AIR COMPRESSORS AND BLOWERS FOR THE OPERATION OF INDUSTRIAL FURNACES

SELECTION OF BLOWER

There is no one air pressure or type of blower that can be properly employed for all furnace operations. The pressure to be carried is determined by the design of the furnace and the nature of the work. In some cases it is desirable to maintain air pressure below 8 oz. per square inch, but in others it is necessary to employ a higher pressure to properly burn the fuel in the space available for the operation. Operating conditions govern the pressure of the air, and the type of blower should be adapted to these conditions. In order to conserve power the general rule is to maintain as low a pressure as is permitted by the operating conditions. Except under very unusual circumstances, air pressures beyond the limits of the blowers herein illustrated are unnecessary. Higher pressures are also open to the objection that high pressure machines involve a high cost of installation and operation. Their use should be avoided whenever possible.

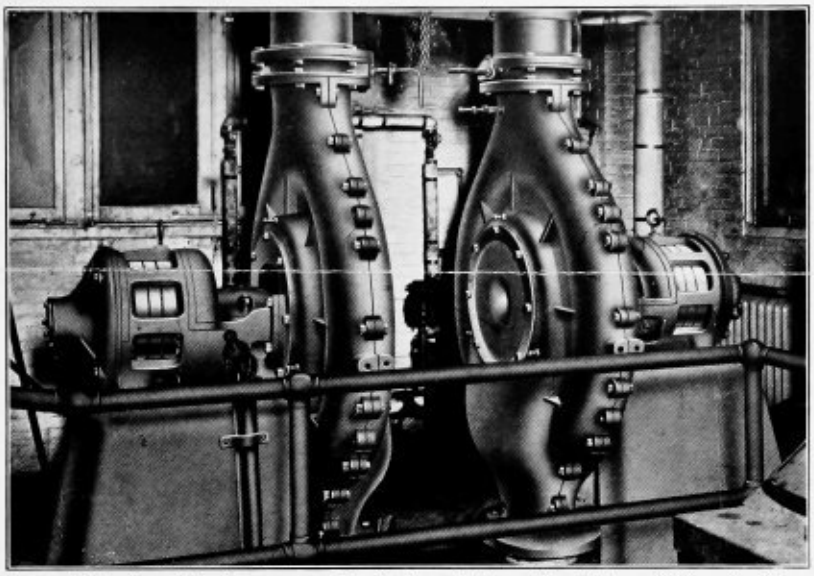

Fig. 2. Typical centrifugal compressor installation. Each machine delivers 3300 cu. ft. of free air per minute at 1½ lb. pressure. Machines are bottom intake, top discharge

The accompanying cuts illustrate some of the different types of blowers that are successfully employed in connection with furnaces operated with oil or gas fuel.

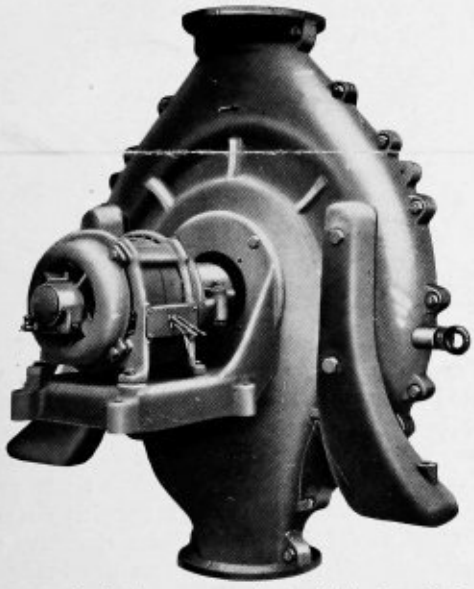

Fig. 1. Centrifugal air compressor, bottom intake, top discharge, or made vice-versa

CENTRIFUGAL COMPRESSORS

Figs. 1, 2 and 3 illustrate a type of centrifugal air compressor very well adapted to the requirements of a majority of furnace installations using oil or gas fuel. This type of machine makes a very simple and compact installation. The design is such that a uniform pressure is maintained at all times, with a power input in proportion to the air volume delivered, also making for economical operation when all of the air is not being utilized. They may also be subjected to considerable sustained overloads without injury. These machines are furnished only direct connected to alternating or direct current motors, or to turbine or steam drive.

The standard single-stage units are built in capacities ranging from 500 to 12,000 cu. ft. of free air delivered per minute, and for pressures from 12 oz. to 4 lb. per sq. in. A multi-stage machine, illustrated by Fig. 4, is also available for smaller installations, these machines being built in capacities of from 350 to 400 cu. ft. of air per minute and for pressures from 12 oz. to 2 lb.

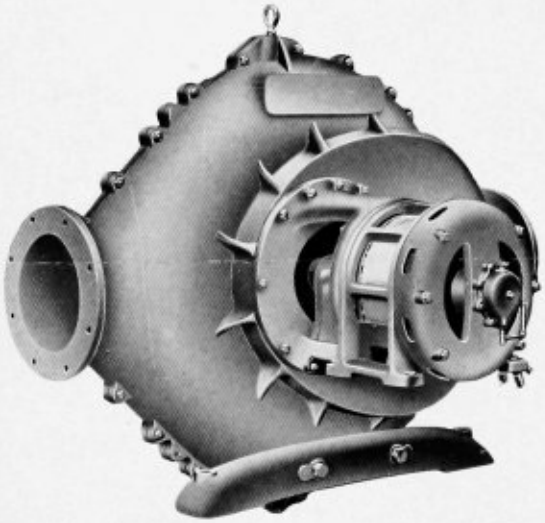

Fig. 3. Centrifugal air compressor, side intake, side discharge. Discharge may be located either side

Fig. 5 illustrates another type of direct motor-driven (either alternating or direct current) low pressure air compressor also well suited to the service of providing air for the operation of oil or gas-fired furnaces. The characteristics of this machine are similar to those illustrated by Figs. 1, 2, 3 and 4; the power input being proportional to the actual quantity of air delivered. Standard machines are available for 1 lb. and 1½ lb. pressures, in capacities ranging from 450 to 10,000 cu. ft. of free air per minute.

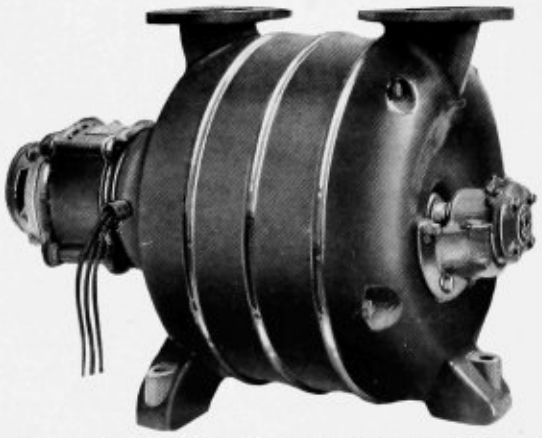

Fig. 4. Small unit centrifugal air compressor. Top intake, top discharge

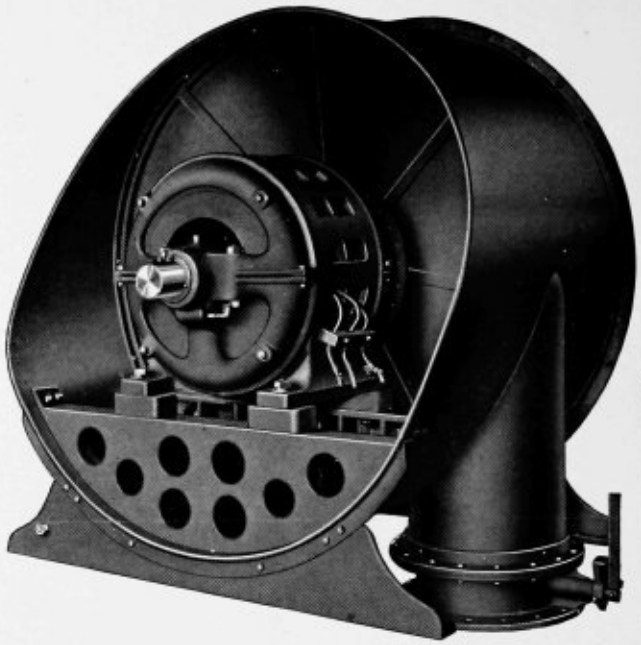

Fig. 5. Motor driven low pressure air compressor

Fig. 6 illustrates the several positions in which the discharge outlet may be placed to afford easy connection to existing or contemplated air pipe lines. The outlet required should be specified with inquiry.

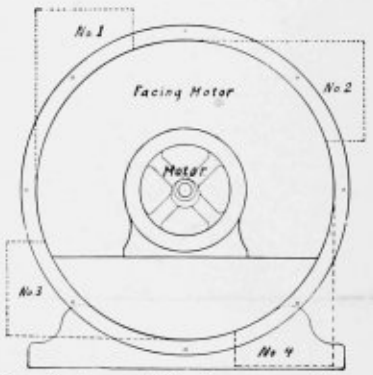

Fig. 6. Various discharge outlets of compressor illustrated by Fig. 5

POSITIVE PRESSURE BLOWERS

Figs. 7, 8, 9, 10 illustrate the standard type of double impeller positive pressure blower, which lends itself very readily to the requirements of almost every furnace installation. These machines can be furnished for belt drive from line shafting, or belt or gear connected to electric motor or other prime mover. They are positive in action, in that at a fixed speed a definite quantity of air is delivered per minute, the pressure being regulated by relief valve. The air output may be varied by changing the speed of the machine.

This type of machine is especially adapted for pressures ranging from 1 to 2 lb. per sq. in. and is available in capacities from 40 to 20,000 cu. ft. of free air delivered per minute. A machine of this type should always be provided with a relief valve capable of discharging the entire output of the machine, to prevent the pressure from running up whenever it may become necessary to shut off the air delivery without stopping the blower.

Fig. 7. Horizontal type positive pressure blower, single pulley, no outboard bearing. Bottom intake, top discharge

Machines can be furnished with or without outboard bearing, and with single or tight and loose pulleys.

Fig. 10 illustrates a positive pressure blower of the single impeller, sliding vane type, suitable for small installations. These machines are built in sizes as small as 6 cu. ft. of air delivered per minute. Being positive in its action, this type of machine should always be provided with an air relief valve. Belt or motor drive may be furnished.

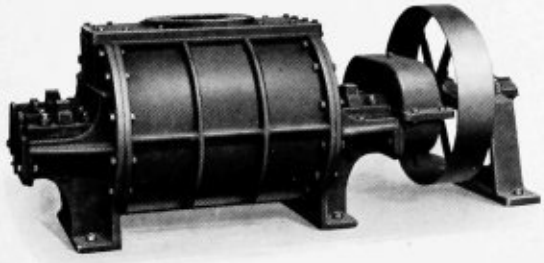

Fig. 8. Horizontal type positive pressure blower, single pulley, outboard bearing. Bottom intake, top discharge

PRESSURE FANS

Pressure fans of the type illustrated by Figs. 11 and 12 are applicable to a great variety of furnace operations where pressures not exceeding 12 oz. per sq. in. will serve. These machines are built in a great range of sizes and for either belt or motor drive.

This type of pressure fan is also available in the special form illustrated by Fig. 13; due to its increased diameter relatively lower speeds are required, permitting easier direct connection to standard electric motors.

Fig. 14 illustrates a type of pressure fan built only for comparatively small volume deliveries but operating at pressures up to 24 oz. per sq. in. These machines are direct motor driven.

Where large volumes of air are to be moved and pressures of a few ounces per sq. in. will suffice, the type of cast iron volume fan illustrated by Figs. 15 and 16 is to be recommended.

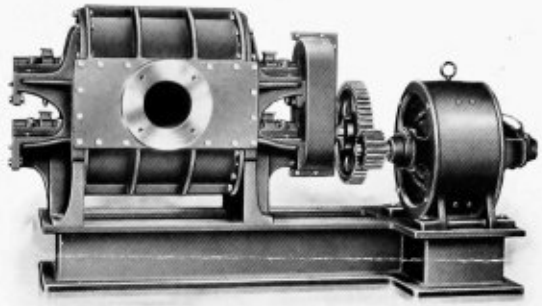

Fig. 9. Vertical type positive pressure blower, gear connected to drive motor. Side intake, side discharge

In making inquiry for fans, it is advisable to specify the "hand" and "discharge" of fans best adapted to meet the local conditions of air piping, etc. This may be readily determined from a reference to the diagrammatic views shown by Figs. 17 to 24. "Right hand" or "left hand" designates the location of the discharge relative to a person facing the driving side of the fan. For example, left hand bottom horizontal discharge indicates that the discharge opening is located on the left hand side of the fan, facing the driving side, and that the discharge leaves at the bottom in a horizontal direction (Fig. 17).

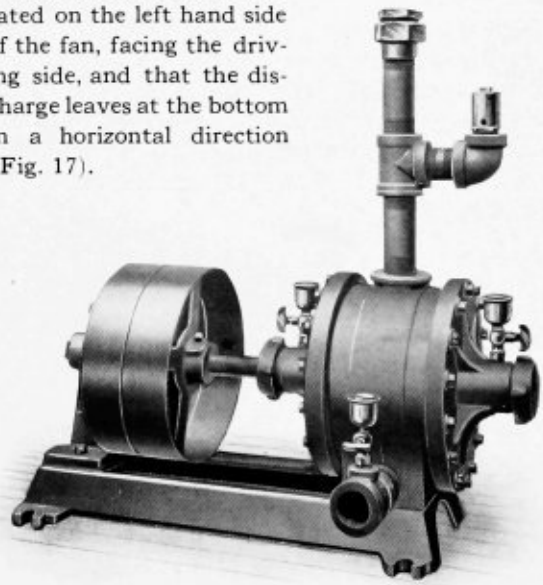

Fig. 10. Single impeller positive pressure blower. Tight and loose pulleys, outboard bearing. Side intake, top discharge

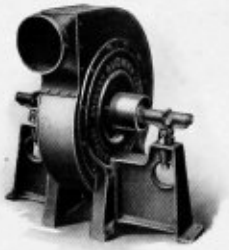

Fig. 11. Steel pressure fan, belt drive, left hand, top horizontal discharge

Fig. 12. Steel pressure fan, direct connected motor drive, right hand, bottom horizontal discharge

Fig. 13. Special type steel pressure fan, for direct motor drive, bottom horizontal discharge. Machines may be built into the factory floor

Fig. 14. High pressure fan, direct connected motor drive, left hand, bottom horizontal discharge

Fig. 15. Cast iron volume fan, belt drive, left hand, top horizontal discharge

Fig. 16. Cast iron volume fan, direct connected motor drive, left hand, top vertical discharge

"HAND" AND "DISCHARGE" OF FANS

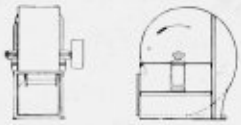

Fig. 17. Left hand, bottom horizontal discharge

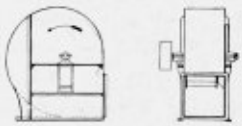

Fig. 18. Right hand, bottom horizontal discharge

Fig. 19. Left hand, top horizontal discharge

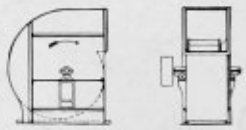

Fig. 20. Right hand, top horizontal discharge

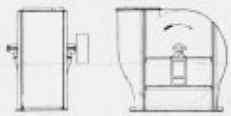

Fig. 21. Left hand, top vertical discharge

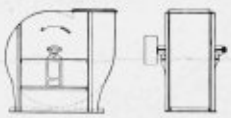

Fig. 22. Right hand, top vertical discharge

Fig. 23. Left hand, bottom vertical discharge

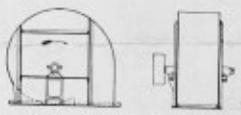

Fig. 24. Right hand, bottom vertical discharge

"ROCKWELL SERVICE" SOLVES HEATING PROBLEMS

W. S. ROCKWELL COMPANY

Furnace Engineers and Contractors

50 CHURCH STREET NEW YORK

(Hudson Terminal Building)

CABLE ADDRESS
"LEWKCOR" NEW YORK
Western Union and Lieber Codes