London, or it can be worked from any existing motive power.

THE "A" MACHINE driven by a Gas Engine costs only 7d. per hour for gas in London.

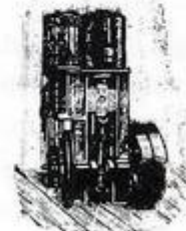
THE "AA" MACHINE and all larger sizes have a steam cylinder combined, and require only a boiler for supplying them with steam.

Prices and Particulars of Boilers sent on application.

For larger sizes for preserving Meat Cargoes and Stores and for Preserving Food on Passenger Ships, apply for Complete Catalogue.

ESTABLISHED 1785.

"A" SIZE.

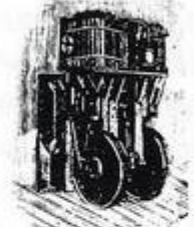


PRICE £225.

Approximate Size of Cold Chamber 2,650 cubic feet.

"AA" SIZE.

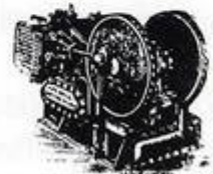
(With Steam Cylinder.)



PRICE £250.

Approximate size of Cold Chamber 2,650 cubic feet.

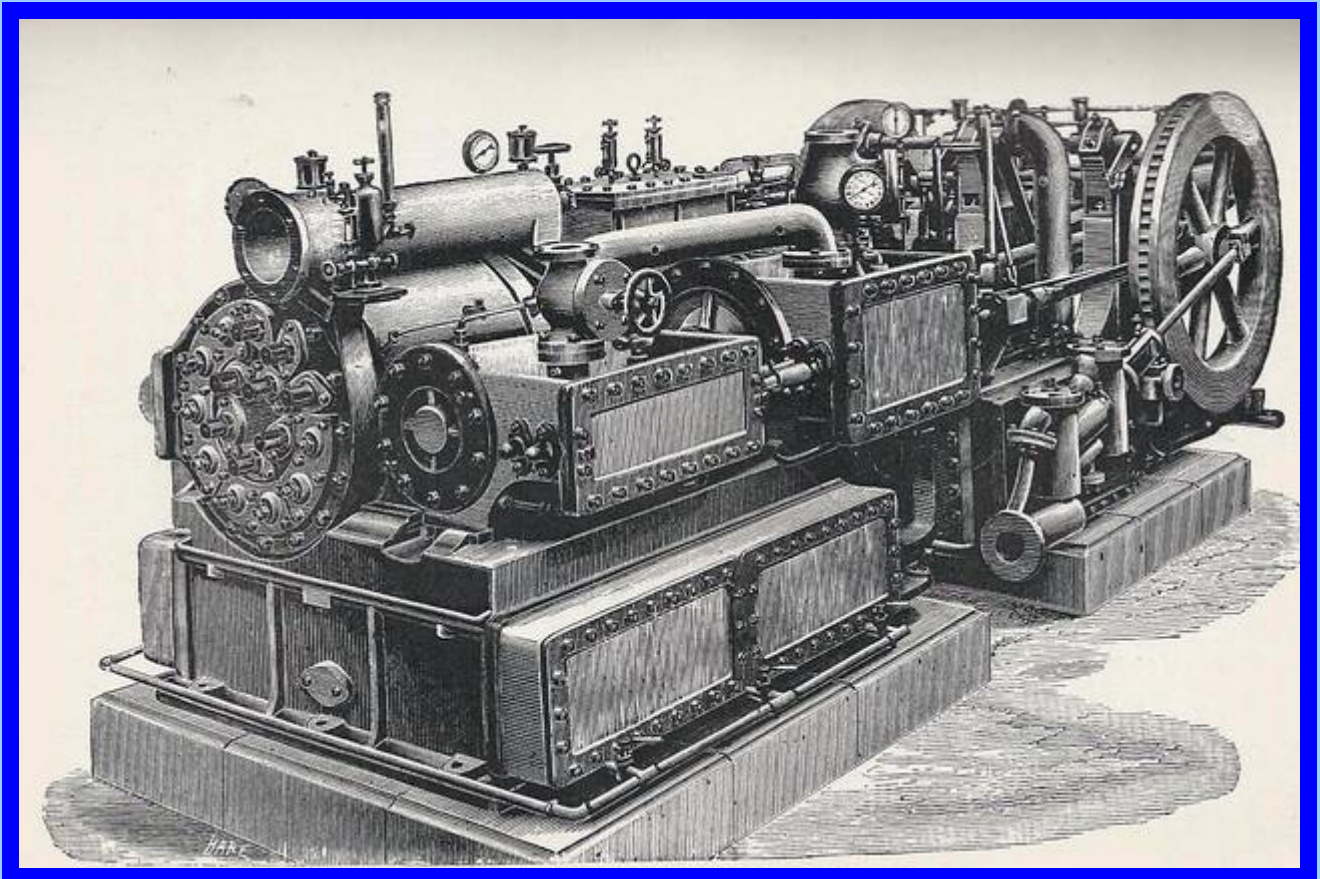
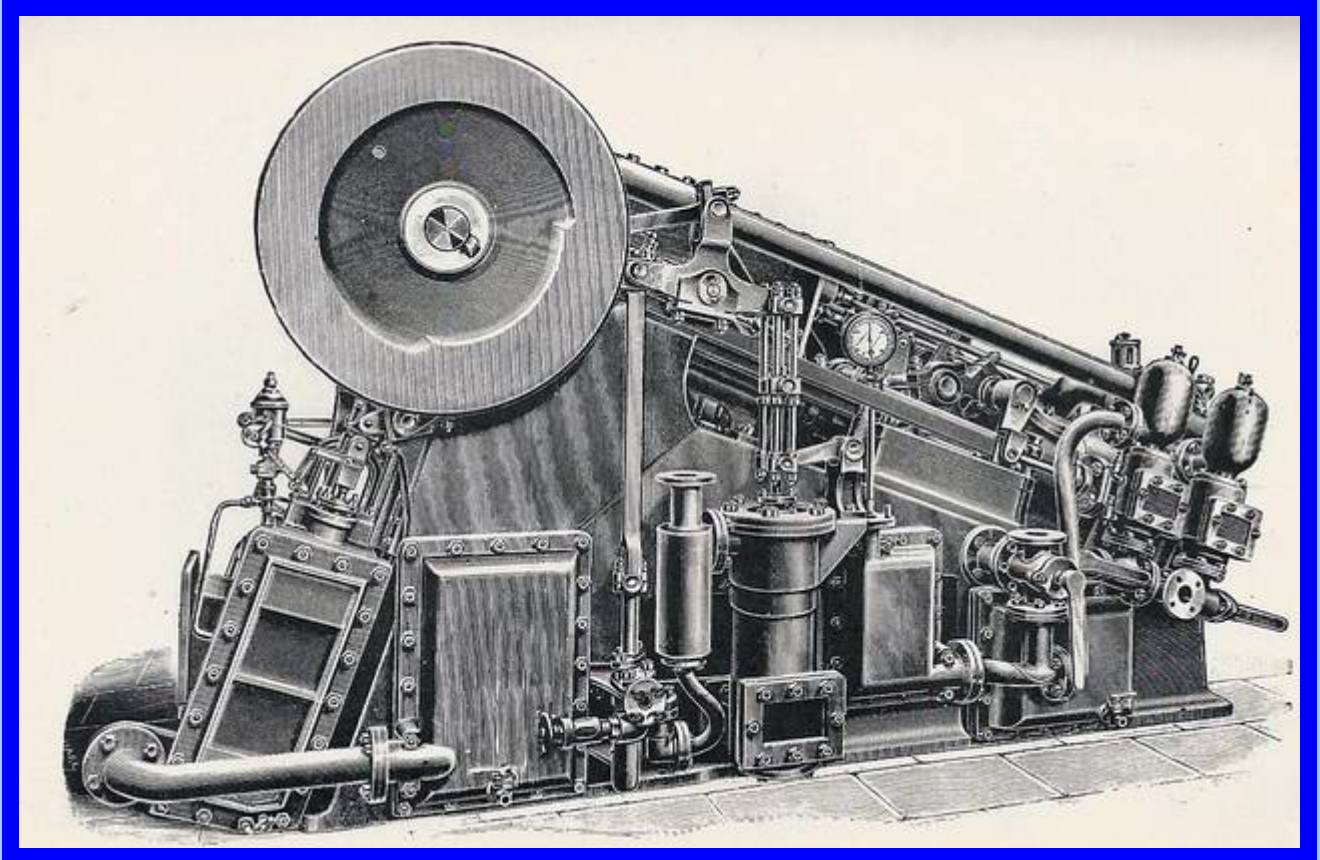
"B" SIZE.



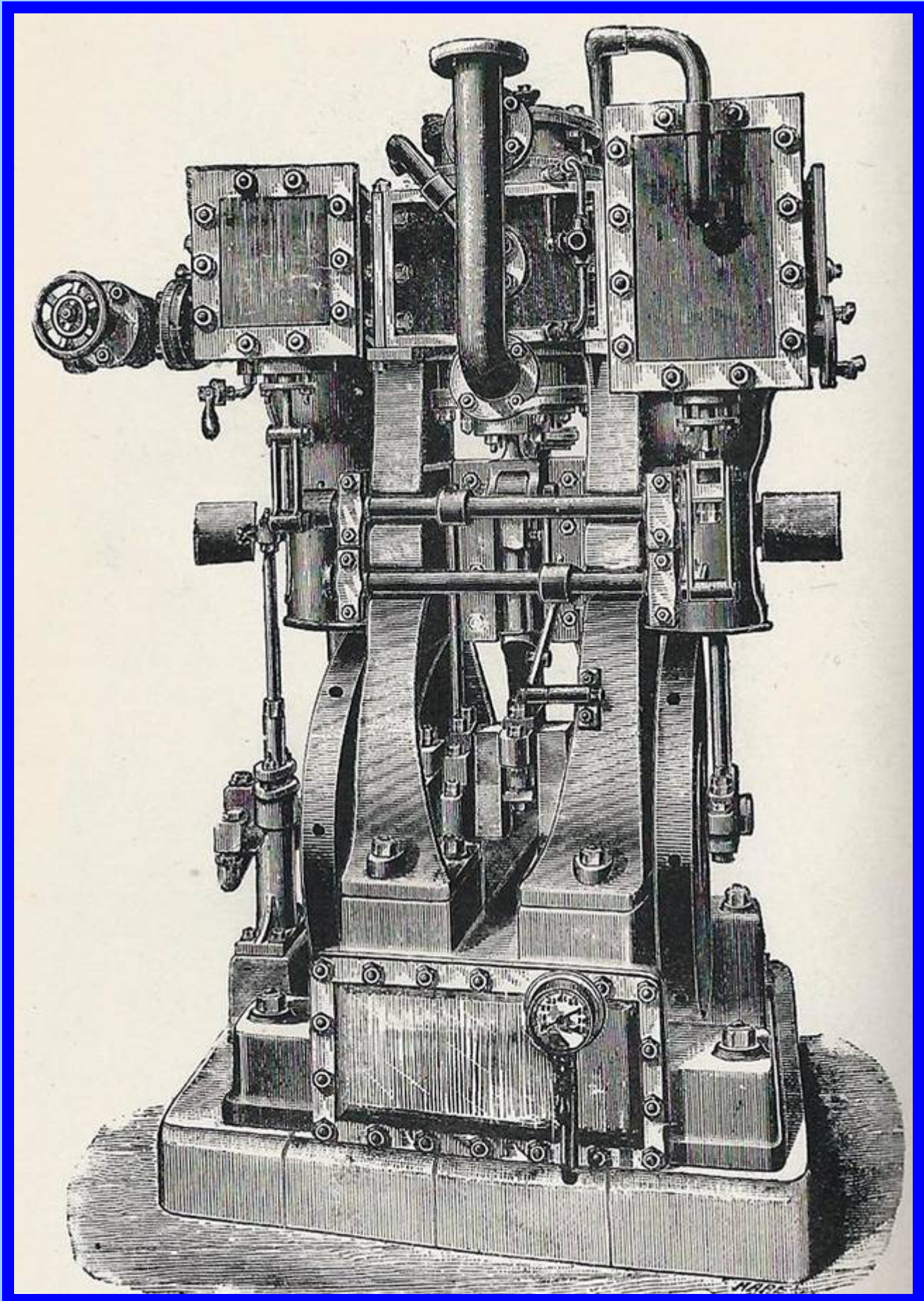
PRICE £450.

Approximate size of Cold Chamber 9,000 cubic feet.

A Hall's advertising poster of 1884



Two designs of cold-air machine of 1880 by Sir Alfred Seale Haslam

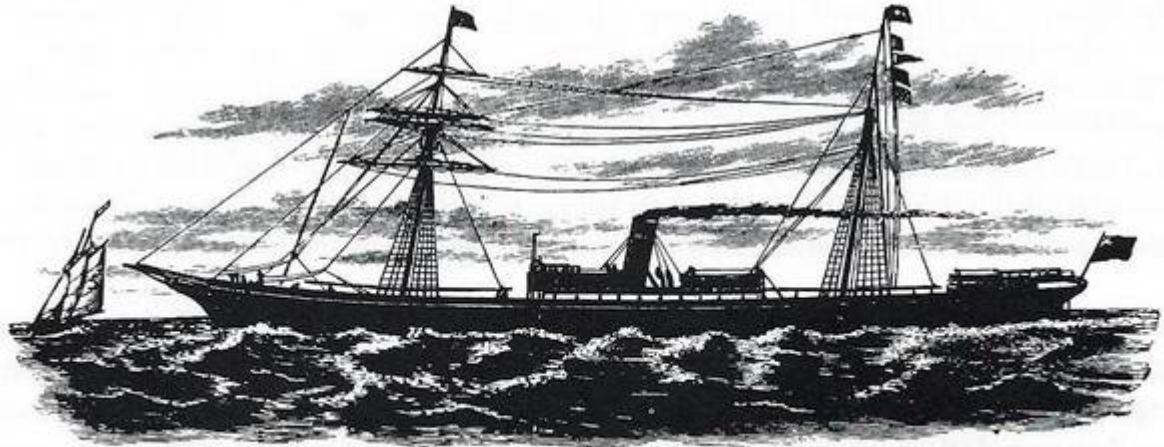


A third Haslam cold-air machine design of 1880

FROZEN MUTTON FROM THE FALKLAND ISLANDS,

Per S.S. "Selebria," fitted with

J. & E. HALL'S COLD AIR MACHINES.



S.S. "SELEMBRIA"—3041 TONS REGISTER.

Extract from "THE TIMES" of the 16th July, 1886.

FROZEN MEAT.—The importation of frozen meat to this country continues to increase, and the recent arrival in the East India Docks of a cargo of over 30,000 frozen carcasses of mutton in excellent condition is the latest and as yet the most extensive contribution that has been made in the form of a single cargo to the meat supply of this country. This has been brought by the steamer *Selebria* from the Falkland Islands, and when one considers that East Falkland was only colonized by British subjects in 1853, and West Falkland in 1861, and that there are now nearly 600,000 sheep in the islands, it seems indeed, little short of marvellous. Those brought over are described as being of prime Canterbury type, well fleshed, and with no superfluous wasteful fat, and they average from 60lb. to 70lb. each. Sales have been effected of portions of the cargo at over 5s. per pound. The steamship *Selebria*, chartered by the Falkland Islands Meat Company, who have entered into agreements with the owners of sheep for the supply of 60,000 per annum, is a steamer of 3,041 tons register, and was fitted out completely by Messrs. J. and E. Hall, of Dartford and London, for this trade. She left England in Decem-

ber last, and would in the ordinary course have returned in April but for the preparations that it was necessary to make in the first instance before the meat could be shipped, as no labour or materials were to be found on the other side. Thus it was necessary to take out a staff of butchers to deal with the meat in the first instance, stedevores to stow away the carcasses in the lower hold as soon as these were frozen, this latter operation being carried out in the 'tween decks, and mechanics to erect the necessary buildings, tramways, and derricks at the three principal ports where the meat is obtained, all this plant being taken out in the ship. The colonists have hitherto contented themselves with what they could realize with the wool, skins, and tallow, to be obtained from their sheep, but now, in consequence of this most recent development in refrigerating machinery by means of cold dry air, they will be able to send their mutton to the English market, not only to their own advantage, but also to that of the consumers over here; and there appears to be every reason to expect that the enterprise which has been entered into in so practical a manner will result in a complete success.

MESSRS. J. & E. HALL,
London.

DEAR SIRS,—The Cold Air Machines fitted by you in the S.S. "*Selebria*," froze very satisfactorily 30,000 carcasses of mutton on the voyage at and from the Falkland Islands, the whole cargo arriving here in perfect condition.

Yours faithfully,

CROW, RUDOLF & CO.

8B, RUMFORD PLACE,

LIVERPOOL.

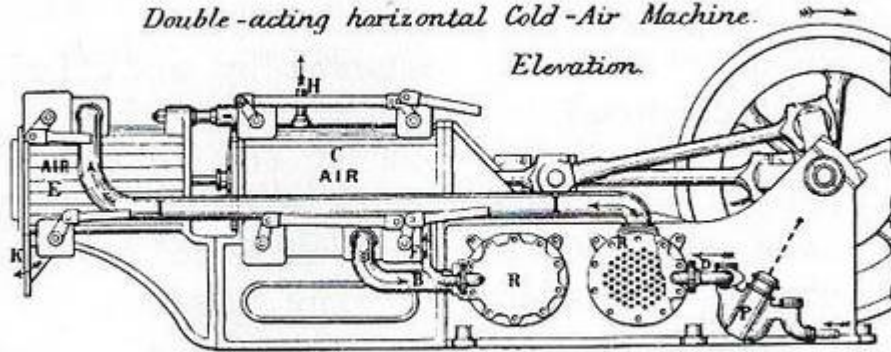
28th August, 1886.

A Hall's advertising poster of 1886

REFRIGERATING MACHINERY.

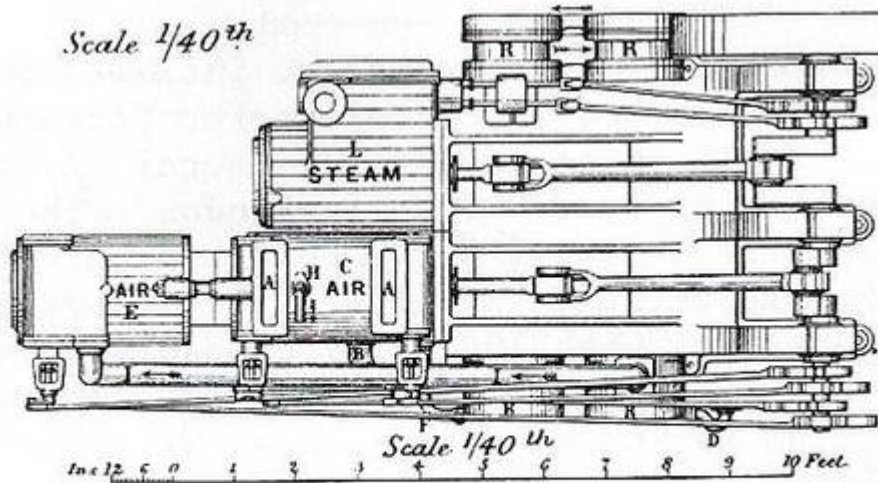
Double-acting horizontal Cold-Air Machine.

Elevation.

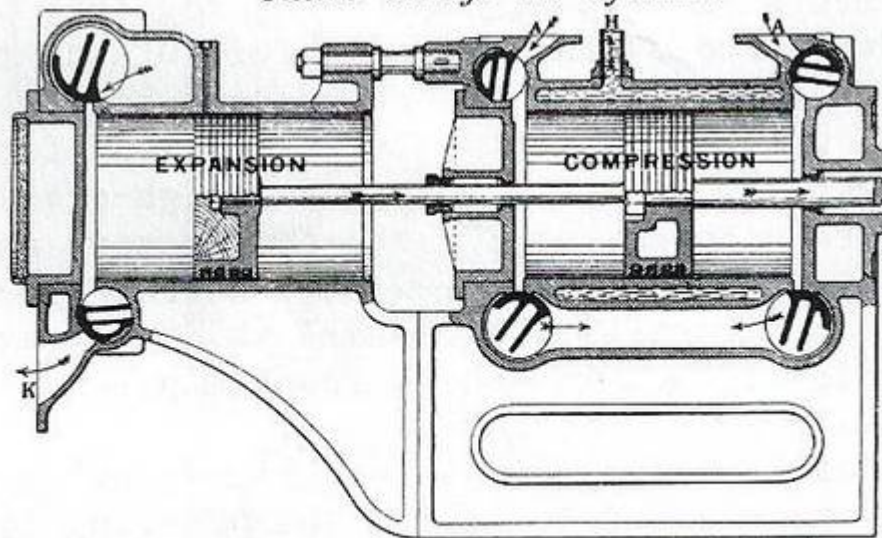


Plan.

Scale $\frac{1}{40}^{th}$

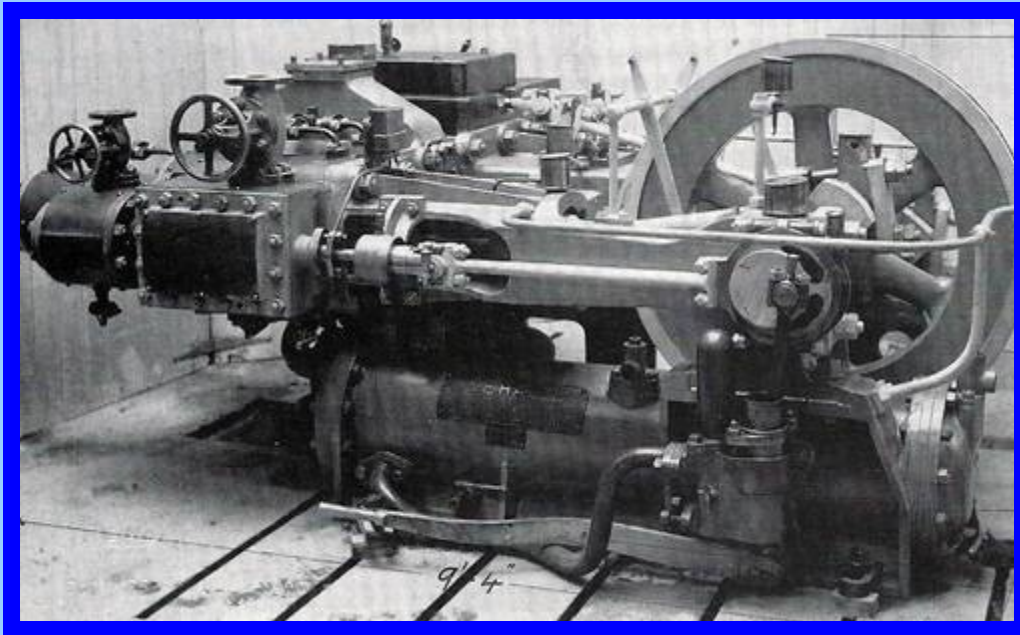


Section through Air Cylinders

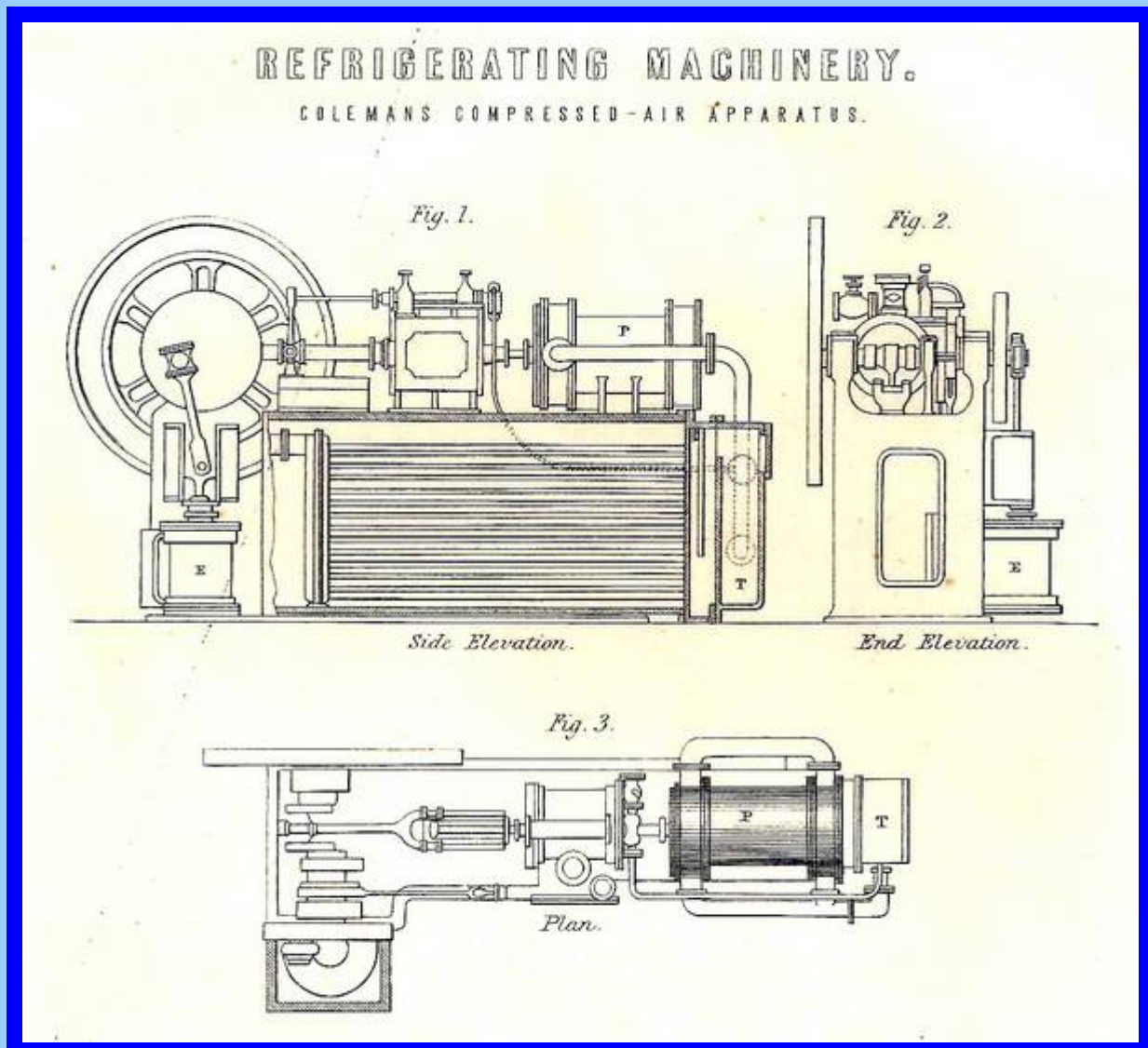


(Proceedings Inst. M. E. 1886)

Lightfoot cold-air machine of 1886



Hall's No. 6 cold air machine of 1886



Coleman cold-air machine c.1877