

AXIAL FANS VENTILATING/INDUSTRIAL

SERVICE MANUAL

SECTION I

This manual has been prepared to help you keep your "Buffalo" equipment operating efficiently with minimum expense for repairs or replacement. It is sectionalized to coordinate related information in a more easily usable form.

An assembly drawing, containing all pertinent data and dimensions, is prepared for the specific equipment furnished on your order.

You will also find it helpful to have a "Buffalo" catalog pertaining to the particular product which you are using. These may be obtained through your nearest "Buffalo" representative or by writ-

ing direct to Buffalo.

The contents of this manual cover our standard line of vaneaxial and tubeaxial fans. For instructions and recommendations on engineered equipment for special requirements, contact your local Buffalo representative or the main plant in Buffalo.

In certain cases, especially where large fans are involved, it is advisable to have an experienced erector supervise installation of the equipment. Buffalo service men are available by arrangement through any Buffalo Forge sales office.

BUFFALO FORGE CO. / Buffalo, N. Y.

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SECTION I

SHIPPING & RECEIVING

BUFFALO STANDARD TERMS OF SALE

F.O.B. factory, Buffalo, N. Y. with freight allowed or not allowed as stated in the proposal. It is, therefore, in the interest of the buyer to carefully inspect all shipments before they are accepted from the carrier. Upon delivery, be sure that all items listed on the combination bill of lading and packing list (inserted in the oil tight envelope attached to the shipment) have been received. Partial shipments are sometimes made.

Axial fans are usually shipped completely assembled, skidded or crated to comply fully with rail or trucking requirements.

Exposed shafts are normally coated with grease to prevent corrosion. V-belt driven units with the driven sheave shipped separately, have the key taped to the fan shaft.

Accessories such as variable inlet vanes, inlet box, sound attenuators, inlet or outlet cones are sometimes shipped separately due to handling and space requirements.

Even though all equipment is carefully inspected and prepared for shipment at the factory, rough handling enroute may cause damage to fan and drive parts.

Any shortage, breakage or damage noticed at time of delivery should be indicated on the carrier's freight bill and signed by the driver or carrier's representative. Damage, noticed after delivery, should be reported to the carrier at once. Request their inspection of the shipment and fill out a concealed damage inspection report.

HANDLING

Axial fans should be hoisted with rope slings placed around the fan housing. When a single hoist is used, a "spreader" will keep the sling from sliding on the housing. If it is necessary to use hooks placed in the holes of inlet or outlet flanges, **BE CAREFUL NOT TO DISTORT OR BEND THE FLANGE OR HOUSING.** Large units may have lifting lugs or holes which should be used in lieu of the sling.

Chain or wire slings should be well padded where they contact the fan, especially where special coverings and paints are involved. Rubber, phenolic enamels, etc. require extreme care as they are easily damaged. Even a small chip will break the continuity of the coating and destroy its protective value. Always touch up scratched surfaces prior to installation.

STORAGE

Store in a dry, protected area being sure fan shaft, bearings and wheel are protected against dust and corrosion.

If necessary to store outdoors or within a building under construction, special care must be taken to prevent moisture, corrosion, dirt or dust accumulation. Coat the shaft with grease or rust preven-

tive compound. Cover and seal bearings to prevent entrance of contaminants. If stored outdoors for any length of time, cover completely with a tarp or heavy waterproof paper. Electrical connections and leads must be protected from moisture. Block wheels to prevent rotation. Do not allow material of any kind to be piled on top of a fan.

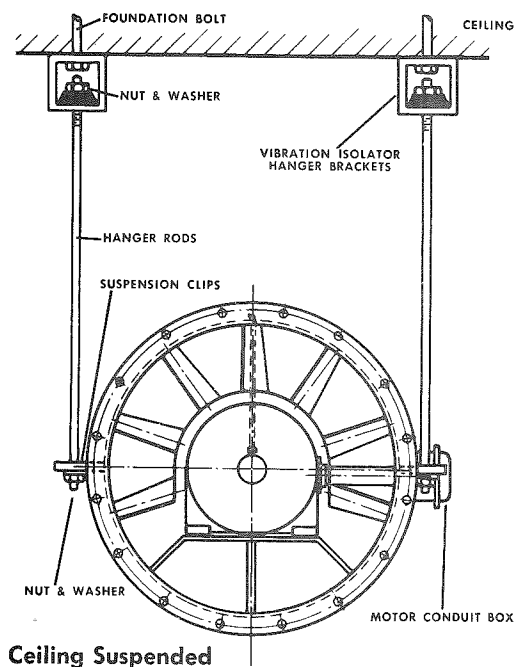
FOUNDATIONS

A rigid, level foundation is a must for every fan. It assures permanent alignment of fan and driving equipment and freedom from excessive vibration, minimizing maintenance costs. The sub-foundation (soil, stone, rock, etc.) should be firm enough to prevent uneven settlement of the structure. Foundation bolt locations are found on the assembly drawing.

POURED CONCRETE FOUNDATIONS RECOMMENDED

Poured concrete under the fan and all drive components is the best fan foundation. A generally accepted rule of thumb is that the weight of concrete foundation be at least three (3) times the total weight of the equipment it will support. This weight acts as an inertia block to stabilize the foundation. Where the ground is soft, the foundation should be flared or the footing course increased in size to resist settling. The top should extend at least 6 inches outside the outline of the fan base and should be beveled on the edges to prevent chipping.

Anchor bolts in concrete should be L or T-shaped. They should be placed in pipe or sheet metal sleeves approximately 2" larger in diameter than the anchor bolts to allow for adjustment in bolt location after the concrete has set. In estimating the length of bolts, allow for the thickness of nut and washers, thickness of fan base, extra threads for draw down and approximately 1" for grout and shims.

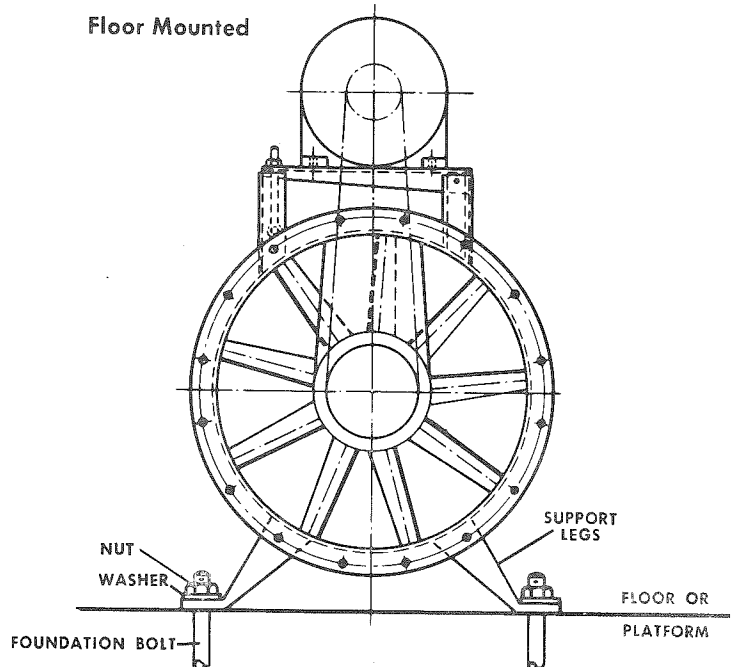


EQUIPMENT MOUNTED FANS

If the fan is mounted on equipment having parts which cause vibration, it is very important the fan support be rigid enough to prevent such vibration being carried to the fan. The natural frequency of the support should differ from the fan running speed by at least 10%. It may be advisable to use vibration isolators under the fan.

STRUCTURAL STEEL FOUNDATION

When a structural steel foundation is necessary, it should be sufficiently rigid to assure permanent alignment. It must be designed to carry, with minimum deflection, the weight of the equipment plus the loads imposed by centrifugal forces set up by the rotating elements. The entire structure should be welded or riveted, rather than bolted, because bolts can loosen allowing the structure to vibrate. Roof mounted units should be located near to or above a rigid wall or heavy column. An overhead platform or support must be rigidly constructed, level and sturdily braced in all directions.



SECTION II ASSEMBLY & INSTALLATION

TYPE B AND TYPE S ADJUSTAX® AXIAL FANS

Type B - Vaneaxial, Tubeaxial, Clamshell® and Spray Booth designs as well as Type S Adjustax® axial fans are shipped completely assembled and have been aligned, balanced and given a running test at Buffalo Forge.

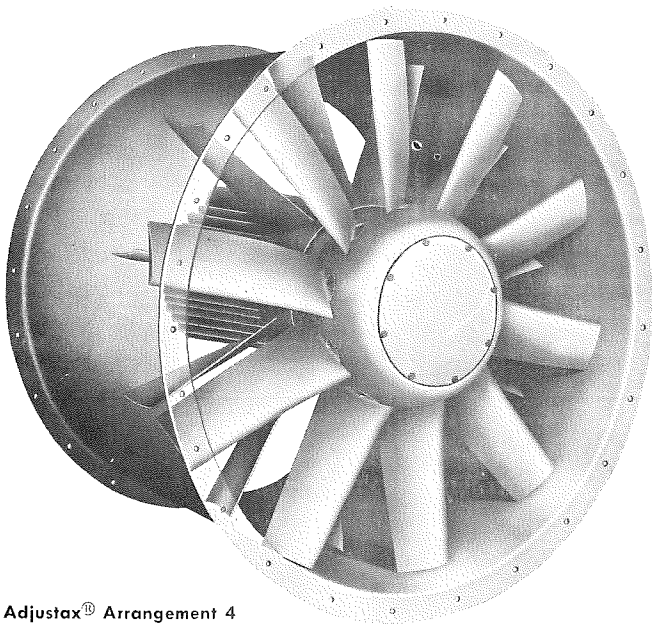
Units that are shipped with motor and V-belt drive separate have had the wheel dynamically balanced. No running test is performed unless called for on the order.

When installing fans, allow ample space for removal of motor, V-belts and wheel, lubrication of bearings, adjustment of motor base (Arr. 9) and for inspection or servicing of complete unit. Access doors should be provided in ductwork at the fan for internal inspection of the fan.

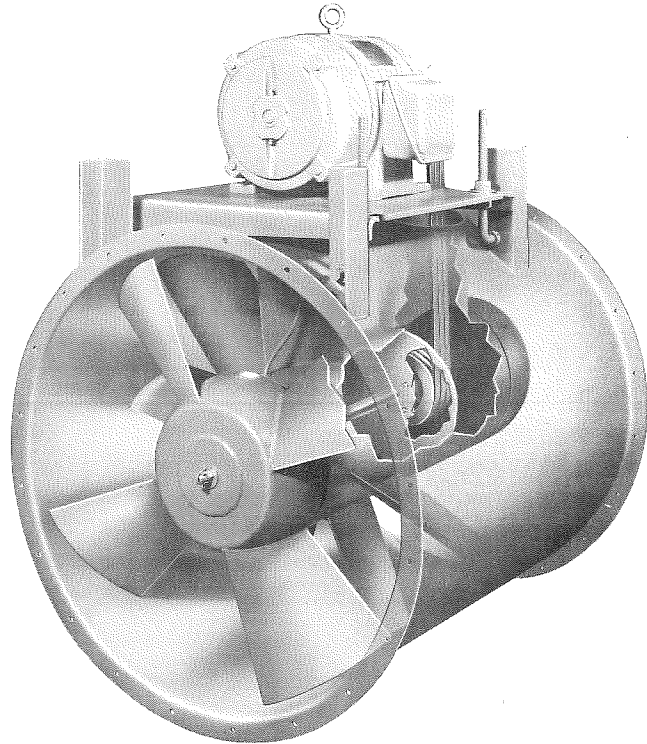
Type B Vaneaxial, Tubeaxial, Clamshell and Spray Booth Arr. #9 fans are suitable for horizontal or vertical mounting with no modifications up through and including Size 66. Consult Buffalo when changing Type B Size 72, 84 or 96 and Type S Fans from horizontal to vertical air flow. Always use a ball bearing motor for vertical mounting.

Adjustax and Type B Arr. #4 fans are suitable for horizontal mounting. For vertical mounting the motor shaft must be drilled and tapped for locking fan wheel on shaft.

Check assembly drawing for proper direction of air flow and position of motor. Arrows on the fan nameplate indicate direction of wheel rotation and air flow.



Adjustax® Arrangement 4



Vaneaxial Arrangement 9

Type S Adjustax is an extremely high efficiency adjustable pitch vaneaxial fan. To maintain this high efficiency, it is important that all blades are at the proper blade setting BEFORE start-up. These blades are factory pre-set according to the fan rating specified on the order. To change setting or adjust, loosen the two Allen Head bolts at the base of each blade and set the blade pitch indicator line on the proper vernier scale setting. Apply Loctite anti-seize compound under the capscrew heads and re-tighten the capscrews to the torque tabulated below. Ensure that capscrew is free of dirt before re-tightening. Never set the blades at a setting higher than shown on the fan nameplate "maximum blade setting".

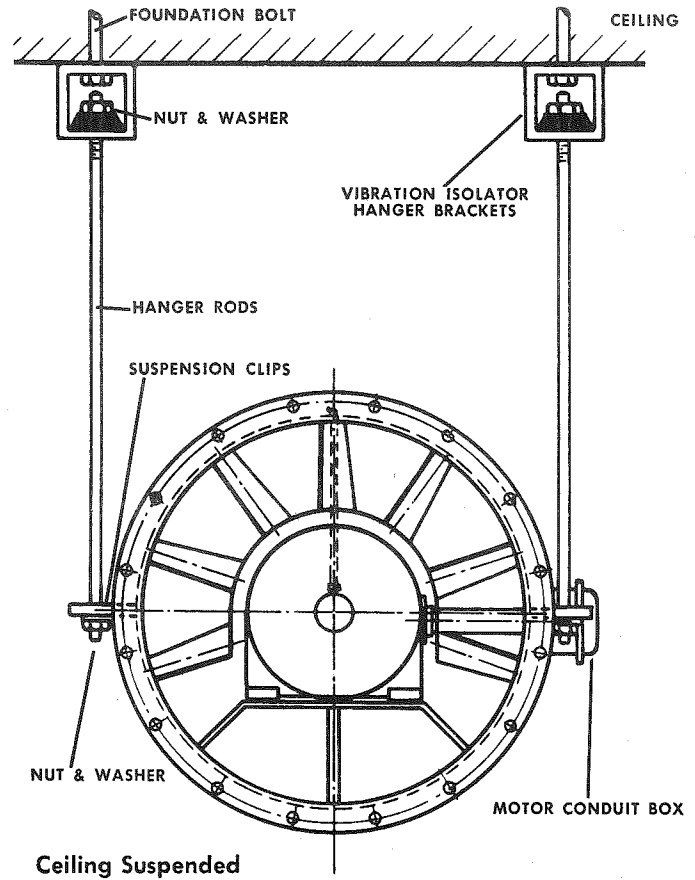
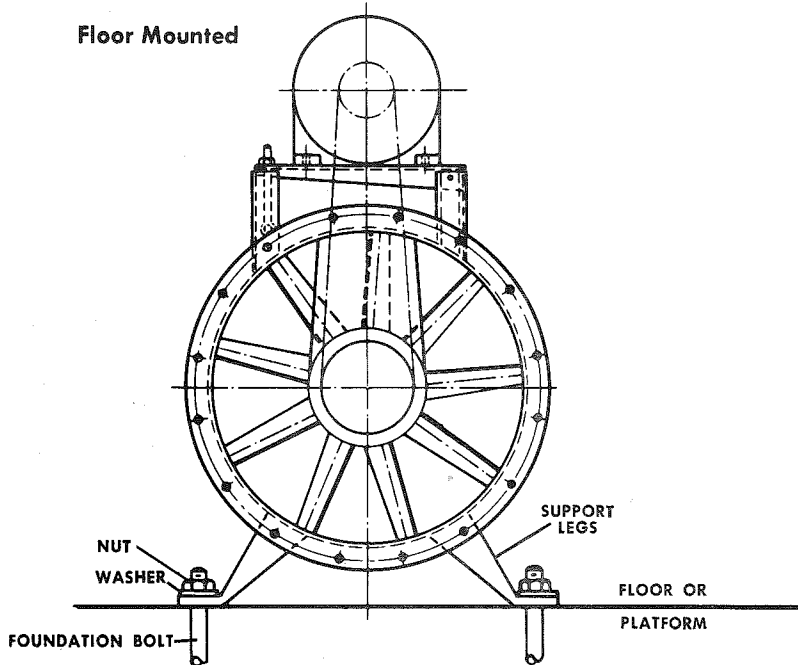
TIGHTEN TORQUE FOR BLADE BOLTS	
Hub Size	Torque Ft. Lbs.
A	15.5
B	31
C	31
D	61

Hub size and fan size are indicated on fan nameplate.
Example: 33A is size 33 having "A" hub.

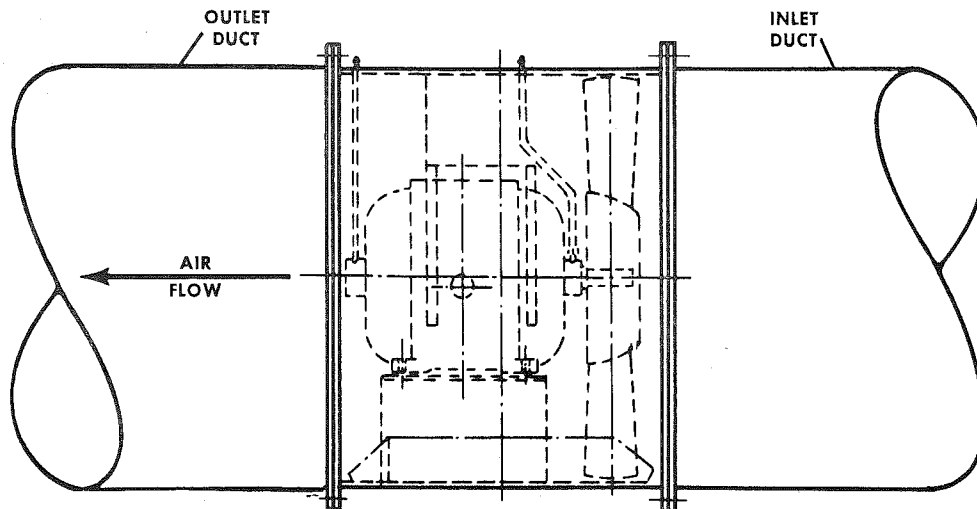
Axial Fans Shipped Completely Assembled

1. With floor and platform mounted units, move fan to its rigid foundation. If vibration isolator rails or pads are required, place these over the anchor bolts in the foundation. Line up foundation holes in support legs of fan with the anchor bolts and lower fan being careful not to strip threads. Level unit and tighten nuts on all anchor bolts.
2. With ceiling suspended units, raise to proper position under hanger rods (Not supplied by Buffalo Forge). Properly loaded vibration isolator hanger brackets should be used. Insert rods through suspension clips on fan housing, attach washers and nuts and tighten. Level fan by adjusting hanger rod lengths.
3. With ductwork supported fans, raise unit to proper position and bolt inlet and outlet flanges of fan to companion flanges of ductwork.
4. Unit is now ready to be connected into the system. See **Operation** section, page 10.

Floor Mounted



Ductwork Supported



ASSEMBLY AND DISASSEMBLY

DIRECT DRIVE ARRANGEMENT #4

TYPE S ADJUSTAX® AND TYPE B AXIAL FANS

DISASSEMBLY — Axial fans are normally shipped completely assembled and ready for operation.

The following steps detail complete disassembly of the fan for maintenance.

Tubeaxial and Vaneaxial

1. Place fan housing (1) on floor and block to prevent rolling.
2. If required remove inlet bell (8), inlet and/or outlet cone (5), inlet or outlet screens (6) variable inlet vanes (7) inlet box (4) or legs (3).
3. Remove conduit box (10) from housing. Then remove conduit pipe from housing and motor. Do not harm motor leads.
4. Remove grease fittings and grease lines (11).
5. To remove wheel (2):

TYPE "B" ONLY

a. Remove spinner or coverplate nosepiece (12) by removing screws. No spinner is furnished on fan sizes 15 thru 36 steel wheel or on sizes 15 thru 24 cast aluminum wheels.

b. Remove cotter pin or lockwire.

c. With steel wheel - sizes 15 thru 36 - remove castle nut and then remove washer. Shaft stud is now removed from shaft.

For steel wheel - sizes 42 thru 96 - and all aluminum wheels remove locking bolt and hex bolt from motor shaft, then remove the retaining plate.

d. Now carefully slide the wheel from the motor shaft. Be careful not to lose the key.

TYPE "S" ADJUSTAX® ONLY

Remove coverplate.

If the Adjustax Wheel is attached to the motor shaft by means of a QD-hub, follow this procedure:

First remove wheel from QD-hub:

- a. Remove 3 hex head draw-up bolts which hold wheel to the QD-hub.
- b. Oil these bolts if dry and insert into tapped holes in the wheel hub.
- c. Tighten bolts 1/2 turn alternately and evenly to break taper fit.
- d. If difficult to break the taper fit, tap slightly and carefully with hammer against QD-hub.
- e. Remove wheel from QD-hub.

If it is necessary to remove the QD-hub from the shaft:

- a. Mark its position on the shaft.
- b. Loosen clamp screw in flange of QD-hub and loosen setscrew over key.

Slide QD-hub from shaft. If hub is tight on shaft, carefully tap screwdriver into flange split to loosen or use wheel puller.

If the wheel is held on the shaft by means of a split hub, follow this procedure:

- a. Loosen self locking socket screw.
- b. Remove split nut.
- c. Remove wheel from split hub. If it is necessary to remove split hub from the shaft:
 - (a) Remove both keys.
 - (b) Remove locating pin.
 - (c) Loosen self-locking socket screw in flange of hub.
 - (d) Remove hub.

If the wheel is held on the shaft by means of a castle nut:

- a. Remove cotter pin or lockwire.
- b. Remove castle nut and then remove lockwasher.
- c. Carefully remove wheel from shaft. Be careful not to lose the key.

6. To remove motor (9):

TYPE "B"

a. The motor (9) is removed simply by taking out the hold down bolts fastening the motor to the motor base.

TYPE "S" ADJUSTAX®

a. The motor (9) is held on a mounting plate by means of capscrews attached to the motor's C flange. Large motors also have front end support rods.

NOTE: When removing the motor from the type "B" and the type "S" fans care must be exercised not to damage the vanes (13).

ASSEMBLY — The type "B" (Vaneaxial and Tubeaxial) and the type "S" fans are re-assembled by reversing the order of the disassembly steps as found above. The following notes also apply:

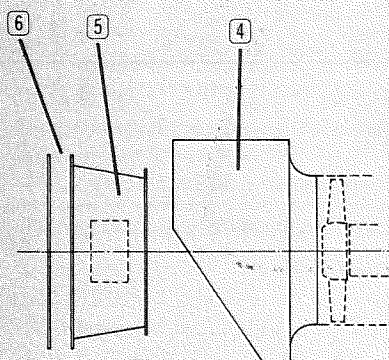
TYPE "B"

a. When replacing the motor insure it is positioned properly on the motor base and that the hold down bolts are only finger tight.

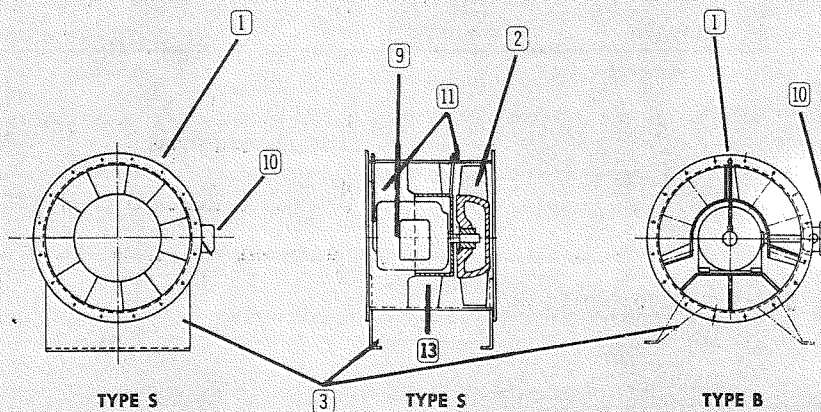
b. Clean the bore of wheel and coat with white lead or oil and slide gently onto shaft. Adjust wheel in housing so there is an equal clearance between tips of blades and inside of housing. The motor might have to be shimmed or moved to one side.

c. When proper alignment is obtained, tighten motor hold down bolts, castle nut on shaft and locking bolts. Insert the cotter pin or lockwire on motor shaft.

d. Replace accessories if required and remount fan. See Operation section, page 10.



ACCESSORIES
TYPES S AND B



TYPE "S" ADJUSTAX®

- a. Replace motor with the motor shaft properly centered in the shaft hole of the motor mounting plate.
- b. To remount QD-hub on shaft:
 1. Wipe shaft, QD-hub inside and outside, and bore of wheel.
 2. Slide QD-hub on shaft (flange side first). Reposition to exact location as marked during removal.
 3. Insert key.
 4. Tighten clamp screw in flange of QD-hub.
 5. Tighten setscrew over key.

c. To remount the wheel on the QD-hub:

1. Apply a thin and even layer of Loctite anti-seize compound to the outside of the QD-hub and to the inside of the wheel bore.
2. Assemble wheel on taper seat of QD-hub.
3. Clean and slightly oil hex head draw-up bolts.
4. Insert bolts in QD-hub using lockwashers and flatwashers and tighten alternately and evenly, with the following torques:

TIGHTENING TORQUE FOR QD HUB BOLTS			
HUB SIZE	B	C	D
TORQUE — FT. LBS.	6	12	22

- d. Replace accessories if required and remount fan.

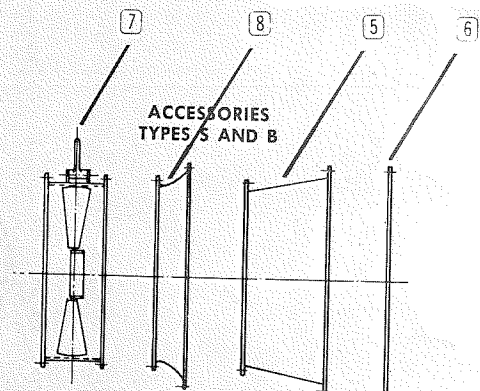
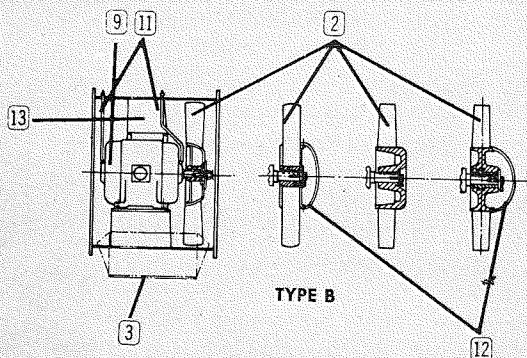
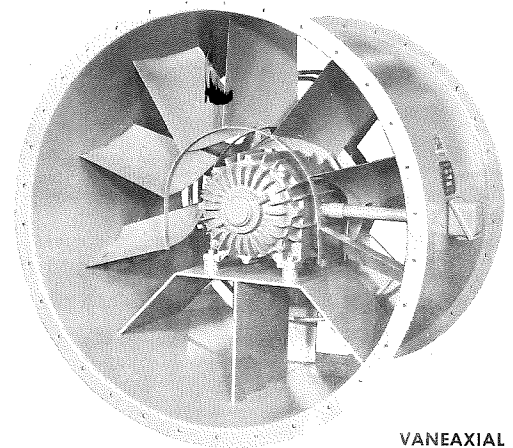
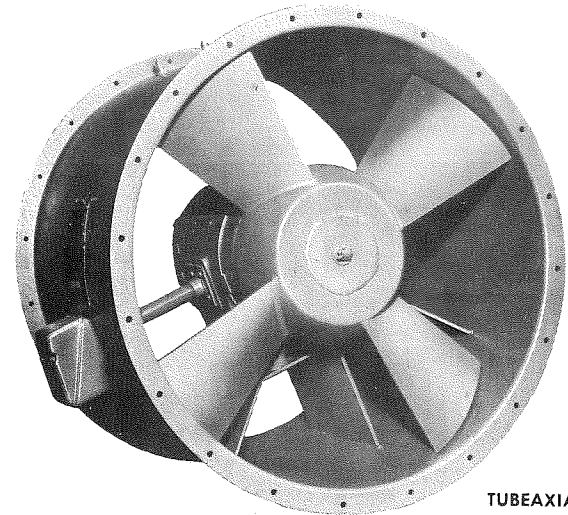
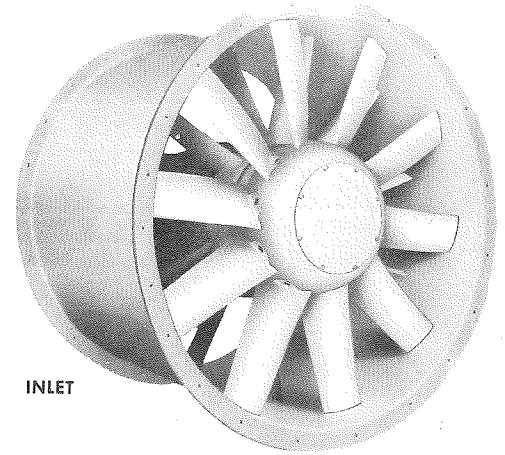
To remount split hub on shaft:

- a. Insert key in shaft.
- b. Slide split hub into position on the shaft. It may be necessary to pry open the hub somewhat by forcing a screwdriver into the split. **CAUTION:** The screwdriver must **NOT** be inserted at the side of the flange which will be in contact with the fan wheel.
- c. Insert locating pin.
- d. Securely tighten the self locking socket screw in flange of split hub.
- e. Apply anti-seize compound between wheel bore and split hub O.D.

To remount the wheel on shaft with castle nut:

- a. Insert key.
- b. Clean wheel bore and apply anti-seize compound on shaft.
- c. Slide wheel gently onto shaft.
- d. Install lockwasher, castle nut and cotter pin or locking wire.

NOTE: Before start-up see Operation section, page 10.



ASSEMBLY AND DISASSEMBLY

V-BELT DRIVE ARRANGEMENT #9

TYPE S ADJUSTAX® AND TYPE B Vaneaxial Fans

DISASSEMBLY — Axial fans are normally shipped completely assembled and ready for operation.

The following steps detail complete disassembly of the fan for maintenance.

Vaneaxial

1. Place fan housing (1) on floor and block to prevent rolling.
2. If required remove inlet bell (8), inlet and/or outlet cone (5), inlet or outlet screens (6), variable inlet vanes (7), belt guard (14) or weather cover (15).
3. Remove V-belt drive (sheaves and belts) (16). Inner cylinder cover (17) must be removed prior to dismantling fan sheave.
4. To remove wheel (2):

TYPE "B" ONLY

- a. Remove spinner or coverplate nosepiece (12) by removing screws. No spinner is furnished on fan sizes 15 thru 36 steel wheel or on sizes 15 thru 24 cast aluminum wheels.
- b. Remove cotter pin or lockwire.
- c. Remove castle nut and then remove lockwasher.
- d. Now carefully slide the wheel from the shaft. Be careful not to lose the key.

TYPE "S" ADJUSTAX® ONLY

Remove coverplate.

If the Adjustax Wheel is attached to the motor shaft by means of a QD-hub, follow this procedure:

First remove wheel from QD-hub:

- a. Remove 3 hex head draw-up bolts which hold wheel to the QD-hub.
- b. Oil these bolts if dry and insert into tapped holes in the wheel hub.
- c. Tighten bolts 1/2 turn alternately and evenly to break taper fit.
- d. If difficult to break the taper fit, tap slightly and carefully with hammer against QD-hub.
- e. Remove wheel from QD-hub.

If it is necessary to remove the QD-hub from the shaft:

- a. Mark its position on the shaft.
- b. Loosen clamp screw in flange of QD-hub and loosen setscrew over key.

Slide QD-hub from shaft. If hub is tight on shaft, carefully tap screwdriver into flange split to loosen or use wheel puller.

If the wheel is held on the shaft by means of a split hub, follow this procedure:

- a. Loosen self locking socket screw.
- b. Remove split nut.
- c. Remove wheel from split hub. If it is necessary to remove split hub from the shaft:
 - (a) Remove both keys.
 - (b) Remove locating pin.
 - (c) Loosen self-locking socket screw in flange of hub.
 - (d) Remove hub.

If the wheel is held on the shaft by means of a castle nut:

- a. Remove cotter pin or lockwire.
- b. Remove castle nut and then remove lockwasher.
- c. Carefully remove wheel from shaft. Be careful not to lose the key.

5. To remove motor (9):

TYPE "B" AND TYPE "S"

- a. The motor (9) is removed simply by taking out the hold down bolts fastening the motor to the motor base.

6. To remove bearings:

- a. Refer to Bearing section, pages 12, 13 & 14.

ASSEMBLY — The type "B" and the type "S" vaneaxial fans are re-assembled by reversing the order of the disassembly steps as found above. The following notes also apply:

FOR TYPE "B" FANS

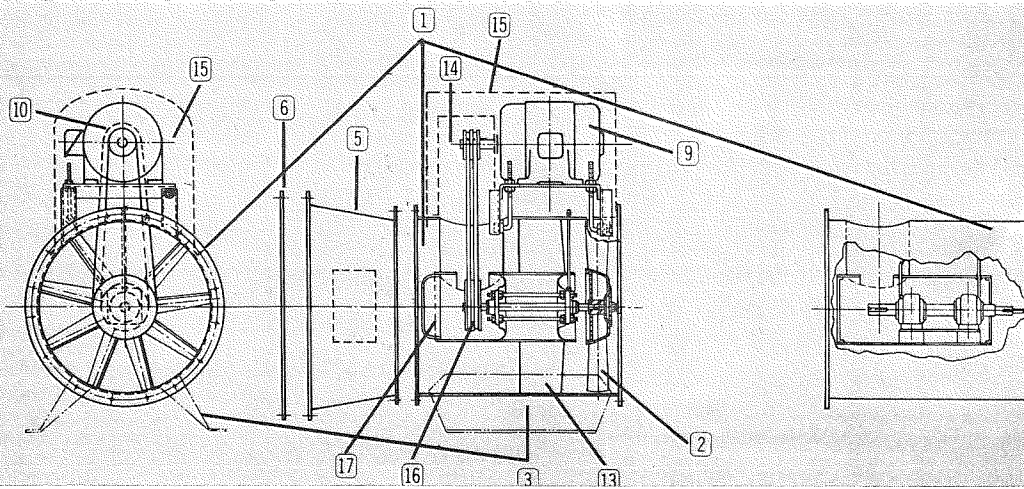
- a. For type "B" clean the bore of wheel and coat with white lead or oil and slide gently onto shaft.

FOR TYPE "S" FANS

- a. To remount QD-hub on shaft:

1. Wipe shaft, QD-hub inside and outside, and bore of wheel.
2. Slide QD-hub on shaft (flange side first). Reposition to exact location as marked during removal.
3. Insert key.
4. Tighten clamp screw in flange of QD-hub.
5. Tighten setscrew over key.

NOTE: Refer pages 6 & 7



b. To remount the wheel on the QD-hub:

1. Apply a thin and even layer of Loctite anti-seize compound to the outside of the QD-hub and to the inside of the wheel bore.
2. Assemble wheel on taper seat of QD-hub.
3. Clean and slightly oil hex head draw-up bolts.
4. Insert bolts in QD-hub using lockwashers and flat-washers and tighten alternately and evenly, with the following torques:

TIGHTENING TORQUE FOR QD HUB BOLTS			
HUB SIZE	B	C	D
TORQUE — FT. LBS.	6	12	22

c. Replace accessories if required and remount fan.

To remount split hub on shaft:

- a. Insert key in shaft.
- b. Slide split hub into position on the shaft. It may be necessary to pry open the hub somewhat by forcing a screwdriver into the split.

CAUTION: The screwdriver must **NOT** be inserted at the side of the flange which will be in contact with the fan wheel.

- c. Insert locating pin.
- d. Securely tighten the self-locking screw in flange of split hub.
- e. Apply anti-seize compound between wheel bore and split hub O.D.

To remount the wheel on shaft with castle nut:

- a. Insert key.
- b. Clean wheel bore and apply anti-seize compound on shaft.
- c. Slide wheel gently onto shaft.
- d. Install lockwasher, castle nut and cotter pin or locking wire.

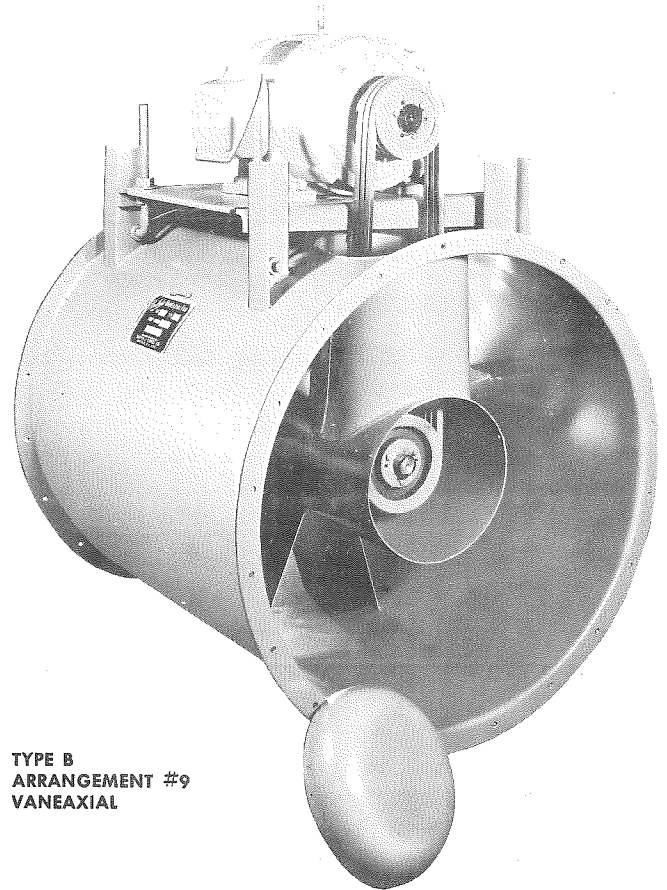
TYPE "B" AND TYPE "S"

c. Adjust wheel in housing so there is an equal clearance between tips of blades and inside of housing.

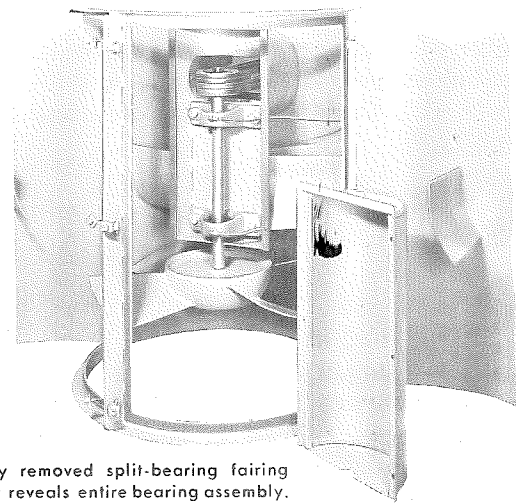
When proper alignment is obtained, tighten motor and bearing hold down bolts. Install safety bar, if removed.

d. Replace accessories if required and remount fan. See **Operation** section, page 10.

NOTE: Before start-up see **Operation** section, page 10.

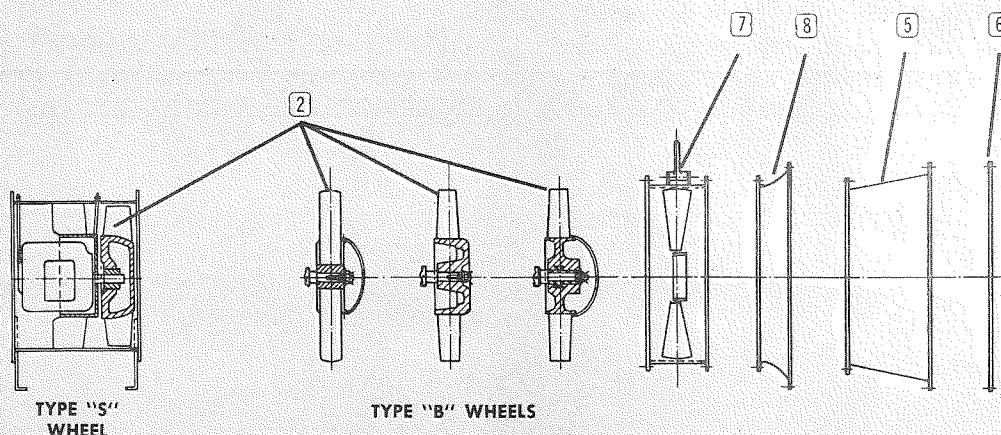


TYPE B
ARRANGEMENT #9
VANEAXIAL



Easily removed split-bearing fairing cover reveals entire bearing assembly. By removing bearing hold-down bolts, the wheel shaft, fan sheave and bearings can be removed as an integral unit without removing fan from the stack.

CLAMSHELL
DESIGN



TYPE "S"
WHEEL

TYPE "B" WHEELS

SECTION III

OPERATION

BEFORE START-UP

1. **Fastenings** — all foundation bolts, wheel hub set screws, wheel locking bolts and bearing locking collars must be tight.
2. **Access doors** should be tight and sealed.
3. **Bearings** — check bearing alignment and make certain they are properly lubricated. See page 19.
4. **Fan Wheel** — turn over rotating assembly by hand to see that it runs free and does not bind or strike fan housing. If wheel strikes housing, the wheel may have to be moved on the shaft or the bearing pillow blocks moved and re-shimmed. There should be an equal clearance all around between tip of wheel blades and housing.
5. **Motor** — check electrical wiring to motor. The current characteristics of the supply line must agree with the motor nameplate rating. See page 11.
6. **V-belt drive** must be in alignment, with belts at proper tension. See page 15.
7. **Duct connections** (if required) from fan to ductwork must not be distorted. Ducts should never be supported by the fan. Expansion joints between duct connections should be used where expansion is likely to occur or where fan is mounted on vibration isolators. All duct joints should be sealed to prevent air leaks. All debris should be removed from ductwork and fan.
8. **Variable inlet vanes** should operate freely. Never remove the mechanical stop supplied by Buffalo Forge as it limits the horsepower requirements of the fan. If it is necessary to close the vanes past the stop, refer to Buffalo Forge.

9. A separate make up air system should be installed if any symptoms of "air starvation" occur.

START-UP

10. "Bump" the motor to check for proper wheel rotation. The motor should be started in accordance with the manufacturer's recommendations. Arrows on fan nameplate indicate the proper direction of rotation and air flow.
11. Fan may now be brought up to speed. Watch for anything unusual such as vibration, overheating of bearings and motors etc.. Multi-speed motors should be started at lowest speed and run at high speed only after satisfactory slow speed operation. Check fan speed on V-belt driven units and adjust motor sheave to give desired RPM.
12. At first indication of trouble or vibration, shut down fan and check for difficulty. (See FAN TROUBLES, page 18.)
 - a. Bearings should be inspected and thoroughly cleaned if necessary. If a bearing is disassembled, mark its parts in relation to one another to avoid error in reassembly. Do not mix its parts with those of other bearings.
 - b. Determine type of pillow block and location of fixed bearing.
 - c. Check all nameplates on fan for special instructions.
 - d. Mount bearings in position on the shaft in accordance with the particular type of bearing furnished.
 - e. The shaft should be clean and free from burrs and other irregularities. Be sure bearing is not seated on worn flat sections.

MOTORS

After motor has been mounted, aligned and bolted down, wire to power supply through a disconnect switch, short-circuit protection and suitable magnetic starter with overload protection. ALL MOTORS should be connected as shown on nameplate. Install all wiring and fusing in accordance with the National Electric Code and local requirements.

Be sure power supply (voltage, frequency and current carrying capacity of wires) is in accord with the motor nameplate.

If grease plugs are inaccessible, motor end frames may be rotated 90° or 180° to afford better access. The main frame may be turned end-for-end to shift conduit box to the opposite side. The conduit box may be rotated to one of four 90° positions.

Most motors are received with bearings lubricated and require no relubrication for some time depending on operating conditions. HOWEVER — ALWAYS CHECK TO BE SURE MOTOR BEARINGS ARE LUBRICATED BEFORE START-UP.

(See Maintenance Section page 17 on Motor Bearings.)

TO REVERSE DIRECTION OF ROTATION

A. Single Phase Motors

1. Shaded Pole rotation cannot be reversed unless motor is constructed so that the shading coil on half of stator pole can be shifted to other half of stator pole.
2. Split Phase interchange connections to supply of either main or auxiliary winding.
3. Capacitor all types of capacitor motors are reversed in rotation by interchanging connections to supply of either main or auxiliary winding.
4. Repulsion remove plate on motor end bracket and turn bracket (holding brushes) in direction opposite to direction of existing rotation.

B. Two Phase Motors — interchange line leads.

C. Three Phase Motors — interchange any two line leads.

Normal operation of motors results in temperature rises according to motor insulation. The total motor operating temperature includes ambient temperature plus motor temperature rise. The motor rise includes nameplate temperature rise, service factor allowance and hot-spot allowance.

INSULATION CLASS	MAXIMUM TOTAL OPERATING TEMPERATURE	
	° CENTIGRADE	° FAHRENHEIT
A	105	221
B	130	266
F	155	311
H	180	356

The motor nameplate indicates type of insulation. As the hot-spot allowance is not measurable, the maximum total operating temperature must be reduced. Class A insulation is then suitable for total measurable temperature of 90°C (194°F) on open motors, 95°C (203°F) on enclosed motors. Class B insulation is suitable for total temperature of 110°C (230°F) on open motors, 115°C (239°F) on enclosed motors. If the motor feels hot, measure its temperature — thermometer against stator windings or by resistance measurement.

Various motor troubles can be caused by:

1. low or high voltage.
2. overload — high temperature — drawing too much current.
3. armature unbalance — vibration and noise.
4. worn bearings — armature rubs against stator.
5. too much or not enough lubricant in bearings.
6. commutator brushes on d-c motor worn or not seated under proper tension.
7. loose hold down bolts — vibration and noise.
8. dirt in windings — high temperature.
9. low insulation resistance due to moisture — check resistance with a megohm meter ("Megger") or similar instrument employing a 500 volt d-c potential. Resistance should read at least 1 megohm. If it is less, remove motor from service, clean and dry windings. A high grade insulation varnish should be applied to the windings before putting back in service.

USEFUL MOTOR FORMULAS

SINGLE PHASE A-C	THREE PHASE A-C	DIRECT CURRENT
$HP = \frac{WATTS}{746} = \frac{KW}{.746}$	$HP = \frac{WATTS}{746} = \frac{KW}{.746}$	$HP = \frac{WATTS}{746} = \frac{KW}{.746}$
$MOTOR HP INPUT = \frac{E \times I \times PF}{746}$	$MOTOR HP INPUT = \frac{E \times I \times PF \times 1.732}{746}$	$MOTOR HP INPUT = \frac{E \times I}{746}$
$MOTOR HP OUTPUT = \frac{E \times I \times PF \times ME}{746}$	$MOTOR HP OUTPUT = \frac{E \times I \times PF \times 1.732 \times ME}{746}$	$MOTOR HP OUTPUT = \frac{E \times I \times ME}{746}$
$FAN BHP INPUT = \frac{E \times I \times PF \times ME \times DE}{746}$	$FAN BHP INPUT = \frac{E \times I \times PF \times 1.732 \times ME \times DE}{746}$	$FAN BHP INPUT = \frac{E \times I \times ME \times DE}{746}$

E = VOLTS • I = AMPS • PF = POWER FACTOR (80 - 85%)

ME = MECHANICAL EFFICIENCY (85 - 90%) • DE = DRIVE EFFICIENCY: DIRECT DRIVE - 100%; V-BELT DRIVE - 95%

FAN BRAKE HORSEPOWER CAN BE FIGURED BY A POWER READING OF FAN MOTOR WITH A VOLT-AMP METER. CALCULATE THE APPROXIMATE BRAKE HORSEPOWER, USING THESE EQUATIONS:

$$1. \text{ CORRECTED FULL-LOAD AMPS} = \frac{\text{NAMEPLATE FULL-LOAD AMPS} \times \text{NAMEPLATE VOLTS}}{\text{FIELD VOLTAGE RATING}}$$

$$2. \text{ APPROX. FAN BHP} = \text{NAMEPLATE HP} \times \frac{(\text{MOTOR OPERATING AMPS} - \text{MOTOR NO-LOAD AMPS} \times 0.5)}{(\text{CORRECTED FULL-LOAD AMPS} - \text{MOTOR NO-LOAD AMPS} \times 0.5)}$$

BEARINGS

These general instructions cover standard types of anti-friction and sleeve bearings furnished with Buffalo Forge equipment. Detailed information on specific bearings supplied with the fan are found in the shipping envelope or can be obtained from the bearing manufacturer.

1. Bearings should be inspected and thoroughly cleaned if necessary. If a bearing is disassembled, mark its parts in relation to one another to avoid error in reassembly. Do not mix its parts with those of other bearings.
2. Determine type of pillow block and location of fixed bearing.
3. Check all nameplates on fan for special instructions.
4. Mount bearings in position on the shaft in accordance with the particular type of bearing furnished. (See following paragraphs).
5. The shaft should be clean and free from burrs and other irregularities. Be sure bearing is not to be seated on worn flat sections.

ANTI-FRICTION BEARINGS

Type "B" Arrangement #9 Fans Thru Size 48"

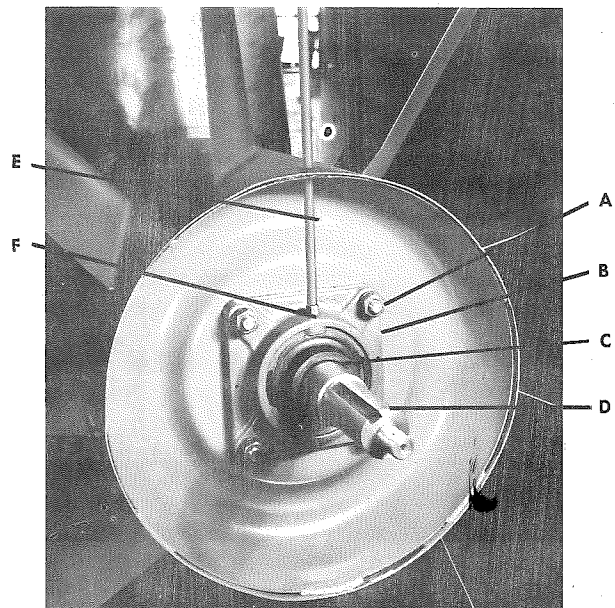
ASSEMBLY INSTRUCTIONS

SEALMASTER SF and MSF — flange cartridge type ball bearing pillow blocks.

- a. This type of bearing is always shipped assembled and ready for installation.
- b. Slip each bearing pillow block and extended inner race into position on the fan shaft.
- c. Bolt pillow blocks in position on their mounting surfaces after shimming and aligning. They should be mounted so fan wheel does not strike any part of fan housing.
- d. Tighten self-locking, cupped point set screws securely onto the shaft. Positive race-to-shaft lock is attained when the hardened cup point set screws are securely tightened through the extended ends of the inner race.
- e. Fill grease tube with grease. Attach grease tube fitting to bearing housing and run grease tube to outside of fan housing. Attach grease fitting to grease tube. Follow this procedure for both bearings. Be sure grease tube is filled with grease.
- f. Bearings are prelubricated and need no additional grease before start-up. See page 19 for lubrication of this type of bearing.
- g. To dismantle, reverse this procedure. **Be sure set screws are loose.**

FAFNIR LCJ and LCJO — flange cartridge type ball bearing pillow blocks.

- a. This bearing is used on special applications. Mounting procedures are same as Sealmaster SF and MSF above except Fafnir bearings have a separate locking collar installed as shown on page 14.



A — HEX NUT & LOCKWASHER

B — FLANGE PILLOW BLOCK

C — LOCKING COLLAR

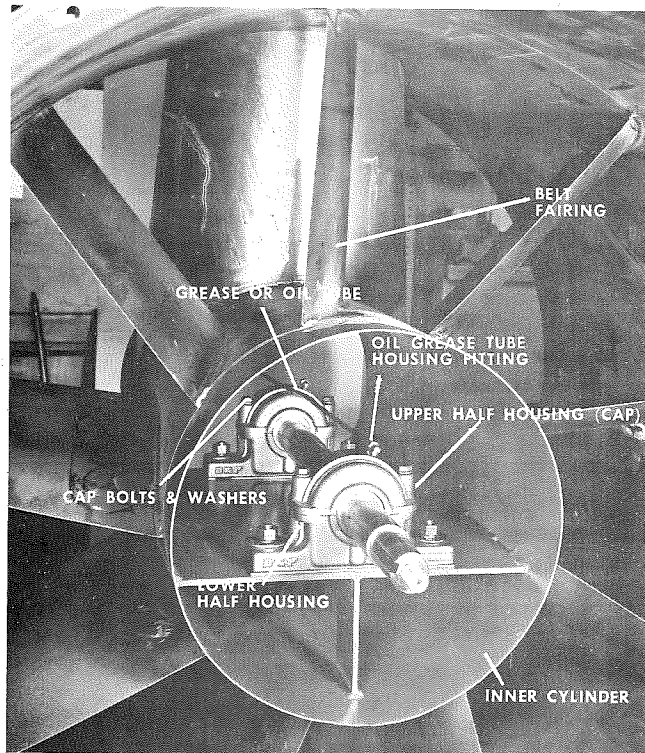
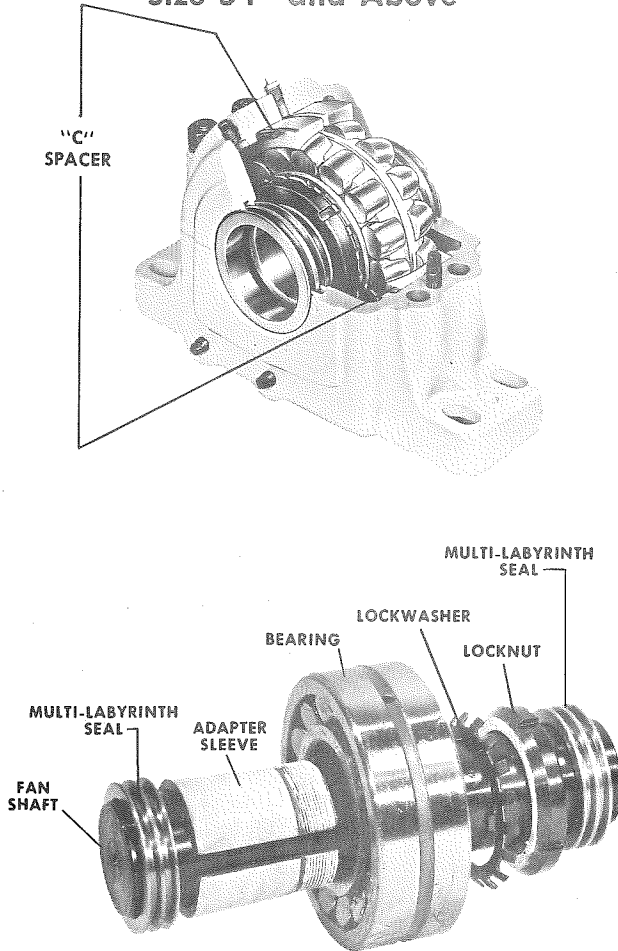
D — FAN SHAFT

E — GREASE TUBE

F — LUBRICATION ADAPTER

ANTI-FRICTION BEARINGS (Continued)

**Type "B" Arrangement #9 Fans
Size 54" and Above**



ASSEMBLY INSTRUCTIONS

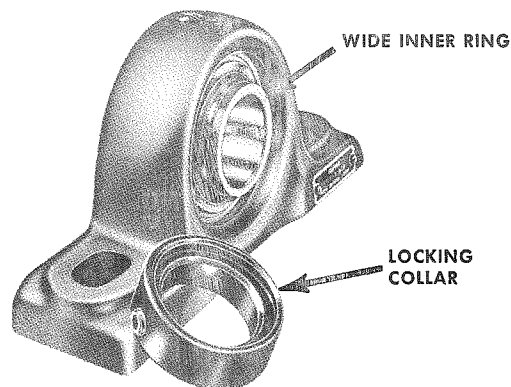
LINK-BELT P-LB — fixed and floating type spherical roller bearing pillow blocks.

- The bearing is dipped in a preservative coating at Link Belt and does not have to be removed as it is compatible with grease and oil.
- Set lower half of split housing in position on its mounting surface. If an oil cup is used be sure it is assembled in pillow block.
- Apply white lead, thinned with oil, on outside diameter and threads of tapered sleeve and face of locknut (helps in tightening adapter).
- Assemble multi-labyrinth seal ring (if used) adapter sleeve, roller bearing, lockwasher, locknut and second seal loosely and position on shaft.
- Hand tighten locknut onto adapter sleeve as tightly as possible.
- Insert feeler gauges between outer ring and the unloaded roller on both sides of bearing until snug fit is obtained. Record this figure.
- Lower shaft with bearing and adapter assemblies into lower half of pillow block housings. Be sure multi-labyrinth seals are aligned with seal grooves. Bolt lower housing to bearing mounting surface after shimming and aligning. Pillow blocks should be mounted so fan wheel and shaft do not strike any part of fan housing and bearing seals are free to rotate.
- Position floating bearing centrally in lower housing. For a fixed bearing, position bearing for insertion of "C" spacer which is inserted on locknut side (keep bearing flush with opposite side of housing).
- Tighten locknut with a spanner wrench until snug. Place soft steel or brass bar against locknut and strike bar several times with a hammer. Distribute blows around locknut by rotating shaft. These blows drive inner ring farther up on adapter sleeve and release pressure on threads. Use spanner wrench to further tighten locknut. Repeat this procedure until desired amount of clearance has been removed from bearing.

BEARING CLEARANCE REDUCTION FROM READING STEP f.

Pillow block series number	Bearing Number	Reduction of Clearance in Inches	
		Minimum	Maximum
6823 thru 6828	22209LBK 22210LBK	.0010	.0015
6829 thru 6844	22211LBK 22216LBK	.0010	.0020
6845 thru 6868	22217LBK 22224LBK	.0015	.0025
6869 thru 6892	22226LBK 22232LBK	.0020	.0030
6893 thru 68104	22234LBK 22236LBK	.0025	.0035
68105 thru 68116	22238LBK 22240LBK	.0025	.0040
68117 thru 68168	22244LBK 23056LBK	.0030	.0050
6923 thru 6928	22309LBK 22310LBK	.0010	.0015
6929 thru 6944	22311LBK 22316LBK	.0010	.0020
6945 thru 6968	22317LBK 22324LBK	.0015	.0025
6969 thru 6992	22326LBK 22332LBK	.0020	.0030

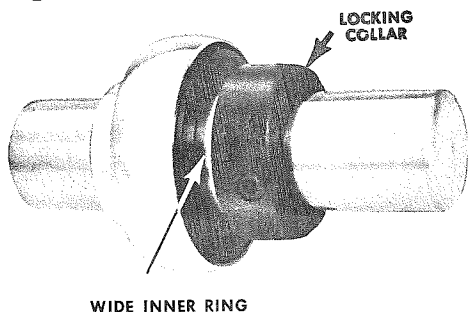
- Secure locknut by bending lockwasher tang into locknut slot.
- Insert "C" spacer in fixed bearing base on locknut side.
- Lubricate bearings with grease or oil. (See **Bearing Lubrication Section**, page 19).
- Replace top half of pillow block (cap). Make sure races are not cocked in housing before tightening cap bolts and that bearing seals are free to rotate.



ASSEMBLY INSTRUCTIONS

FAFNIR LSAO — fixed cartridge type ball bearing pillow blocks.

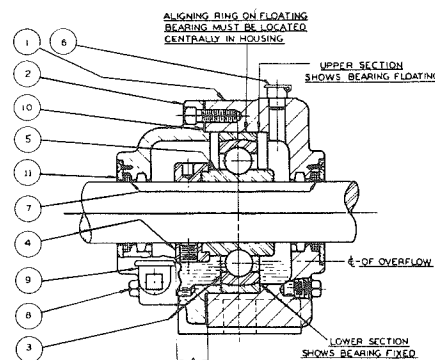
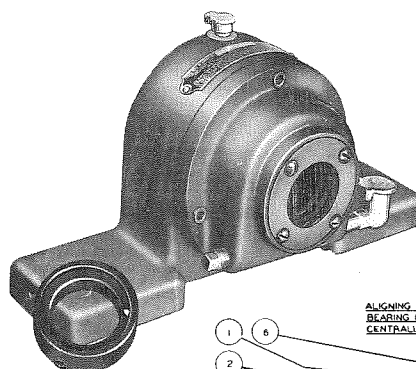
- This type of bearing is always shipped assembled and ready for installation.
- Slip each bearing pillow block locking collar into position on the fan shaft. The locking collars will face each other.
- Bolt pillow blocks in position on their mounting surfaces after shimming and aligning. They should be mounted so fan wheel does not strike any part of fan housing.
- Slide locking collar against end of inner ring. Turn collar in direction of shaft rotation until it grips shaft and inner ring. Tighten collar with a drift pin. Tighten set screw in collar. (See below for detailed step by step procedure of locking collar installation.)
- LSAO bearings are prelubricated and need no additional grease before start-up. See page 19 for lubrication of this type of bearing.
- To dismantle, reverse this procedure. **Be sure** to remove burrs on shaft caused by set screws **BEFORE** removing pillow block from shaft. A honing stone will remove burr.



LOCKING COLLAR INSTALLATION

- Mate cam of collar with cam of bearing inner ring.
- Pressing collar lightly against inner ring, turn collar in direction of shaft rotation until engaged.
- With drift pin in collar hole, strike in direction of shaft rotation to lock.
- Tighten set screw in collar.

FAFNIR SAOL — fixed and floating type ball bearing pillow blocks.



- These pillow blocks are shipped with bearings mounted in the housings but with locking collars separate.
- Remove end cover 2, gasket 10, plates 11 with packings 7. Be careful not to damage gasket and packings.
- Slide pillow block housing 1 with bearing 3 and one plate 11 onto shaft. Position bearing on shaft making sure cam end of inner ring 5 points out.
- In order to position floating bearing in its housing, measure collar projection "A" on fixed unit and duplicate it on floating unit. Since "A" is the same on both pillow blocks, the floating bearing will automatically be positioned in the center of the floating space.
- Bolt pillow blocks securely in position in their mounting surfaces after shimming and aligning. The outside diameter of shaft and housing bore should clear equally all around. Pillow blocks should be mounted so fan wheel and shaft does not strike any part of fan housing.
- Slide locking collar 4 into position against bearing inner ring 5. Turn collar in direction of shaft rotation until it grips shaft and inner ring. Tighten collar with a drift pin. Tighten set screw in collar.
- Replace gasket 10, end cover 2, packing 7 and plate 11 on end cover. Bolt on end cover.
- Draw up screws holding plates just enough to hold packing rings snugly in place.
- Then fill with oil in top cup 6 until overflow cup 9 is full. Fill only when fan is not running.

V-BELT DRIVES

It is important that the alignment of the V-belt drive be checked **BEFORE INSTALLATION** of the fan.

1. Be sure sheaves are locked in position.
2. Key should be seated firmly in keyway.
3. Place straight edge or taut cord across faces of driving and driven sheaves to check alignment. The motor and fan shafts must be parallel; with V-belts at right angles to the shafts.
4. Start the fan. Check for proper rotation. Run fan at full speed. A slight bow should appear on slack side. Adjust belt tension by adjusting motor on its adjustable base. Depending upon motor frame size, fan motor base may have slotted holes for adjustment.
5. If belts squeal at start-up, they are too loose and should be tightened.
6. When belts have had time to seat in the sheave grooves, then readjust belt tension.

V-belt drive assembly can be mounted as follows:

1. Clean motor and fan shafts. Be sure they are free from corrosive material. Clean bore of sheaves and coat with white lead or heavy oil for ease of shaft entry. Remove oil, grease, rust or burrs from sheave grooves.
2. Place fan sheave on fan shaft and motor sheave on its shaft. **DO NOT POUND SHEAVES ON** as this may damage bearings. Tighten sheaves in place.
3. Loosen motor base adjusting screws so belts

can be placed in grooves without forcing. Do not roll belts or use a tool to force belts over the grooves.

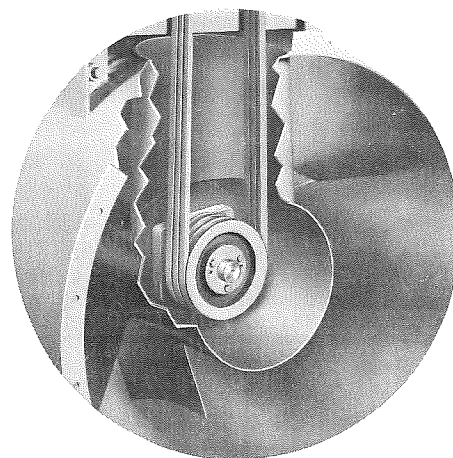
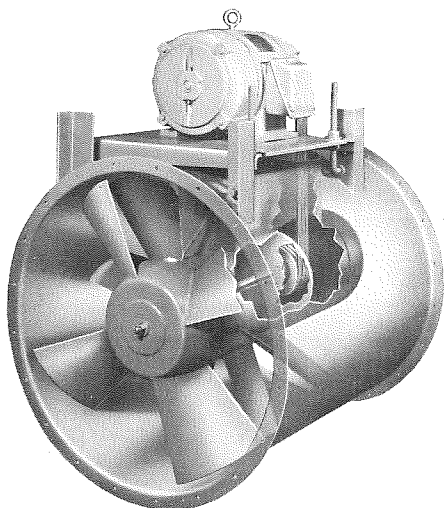
4. Align fan and motor shafts so they are parallel. The belts should be at right angles to the shafts. A straight edge or taut cord placed across faces of sheaves will aid in alignment.
5. Tighten belts by adjusting motor position. Correct tension gives the best drive efficiency. Excessive tension causes undue bearing pressure.
6. Start the fan and run it at full speed. Adjust belt tension until only a slight bow appears on the slack side of the belts. If slippage occurs, a squeal will be heard at start-up. Eliminate this squeal by tightening up the belts.
7. Give belts a few days running time to become seated in sheave grooves — then readjust belt tension.

If the shafts become scratched or marked, carefully remove sharp edges and high spots such as burrs with fine emery cloth or a honing stone. Avoid getting emery dust in the bearings.

Do not apply any belt dressing unless it is recommended by the drive manufacturer. V-belts are designed for frictional contact between the grooves and sides of the belts. Dressing will reduce this friction.

Minimum belt center distances are available on request.

Belt tension on an adjustable pitch drive is obtained by moving the motor — **not by changing the pitch** diameter of the adjustable sheave.



BELT FAIRING

FAN BALANCING

Axial flow fan wheels are balanced by the factory and, if undamaged, should require no further balancing. Fans shipped completely assembled have had a running test to check balance.

A fan handling clean air should not need balancing once it is balanced. Dust build-up on fan blades or wear can unbalance the fan. Periodic inspection of the fan should be made to determine amount of dust build-up or wear.

Before any attempt is made at balancing, check other causes of vibration or unbalance as listed on page 18, FAN TROUBLES.

Portable instruments are available that will indicate vibration displacement in mils (1 mil = 0.001 inches). The following table can be used as a guide to determine when a fan is operating with too much vibration:

FAN SPEED RPM	SMOOTH	FAIR	ROUGH	VERY ROUGH
600	2 mils	4 mils	8 mils	15-20 mils
900	1.5	2.75	6	8 - 10
1200	1.0	2	4.5	6 - 8
1800	0.75	1.5	3.5	5 - 7

The fan can also be balanced by a trial-and-error method, as follows:

1. Close off fan inlet, if possible, to prevent fan rotation due to stack effect.
2. Number fan blades to record weight placements.
3. Remove V-belts if belt driven.
4. Rotate wheel by hand for ten revolutions. Then let wheel come to a stop by itself. Alternate clockwise and counter-clockwise rotation. Place a chalk mark on the lowest point of the wheel hub or fan sheave when it stops. This is heavy side. When stopping points vary considerably, continue the procedure until a definite pattern is established. Add a trial weight 180° opposite heavy side.
5. Erase chalk marks and proceed as Step 4. If chalk marks show up in same position, the weight is light and must be increased. If the pattern is offset from original position, move weight in same direction as offset. Continue this method until no pattern shows. Wheel is then balanced statically and most of the time will do the job. Install permanent weights and recheck balance.
6. Install V-belts if belt driven and start fan. If fan is still vibrating stop fan and rebalance.
7. If fan cannot be balanced, check fan sheave, motor or motor sheave for unbalance. If sheaves are replaced, it will be necessary to remove all **field** balance weights and recheck wheel for static balance.
8. Due to field conditions, the foregoing process may be difficult. Balance may be obtained by simply selecting any point on the wheel hub — say 180° from the key, adding a trial weight and operating the fan at rated speed. Move weight around until vibration is reduced or eliminated. Increase or decrease weight to give smoothest operation.



MAINTENANCE

1. **A definite time schedule** for inspecting all rotating parts and accessories should be established. The frequency of inspection depends on the severity of operation and the locality. Inspections might be weekly at first in order to set up the schedule.
2. **Alignment** — shaft must not be cocked in the bearings. Misalignment can cause overheating, wear to dust seals, bearing failure and unbalance.
3. **Hardware** — check tightness of all bolts and set screws.
4. **Lubrication** — check fan and motor bearings and add lubricant if necessary. If oil lubrication is used and the oil becomes dirty or cloudy, it should be drained and the bearing flushed with mineral oil. Drain the mineral oil and add new lubricant.
If grease is used and it is breaking down into a sludge, flush the bearing out and regrease.
5. **Air flow** — make sure there are no obstructions to air flow in outlet or inlet ductwork.
6. **Bearings** on high speed fans tend to run hot. Therefore, do not replace a bearing because it feels hot to the touch. Place a Pyrometer or contact thermometer against the pillow block and check the temperature.

Ball or roller bearing pillow blocks can have total running temperatures of 165° F. (74° C.) before the cause of overheating be investigated. See pages 12 thru 14 when removing or replacing pillow blocks.

7. **Wheel** — inspect wheel blades for accumulations of dust and dirt. Clean thoroughly with steam or water jet, compressed air or a wire brush. This will help prevent an unbalanced condition. If blades are aluminum, be careful not to damage them. Cover the bearings so water won't enter the pillow block. The wheel should be centered to prevent the blades from striking the housing. Make sure wheel is rotating in proper direction. Never run the fan at a higher speed than it was designed for unless you check Buffalo Forge first. The higher speed may be over the critical speed of the rotating parts, causing wheel collapse. Also, the power required by the fan may in-

crease enough to overload and burn out the motor.

8. **V-belt drive** — check belt wear, alignment of sheaves and belt tension. Replace all belts when necessary with new belts. New belts will not work properly in conjunction with used belts due to difference in length. Belts must be free of grease.
9. **Repainting** of exterior and interior parts of fans and ductwork will extend the service life of the installation. Select a paint which will withstand the operating temperature. For normal temperature, a good machinery paint may be used. If moisture is excessive or if fans are exposed to the weather, bitumastic paint is suitable. Corrosive fumes require all internal parts to be wire brushed, scraped clean and repainted with an acid resisting paint. Competent advice should be secured when corrosive fumes are present.
10. **Lubricate motor bearings** according to the manufacturer's recommendations. DO NOT OVER LUBRICATE. Lubrication recommendations are printed on tags attached to the motor. Should these tags be missing, the following will apply:

A. FRACTIONAL HORSEPOWER SLEEVE BEARING MOTORS:

1. Under normal operation at ordinary temperatures and clean surroundings, these motors will operate for three years without re-lubrication. Then lubricate annually with electric motor oil or SAE 10 oil. Under continuous operation at higher temperatures (but not to exceed 104° F. ambient) re-lubricate annually.

B. FRACTIONAL HORSEPOWER BALL BEARING MOTORS —

1. Under normal conditions, ball bearing motors will operate for five years without re-lubrication. Under continuous operation at higher temperatures (but not to exceed 104° F. ambient) re-lubricate after 1 year. To re-lubricate where motors

MAINTENANCE (Continued)

are NOT equipped with pressure fittings, disassemble motor and clean the bearings and housings thoroughly. Repack each bearing and fill cavity in back of bearing 1/3 full with ball bearing grease.

C. INTEGRAL HORSEPOWER BALL BEARING MOTORS —

1. Motors having pipe plugs or grease fittings should be re-lubricated while warm and at stand-still. Replace one pipe plug on each end shield with grease fitting. Remove other plug for grease relief. Use low pressure grease gun and lubricate until new grease appears at grease relief. Allow motor to run for 10 minutes to expel excess grease. Replace pipe plugs.
2. Motors not having pipe plugs or grease fittings can be re-lubricated by removing end shields, cleaning grease cavity and re-filling 3/4 of circumference of cavity.
3. Recommended re-lubrication intervals — general guide only.

H.P. RANGE	STANDARD DUTY 8 HR./DAY	SEVERE DUTY 24 HR./DAY Dirty, Dusty	EXTREME DUTY VERY DIRTY High Ambients
1½-7½	5 yrs.	3 yrs.	9 mos.
10-40	3 yrs.	1 yr.	4 mos.
50-150	1 yr.	9 mos.	4 mos.

4. These ball bearing greases or their equivalents are satisfactory for ambi-ents from -15°F to 130°F. For motors:

Mobilplex EP #1 - Socony Mobil Oil Co.
 Alvania grease #2 - Shell Oil Co.
 Andox B grease - Esso Standard Oil Co.
 Prestige #42 grease - Sun Oil Co.

13. Blow out **open type motor windings** with low pressure air to remove dust or dirt. Air pressures above 50 psi. should not be used as high pressures may damage insulation and blow dirt under loosened tape. Dust can cause excessive insulation temperatures.
14. Make certain motor is not overloaded. Check amps with nameplate.
15. **KEEP MOTORS DRY.** Where motors are idle for a long time, single phase heating or small space heaters might be necessary to prevent water condensation in windings.
16. **Screens** should be cleaned periodically to prevent resistance to air flow which will decrease volume of air supplied.
17. **Vibration** could be caused by unbalance, misalignment, loose bolts, poor lubrication, dirt build-up on the wheel, bent or sprung shaft, or loose set screws, etc. **DO NOT PERMIT VIBRATION.**

FAN TROUBLES

In the event that trouble is experienced in the field, listed below are the most common fan difficulties. These points should be checked in order to prevent needless delay and expense of factory service.

1. CAPACITY OR PRESSURE BELOW RATING

- a. Total resistance of system higher than anticipated.
- b. Speed too low.
- c. Dampers or variable inlet vanes not properly adjusted.
- d. Poor fan inlet or outlet conditions.
- e. Air leaks in system.
- f. Damaged wheel.
- g. Incorrect direction of rotation.
- h. Wheel mounted backwards on shaft.

2. VIBRATION AND NOISE

- a. Misalignment of bearings, couplings, wheel of V-belt drive.
- b. Unstable foundation.
- c. Foreign material in fan causing unbalance.
- d. Worn bearings.
- e. Damaged wheel or motor.
- f. Broken or loose bolts and set screws.
- g. Bent shaft.
- h. Worn coupling.
- i. Fan wheel or driver unbalanced.
- j. 120 cycle magnetic hum due to electrical input. Check for high or unbalanced voltage.
- k. Fan delivering more than rated capacity.

- l. Loose dampers or Variable Inlet Vanes.
- m. Speed too high or fan rotating in wrong direction.
- n. Vibration transmitted to fan from some other source.

3. OVERHEATED BEARINGS

- a. Too much grease.
- b. Poor alignment.
- c. Damaged wheel or driver.
- d. Bent shaft.
- e. Abnormal end thrust.
- f. Dirt in bearings.
- g. Excessive belt tension.

4. OVERLOAD ON DRIVER

- a. Speed too high.
- b. Discharging considerably under capacity due to existing system resistance being higher than originally anticipated.
- c. Specific gravity or density of gas above design value.
- d. Wrong direction of rotation.
- e. Bent shaft.
- f. Poor alignment.
- g. Wheel wedging or binding.
- h. Bearings improperly lubricated.
- i. Motor improperly wired.

LUBRICATION OF ANTI-FRICTION BEARINGS

Bearings on assembled fans receive their initial lubrication at Buffalo Forge. Bearings shipped separate from the fan or as replacements are almost never lubricated before shipping, except prelubricated types such as the Fafnir RAK. When there is the slightest doubt, the safe practice is to assume that the bearing has not been lubricated.

GREASE LUBRICATION

For grease lubricated ball or roller bearing pillow block, a good grade of grease, free from chemically or mechanically active material should be used.

These greases are a mixture of lubricating oil and a soap base to keep the oil in suspension. They have an upper temperature limit where oil and soap base oxidize and thermally decompose into a gummy sludge.

Separate lube data sheets list the lubricant installed at the factory in the particular bearings furnished on your Buffalo fan. For best results, use the same grease when relubricating. Mixing of

different lubricants is not recommended. If necessary to change to a different grade, make, or type of lubricant, flush bearings thoroughly before changing. Regreasing will vary from 3 months to a year depending upon hours of operation, temperature and surrounding conditions. Special greases may be required for dirty or wet atmospheres (consult your lubricant supplier).

When grease is added, use caution to prevent any dirt from entering the bearing. The pipe plug or grease relief fitting should be open when greasing to allow excess grease to flow out. The pillow block should be about 1/3 full, as excess grease may cause overheating. Use low pressure grease gun.

CLEANING OF BEARINGS

Here are some general bearing cleaning instructions.

Bearings removed from their shafts should be placed in a suitable container with a clean petroleum solvent or kerosene and allowed to soak. Revolve each bearing by hand to help dislodge any dirt particles.

When using kerosene all parts must be wiped dry with a clean cloth. Carbon Tetrachloride can be used, but some people object to the drying action on the hands. Other solvents similar to "Inhibisol" made by Penetone Company of Tenaflly, New Jersey can be used.

All the old grease and oil must be removed from the bearing pillow block. The solvent or kerosene can be used to clean the housing.

Where the grease in a grease-lubricated bearing is badly oxidized, it may help to soak the bearings in 200 - 240° F. light oil (anything heavier than SAE 10 motor oil is not recommended). After this soaking, the bearings should be cleaned as described above.

The clean bearing should then be spun in light oil to remove the solvent. If the bearing is not to be re-assembled immediately, coat it with grease.

Bearings can be cleaned without removing them from the pillow blocks by flushing 180 - 200° F. light oil, kerosene or solvent through the pillow block while rotating the shaft slowly. Badly oxidized grease can be removed by flushing with hot aqueous emulsions. The solutions must then be drained, pillow block flushed with hot light oil and again drained before adding new lubricant.

After the bearings and pillow block have been cleaned, reassemble bearings and add lubricant to the proper level.

ORDERING SPARE PARTS

Contact the local Buffalo Representative or the factory and supply the following information:

1. Fan shop order number stamped on nameplate.
2. Fan size and type stamped on nameplate.
3. Fan arrangement.
4. Description of part required.
5. Pattern number if part is a casting.
6. Special paints or coatings.

WHEEL — be sure to indicate direction of rotation of fan and type of wheel and the operating speed. The bore and keyway dimensions are also required.

SHAFT — Length and diameter.

MOTORS — Motors for direct drive, Arr. 4, Adjustax® Fans are specially made and must be ordered from Buffalo Forge Company. The **name** of the motor manufacturer and the motor **model number** from the motor nameplate must be supplied to the factory for repairs or replacement.

BEARINGS — the following information should be indicated when ordering various types of bearings:

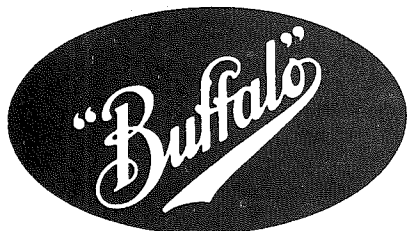
Anti-Friction Bearings

1. State whether ball or roller
2. Manufacturer
3. Size and number
4. Fixed or floating
5. Parts required

NOTE: Sealmaster SF and MSF bearings as shown on page 12 have a special fit of the bearing in the housing and must be ordered from Buffalo Forge Company.

RECOMMENDED SPARES

1. V-belts on V-belt driven fans
2. Fan bearings
3. Wheel(s) and shaft



BUFFALO FORGE COMPANY
AIR HANDLING DIVISION / BUFFALO, NEW YORK
Canadian Blower & Forge Co., Ltd. / Canada Pumps, Ltd. / Kitchener, Ont.