power curve indicates that a large reserve in horsepower of the motor is required as with the forward curved blade type of fan. Fig. 5 shows the characteristic curves of this type of fan.

The outstanding characteristics of the *full backward curve multiblade type fan* are the steep pressure curves, the non-overloading power curve, and the high speed. (See Fig. 6). This fan operates at a peripheral speed of approximately 250 per cent of the forward curve multiblade type for like results. The pressure curves begin to drop at very low capacity and continue to fall rapidly to full outlet opening. This makes the fan adaptable

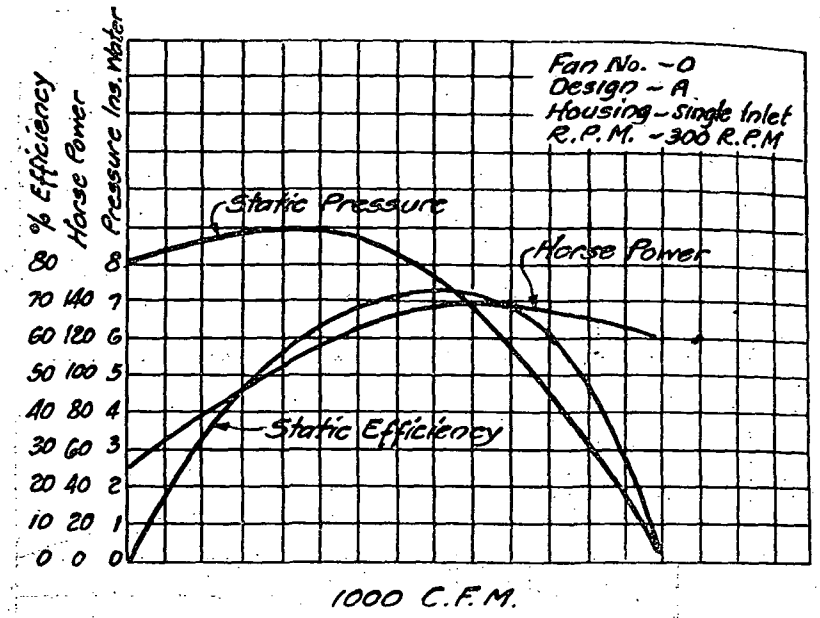

Fig. 7. Typical Fan Performance Curve

to parallel operation for such application as stoker installations. The steep pressure curves tend to produce constant capacity under changing pressures. Where wide fluctuations occur, the use of this type of fan is desirable to prevent overloading of motors. The maximum power requirement occurs at about the maximum efficiency. Consequently a motor selected to carry the load at this point will be of sufficient capacity to drive the fan over its full range of capacities at a given speed. The high speed of this type makes it adaptable for direct connected electric motor drives. The high speed necessitates heavier construction, and more operating attention and service is required than for the other type multiblade fans. The dimensional bulk for a given duty is 150 to 200 per cent that of a forward curve multiblade type fan.

Typical fan performance curves indicating static pressure, static efficiency and horsepower are shown in Fig. 7.

SELECTION OF FANS

Fans for Ventilation

The following information is required to select the proper type of fan:

1. Cubic feet of air per minute to be moved.
2. Static pressure required to move the air through the system.
3. Type of motive power available.
4. Whether fans are to operate singly or in parallel on any one duct.
5. What degree of noise is permissible.
6. Nature of the load, such as variable air quantities or pressures.

Knowing the requirements of the system, the main points to be considered for fan selection are:

1. Efficiency.
2. Reliability of operation.
3. Size and weight.
4. Speed.
5. Noise.
6. Cost.

In order to facilitate the choice of apparatus, the various fan manufacturers supply fan tables or curves which usually show the following factors for each size of fan operating against a wide range of static pressures:

1. Volume of air in cubic feet per minute, (68 F, 50 per cent relative humidity, 0.07488 lb per cubic foot).
2. Outlet velocity.
3. Revolutions per minute.
4. Brake horsepower.
5. Tip or peripheral speed.
6. Static pressure.

The most efficient operating point of the fan is usually shown by either bold or italicized figures in the capacity tables.

Two important factors in selecting fans for ventilating systems are efficiency (which affects the cost of operation) and noise. First cost and space available are secondary. The fans should be selected to operate at maximum efficiency without noise. Noise in a ventilating system is irritating and a cause for complaint. Fans must be selected of proper size in order to reduce it to a minimum. Noise may be caused by other factors than the fan, namely, high velocity in the duct work, unsatisfactory location of the fan room, improper construction of floors and walls and poor installation. Where noise is chargeable directly to the fan, it is caused either by excessive peripheral speeds, or the fan is of insufficient size. It should be remembered, however, that the tip speed required for a specified capacity and pressure varies with the type of blade, and a tip speed that is excessive for the forward curved type is not necessarily so