

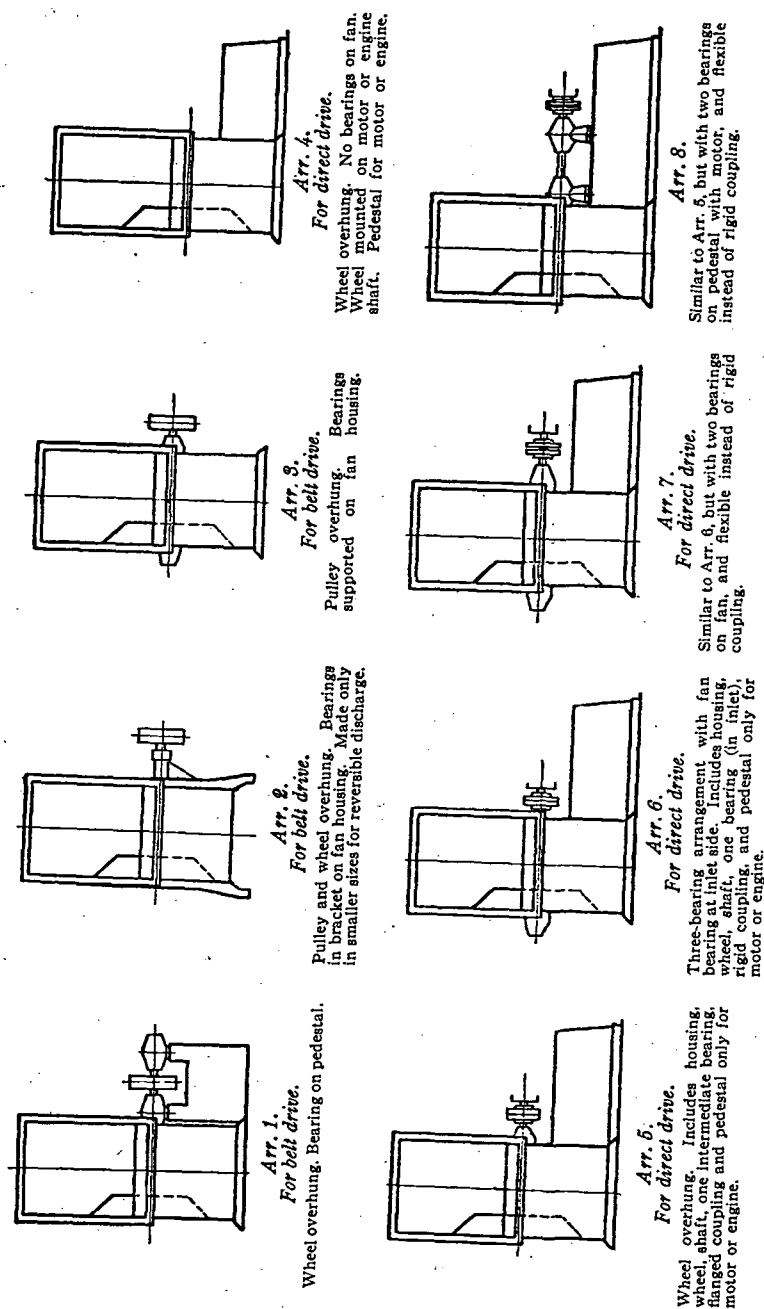


FIG. 5. ARRANGEMENT OF FAN DRIVES

Each type of electric motor and kind of electric current has its advantages and disadvantages as applied to a fan.

Direct-connected electric motors usually are very efficient for fan driving because there is no slippage due to belts, and no wear or noise due to chains or gears. There is less maintenance and upkeep to a direct-connected unit, and with an overhung fan wheel on the motor shaft, the usual fan bearings are eliminated.

The disadvantage of a slow-speed direct-connected motor is that it may be unduly large and heavy as well as costly, but this may be offset by the compactness of the unit as a whole due to limited space for fan equipment.

Should anything go wrong with a slow-speed direct-connected motor there may be a considerable delay in securing replacements, as these motors are not usually carried in stock, as is the case with moderately high-speed motors.

If a change of speed is found necessary with a direct-connected motor, it will mean a change of motor, which may necessitate a change in the motor foundation usually built with the fan in such cases. On the other hand, non-direct-connected motors have transmissions subject to wear and slippage, and chains or gears may be noisy with this latter type. However, should a change in speed be necessary where the motor is not direct-connected, changes in speed ratio can easily be accomplished by changing pulleys, sprockets or gears on either the fan or the motor. In the case of a motor breakdown a standard stock motor may easily be substituted.

A type of drive using wedge-shaped rope-like belts, often in multiple, has become very popular recently as it enables the use of high speed motors with slow speed fans. These motors are less expensive and more efficient, and they allow very short belt centers, thus saving floor space and making the fan unit and the motor much more compact than the usual belt drive. The compactness secured by this equipment compares favorably with a direct connected layout. This type of drive is also very quiet in operation, being similar to a conventional belt drive in this respect.

Alternating current motor designs are such that improved operating characteristics are obtained with the higher motor speeds. Efficiencies and power factors are improved over those in effect with slower speed motors, thus showing a considerable saving in power consumption, where some effective speed reducing transmission device to the fan is installed.

Quietness of operation is more readily obtained with moderately high speed induction motors than with low speed motors, as any slight magnetic unbalance is not as easily heard. Magnetic unbalancing at times causes noises whose repetition and wave length is such as to cause vibrations and harmonics. Amplifications of the noises in other parts of a building remote from the motor equipment are sometimes found, due to such noises being carried by the steel work, ducts, or piping in the building. There is considerable evidence that these sounds are more easily controlled with higher motor speeds than with lower motor speeds.

Motors which are practically quiet in operation and free from magnetic disturbing noises can be obtained and should always be specified for