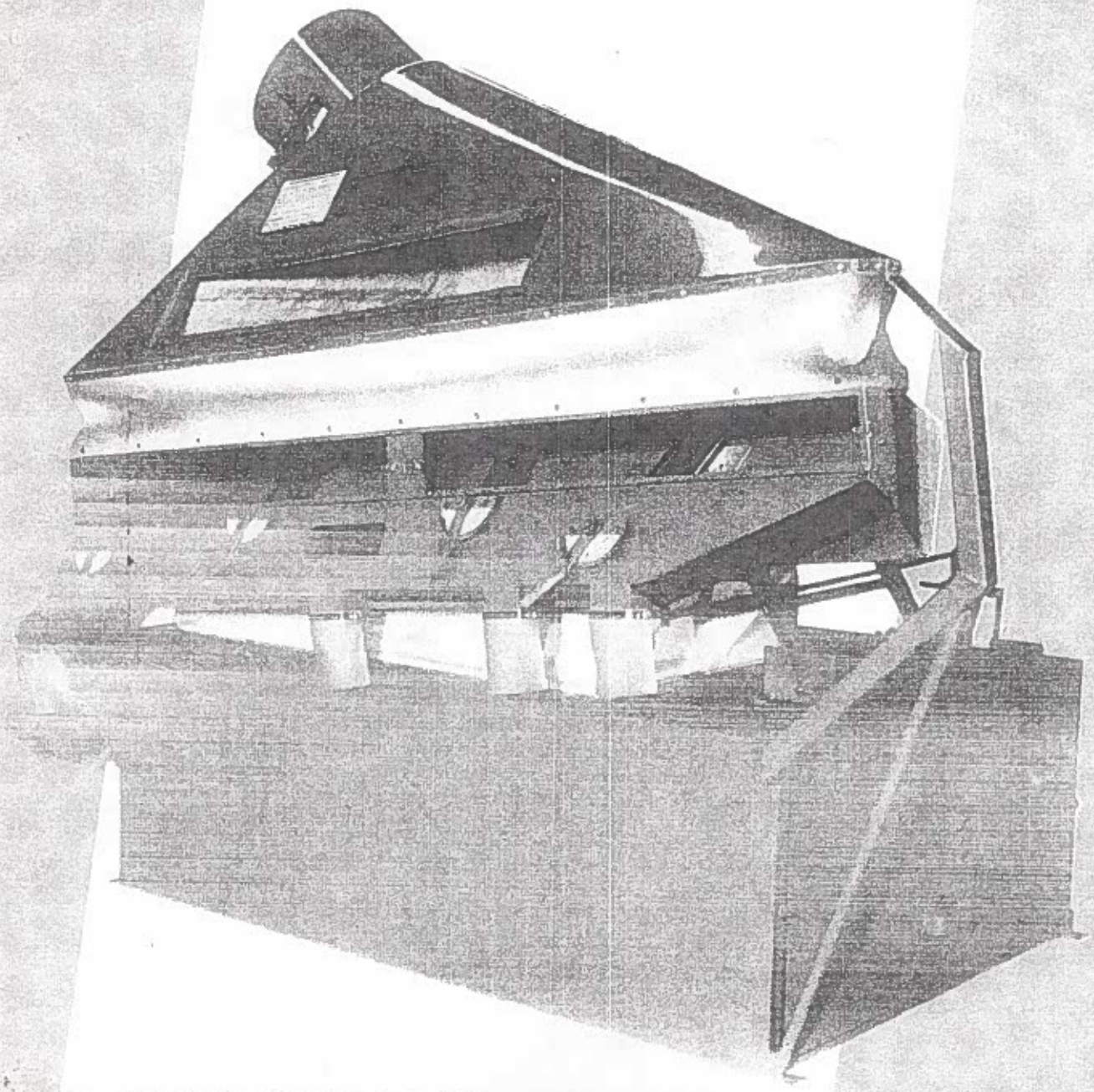
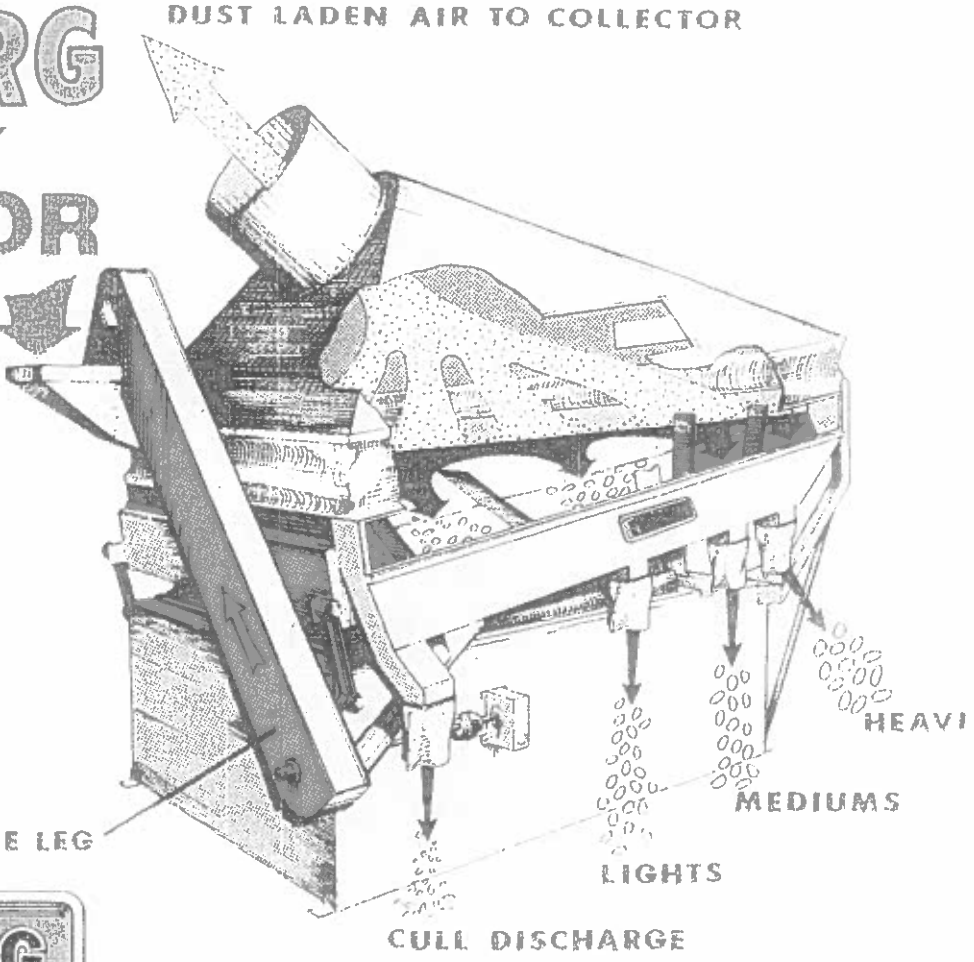
FORSBERG

VACUUM GRAVITY SEPARATORS



"Specialists in Separation Machinery"

FORSBERG
VACUUM GRAVITY
SEPARATOR



FEATURING: All steel construction with a fiberglass vacuum hood, metal decks and air baffles, sanitary divider adjustments, all metal rubber-bushing suspension, and deck adjustment system, a counter-balanced drive and accurate simplified crank controls.

FORSBERG

Dust-Free, All-Enclosed Separation For Unlimited Applications

NO-BLAST FANS OR OPEN DECK AREAS! The Forsberg Vacuum Gravity is **completely enclosed.** Outside air can be brought into the separator and returned to an outside collector. Better yet, use a Forsberg closed circuit air supply system, AIRECYCLE, for a completely dust-free operation. (See back page)

COMPLETE ACCURATE SEPARATIONS! The vacuum gravity's separation system provides complete and accurate density classification from the very lightest to the very heaviest — all at fingertip control. The easy-to-adjust divider blades allow unlimited control of the product discharge. Five inspection windows for operating convenience.

ALL STEEL CONSTRUCTION! This all steel construction includes the decks, deck covers, rails, air baffles and heavy duty base, which is free of bottom obstructions, for ease of cleaning, using steam, etc., to eliminate product contamination or pollution.

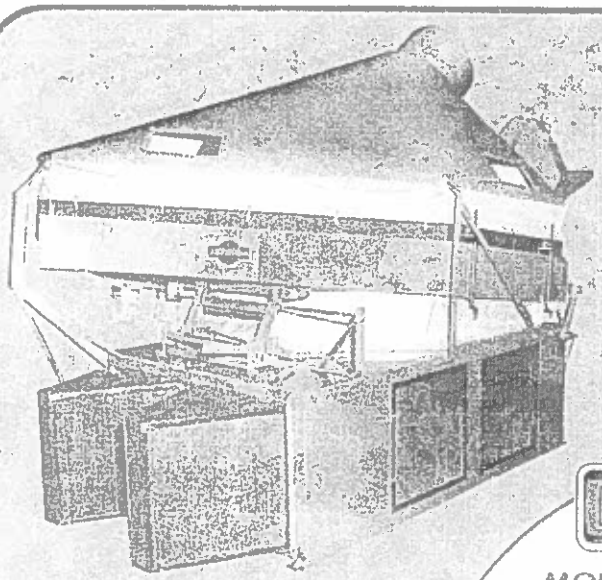
TOTAL CONTROL OF AIR! Exclusive type of underdeck feathering insures correct air distribution through the deck, so vital to material stratification and good product separation.

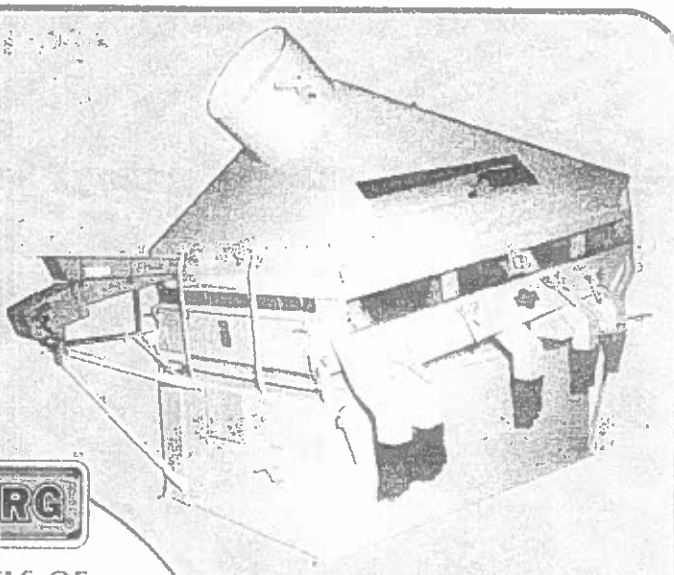
RUBBER BUSHING SUSPENSION! The deck's separation movement is enhanced by a rubber suspension system which permits a more sensitive machine adjustment and control. This system is available in replacement kits for older models.

UNIVERSAL INSTALLATION! Install the Forsberg Vacuum Gravity almost anywhere. You need a clean air supply and a level, solid foundation. Right or left hand models are available for combined processing lines. Metal air filters are provided when applicable.

RECYCLE LEG is available to permit the light and middling product to be recycled for a more precise separation of tailings or cull materials.

Numerous options and modifications are available such as, an augered product return, auxiliary feed hopper, steel vacuum hood, stainless steel on product contact parts, etc. For more complete information about your separation needs, consult FORSBERGS INC., P.O. Box 510, Thief River Falls, Minnesota 56701.





FORSBERG

MODIFIED MODELS OF

GRAVITY SEPARATOR

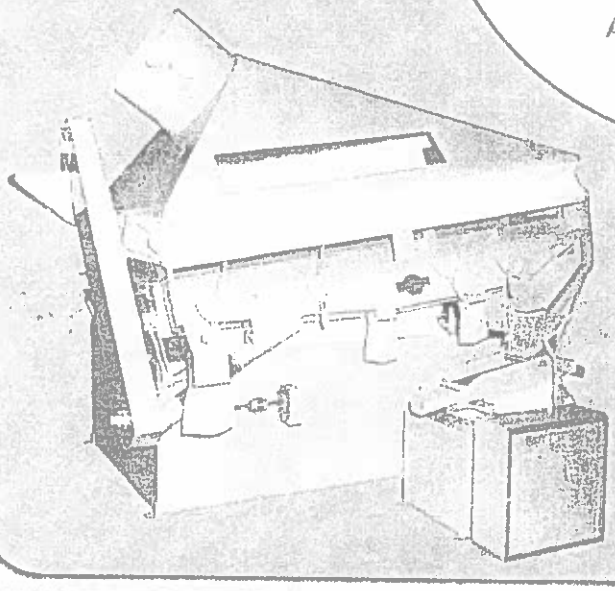
FOR SPECIALIZED APPLICATIONS

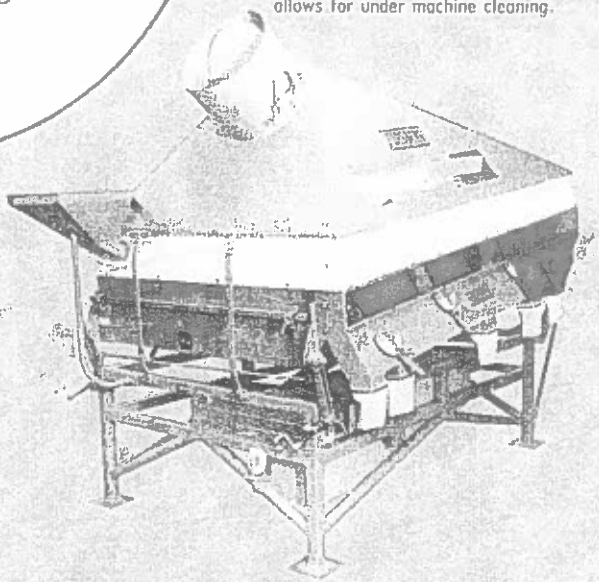
VMS — FILTERED MODEL: This standard Vacuum Gravity is modified for use where an outside source of air is not available. It utilizes built in air filters for inside air use and to prevent blinding or clogging of deck coverings.

VMSP — PEANUT MODEL WITH "AS" DESTONER: Adapted especially for the separation of splits, skins, etc., from whole peanuts, with rubber covered wire decks, special air baffle, stabilizing bars front and rear and high point cut to a Model AS Destoner.

VMS — METALS RECLAMATION MODEL: A special machine which permits a fine separation of insulation and other waste substances from granulated copper and aluminium, etc. The features include a special electronic feeder, stainless steel on product contact parts and modified deck.

VMS — OPEN FRAME MODEL: The open frame modification is used only in dust free areas as incoming air cannot be filtered. This construction allows for under machine cleaning.





STANDARD DECK COVERS

- Three different cloth fabrics available
- Nine steel fabrics
- Two rubber-coated fabrics
- Six nylon fabrics

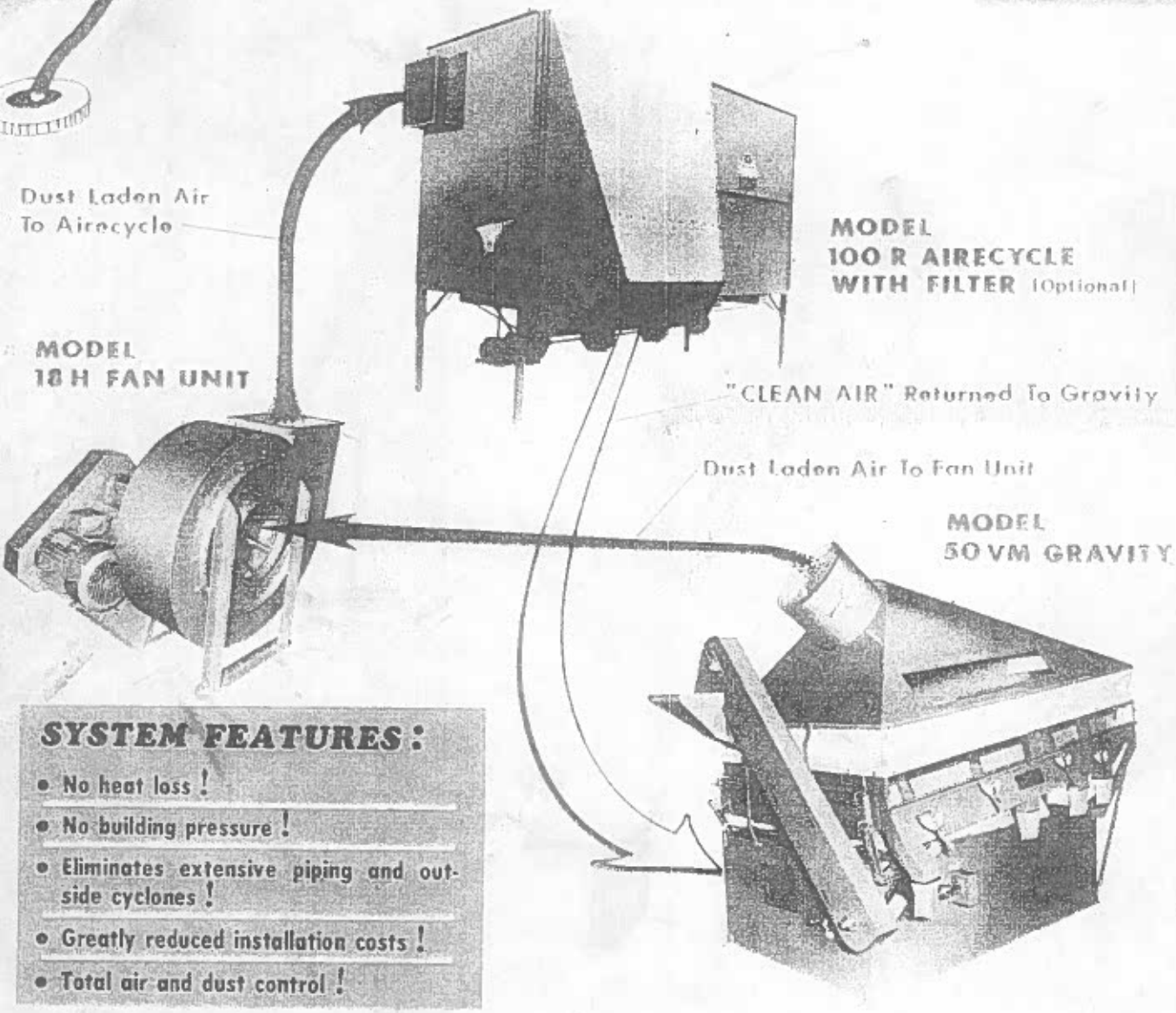
SPECIFICATIONS

MODEL	HEIGHT	WEIGHT	AREA	HORSEPOWER	CAPACITY
50 VMS	83 inches	1400 lbs (635 kg)	64 x 106 inches	Drive: 1 Fan Unit: 15 to 20	Up to 6000 lbs. per hr. (2721.6 kg)
40 VMS	74 inches	1100 lbs (499 kg)	52 x 92 inches	Drive: 1 Fan Unit: 5 to 10	Up to 4500 lbs. per hr. (2041 kg)

Capacities can vary greatly and are only a general guide. Forsbergs maintains a full-size testing lab that will test your product, free of charge, for capacity as well as separations.

POLLUTION

...with an "Airecycle", Forsberg's closed circuit air system !



SYSTEM FEATURES :

- No heat loss !
- No building pressure !
- Eliminates extensive piping and outside cyclones !
- Greatly reduced installation costs !
- Total air and dust control !

Constant Air Supply Means Better Separations !

FOODS - PLASTICS - GRAINS - NUTS - SPICES - METALS - MINERALS, etc.

REPRESENTED BY:

FORSBERG

Airecycle

CLOSED CIRCUIT AIR SUPPLY SYSTEM

FORSBERGS INC.
P.O. Box 510 — Thief River Falls — Minnesota 56701
Telephone: (218) 681-1927 — Cable: Forsco

Performance

MODEL	CFM AIR DELIVERIES AT RPM SHOWN (‡)							BLOWER RPM	MOTOR HP
	1/4 SP	1/2 SP	3/4 SP	1 SP	1 1/4 SP	1 1/2 SP	2 SP		
No. 3C716	1220	1140	1060	950	825	520	—	1865	1/4
10 1/2" Dia. Wheel	1350	1290	1220	1130	1040	900	—	2055	1/3
Tip Speed = 2.749xRPM	1565	1510	1450	1385	1325	1230	1015	2350	1/2
Outlet 0.636 sq. ft.	1810	1760	1710	1660	1610	1550	1400	2685	3/4
Inlet 0.894 sq. ft.	2025	1975	1925	1875	1805	1775	1660	2955	1
	2300	2250	2225	2175	2140	2100	2000	3385	1 1/2
No. 4C333A	1765	1635	1500	1325	1000	—	—	1485	1/3
12 1/4" Dia. Wheel	2050	1945	1825	1710	1560	1365	—	1700	1/2
Tip Speed = 3.207xRPM	2375	2285	2185	2075	1980	1850	1525	1950	3/4
Outlet 0.858 sq. ft.	2650	2575	2475	2400	2285	2200	1975	2145	1
Inlet 0.921 sq. ft	3060	3000	2925	2850	2730	2675	2500	2455	1 1/2
	3375	3300	3250	3175	3100	3025	2875	2705	2
No. 3C073A	3125	2950	2775	2600	2375	2085	—	1435	3/4
15" Dia. Wheel	3460	3310	3150	3000	2830	2600	2000	1575	1
Tip Speed = 3.93xRPM	4025	3900	3775	3625	3470	3325	3000	1800	1 1/2
Outlet 1.28 sq. ft.	4450	4325	4200	4075	3960	3825	3540	1980	2
Inlet 1.37 sq. ft.	5125	5025	4910	4810	4755	4600	4375	2265	3
No. 3C074A	4400	4175	3910	3625	3300	2850	—	1160	1
18 1/2" Dia. Wheel	5100	4900	4680	4450	4205	3925	3200	1325	1 1/2
Tip Speed = 4.78xRPM	5650	5450	5275	5100	4880	4650	4150	1460	2
Outlet 1.90 sq. ft.	6500	6320	6175	6000	5850	5675	5300	1670	3
Inlet 2.02 sq. ft.	7750	7600	7500	7350	7200	7050	6775	1980	5
No. 3C048A	5700	5450	5200	4900	4560	4175	—	1140	1 1/2
20" Dia. Wheel	6375	6100	5875	5600	5330	5025	4300	1255	2
Tip Speed = 5.24xRPM	7300	7100	6900	6700	6505	6250	5725	1435	3
Outlet 2.32 sq. ft.	8750	8600	8400	8200	8010	7900	7500	1700	5
Inlet 2.44 sq. ft.	9700	9500	9400	9200	9000	8900	8600	1865	7 1/2

MODEL	CFM AIR DELIVERIES AT RPM SHOWN (‡)								BLOWER RPM	MOTOR HP
	1/4 SP	1/2 SP	3/4 SP	1 SP	1 1/2 SP	2 SP	2 1/2 SP	3 SP		
No. 3C049A	8400	8000	7500	7100	5700	—	—	—	870	2
24 1/2" Dia. Wheel	8400	8000	7500	7100	5700	—	—	—	870	2
Tip Speed = 6.41xRPM	9700	9400	9000	8600	7700	6500	—	—	995	3
Outlet 3.46 sq. ft	11600	11300	11050	10700	10050	9300	8400	6900	1180	5
Inlet 3.65 sq. ft	13400	13100	12900	12600	12000	11450	10800	10100	1350	7 1/2
	14800	14510	14300	14100	13600	13100	12525	11950	1485	10
No. 3C109	8415	8005	7615	7210	6305	4510	—	—	855	2
27" Dia. Wheel	9735	9390	9020	8685	7980	7165	5825	—	980	3
Tip Speed = 7.07xRPM	11715	11395	11085	10805	10225	9630	8985	8230	1165	5
Outlet 4.19 sq. ft.	13495	13220	12950	12675	12180	11665	11160	10620	1335	7 1/2
Inlet 4.43 sq. ft.	14850	14600	14350	14100	13650	13200	12725	12250	1470	10
No. 3C110	11140	10665	10220	9770	8785	7505	—	—	825	3
30" Dia. Wheel. Tip Speed =	13375	12980	12570	12185	11400	10600	9650	8230	975	5
7.85xRPM. Outlet 5.17 sq. ft.	15420	15060	14725	14395	13705	13035	12360	11570	1120	7 1/2
Inlet 5.47 sq. ft.	17055	16695	16415	16070	15475	14850	14250	13605	1230	10
No. 3C111	17631	17025	16330	15530	13950	12385	10190	—	725	5
36 1/2 Dia. Wheel. Tip Speed =	20390	19825	19315	18700	17350	16025	14710	13165	830	7 1/2
9.57xRPM. Outlet 7.66 sq. ft.	22530	22050	21590	21060	19870	18605	17380	16175	915	10
Inlet 8.11 sq. ft.	25980	25560	25150	24720	23780	22690	21600	20560	1050	15

(‡) Performance rating shown above is based on standard test codes of AMCA.

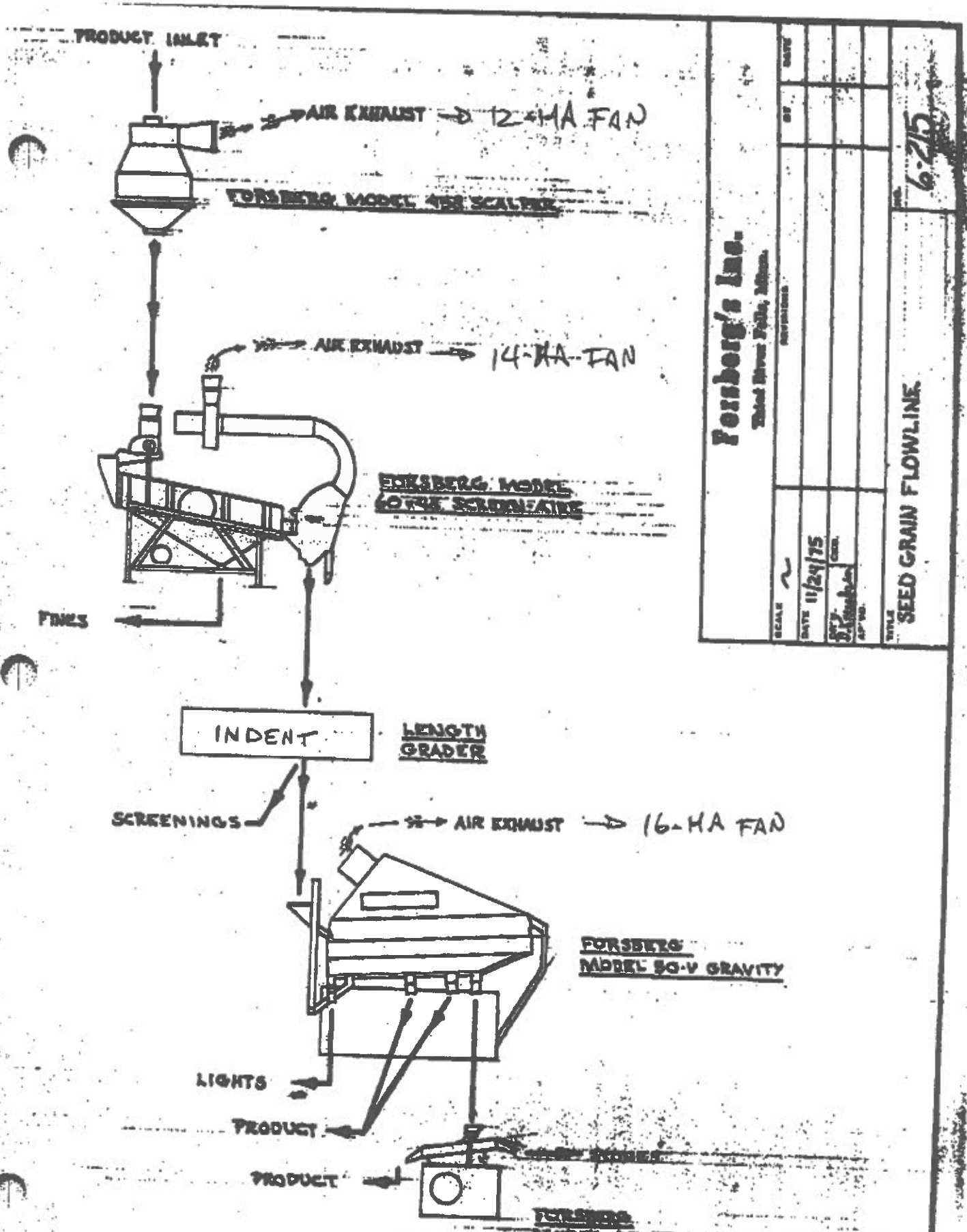
OUTLET VELOCITY for any given static pressure can be determined by

$$O.V. = \frac{CFM}{\text{sq. ft. outlet area}}$$

MESSAGE:

18¼ Wheel Dia Backward Inclin Blower 1980 RPM
CFM Air Delivery @ RPM Shown.

7750 CFM @ .25" SP
7600 CFM @ .50" SP
7500 CFM @ .75" SP
7350 CFM @ 1" SP
7200 CFM @ 1.25" SP
7050 CFM @ 1.50" SP
6775 CFM @ 2.00" SP
6450 CFM @ 2.50" SP
6100 CFM @ 3.00" SP


PRODUCT INLET
AIR EXHAUST → 12-HA FAN
FORSBERG MODEL 48B SCALPER
AIR EXHAUST → 14-HA-FAN
FORSBERG MODEL 60"x16' SCREENAIRE
FINES
INDENT
LENGTH GRADER
SCREENINGS
AIR EXHAUST → 16-HA FAN
FORSBERG MODEL SG-V GRAVITY
LIGHTS
PRODUCT
PRODUCT
FORSBERG MODEL AS STONER (OPTIONAL)
Forsberg's Inc.
SEED GRAIN FLOWLINE
6-275
11/24/75

Trouble Guide List for Forsberg Gravity Separator

Before making any repairs or looking for trouble with gravity separator, check over the machine for correct rotation of motor, obstructions to the air intake, that it has a steady and uniform feed from an overhead bin and not from an elevator leg, that the machine is sitting on a firm and level foundation, and that it is securely fastened to the floor.

Trouble	Where to Look for Remedy
UNSTEADY OR VARIATION IN SEED UPON DECK.	Check for loose bearings, faulty or worn belt, loose bolts, stuck speed changing pulley, or machine being unlevel or not secured to the floor. Check retaining rubber washer on speed crank, making sure it is not turning.
"DEAD SPOTS" ON DECK WHERE STOCK BECOMES UNEVEN.	R... he... of...
UNABLE TO MAKE STOCK CARRY ALL THE WAY UP ON DECK, OR ALL THE WAY DOWN ON DECK.	Cl... w... bl... re... w...
TOO MUCH VIBRATION IN DECK OR FRONT OF DECK NOT TRAVELING TRUE.	Ch... the... styl... sure... not...
A STICKING RETURN ELEVATOR.	Che... ning... ting... sure...
UNABLE TO ATTAIN A STEADY SPEED ON DECK.	Chec... there... the sp... er on...
EXCESSIVE VIBRATION IN BODY OF MACHINE.	Check... on the... sure th... floor n...
POUNDING OR THUMPING NOISE IN MACHINE.	Check all bearings and make sure they are all tight, and that all set-screws are securely tightened.

Set the front post's elevation about midway and the base of the front post (thrust setting) also at its midway setting.

Open the air control to a middle setting for small light material and wider for larger, heavier material.

(A) START UP: Start the machine and feed the material onto the deck allowing it to cover the deck and form a constant pattern of distribution.

(B) NORMAL OPERATION: **Figure 1** —

The material will flow over the deck surface gradually moving toward the discharge side. The heavier material will also move upward to the "point" of the deck while the lighter material curves downward to the lower "cull" corner. This stratified mass (bed) of material will appear to be freely agitated and bubbling evenly over the deck's entire surface and a distinct pattern of material movement should be evident.

Compare the material's pattern with the figures in the chart for achieving ideal or optimum separation.

(C) ADJUSTMENT CORRECTIONS: Correct errors of adjustment in the order given below.

1. AIR ADJUSTMENT — **Figure 2A** — Too little air will cause the bed of material to pile up near the upper end of the deck and bare the deck screen on the lower end.

   Figure 2B — Too much air will cause the bed of material to have an extremely active bubbling action preventing proper stratification and cause it to shift toward the lower end baring the deck screen on the upper end. The idea is to maintain a fully covered deck with uniform depth of material.

2. MACHINE MOVEMENT — **Figure 3A** — Too slow of speed (deck movement) will cause the material to pile up in the input area and gradually be thinner in other areas, especially at the point where the screen may become visible.

   Figure 3B — Too much speed will cause the material to pile-up along the head board and become thin at the lower end of the deck where the screen may become visible.

3. ELEVATION OF DECK — **Figure 4A** — A low elevation setting will cause the material to be thicker at the upper end and thinner in a larger than normal area at the lower end.

   Figure 4B — A high elevation setting will cause the material to shift to the lower end and be thinner in a larger than normal area at the upper end.

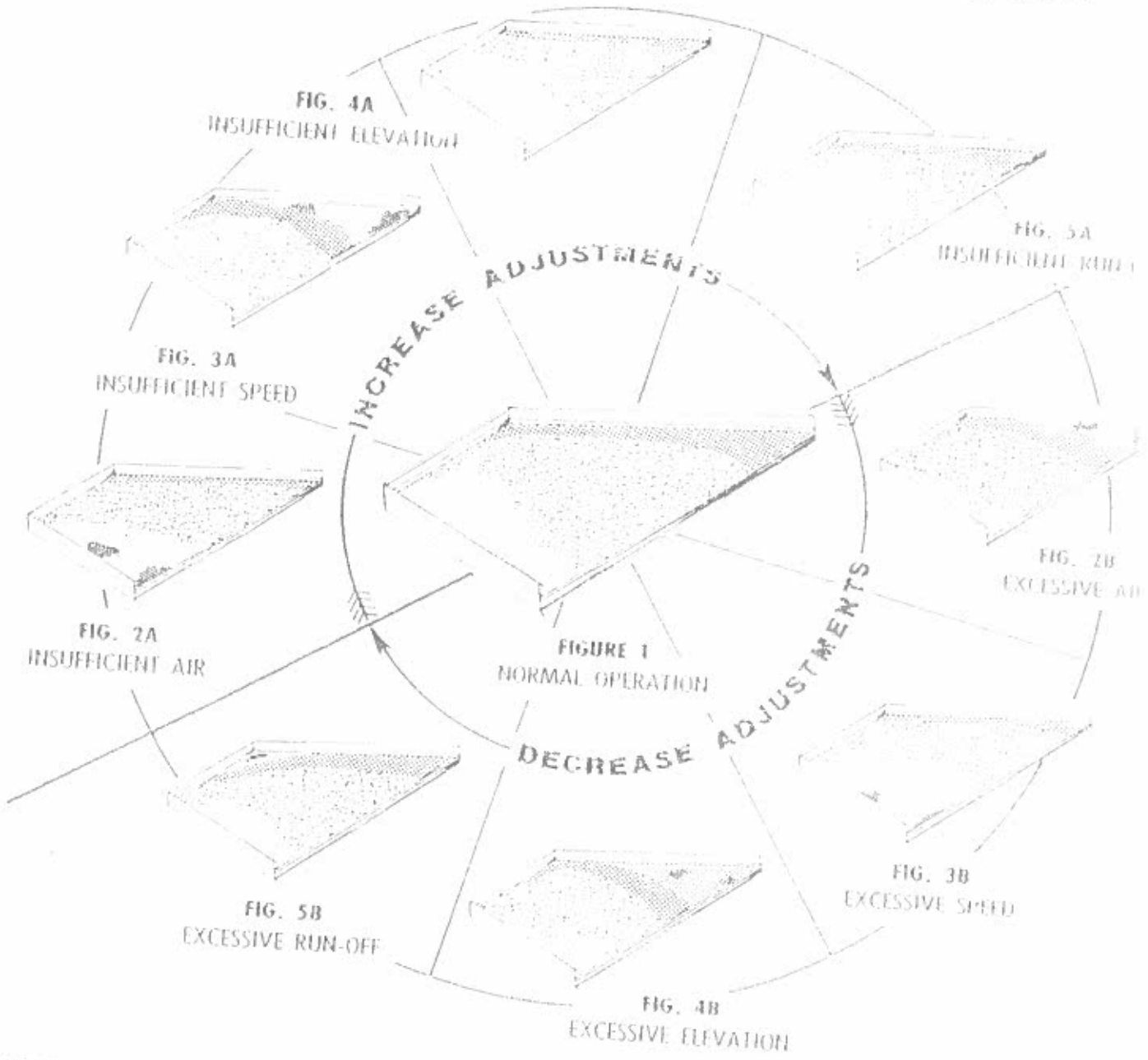
4. DECK RUN OFF (Level Control) — **Figure 5A** — Insufficient (low) run-off setting will cause a heavy pile up of material along the back side (opposite the discharge) of the deck. The lighter material will move further up toward the point before curving down to the lower corner.

   Figure 5B — An excessive (high) run-off setting will cause the material to move directly toward the discharge side and head board. Because of this faster movement toward the discharge, the deck screen will become bare of material at the hip area.

   The run off adjustment seldom needs to be changed once properly set; exception would be if feed rate into the machine is changed.

NOTE: MAKE ONLY SLIGHT ADJUSTMENTS, ONE AT A TIME AND ALLOW TIME FOR THE PATTERN TO REFORM ON THE DECK BEFORE ANY FURTHER ADJUSTING.

GRAVITY ADJUSTMENT CHART



HEAVY MATERIAL

INTERMEDIATE MATERIAL

LIGHT MATERIAL

VISIBLE "OPEN AREA" OF DECK SCREEN

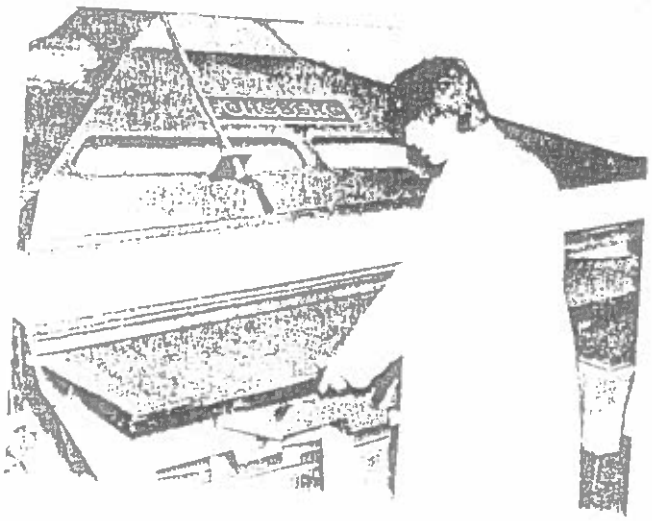
STARTING ADJUSTMENTS: Read and follow all instructions supplied in the INSTALLATION and OPERATION MANUAL.

Before starting the machine, the following settings must be made:

Set the base of the left rear adjustment post as far forward as possible.
Set the base of the right rear adjustment post as far back as possible.

(3)

Remove the window retainer (item 6, plate 4) and unclip the inspection window at each end. Swing inspection window down out of the way. The dividers must be in their lowest position. The deck grid and cover can now be lifted out of the shoe (item 8, plate 6) and out the inspection window opening.



A new deck and cover may be installed in the machine the same way the previous one was removed by reversing the order.

IMPORTANT: When installing a deck grid and cover, be sure to have the cull and front end alignment pins (items 15 16, plate 5) in their proper slots on the deck hold-down and th the grid is completely back against the back side of the hol down and shoe before clamping them down with the four hol down clamps. Be sure clamps are down all the way and are tig - if not, re-adjust upper part of clamps to apply more pressur

This deck system was designed for easy maintenance an to keep down time to a minimum. We recommend that spar deck grids and covers be purchased so that when one is remove a new one is ready for immediate installation. Also, decks with different covers may be kept on hand so various produ materials may be processed.

When deck covers become worn, they may be replaced by drilling out the rivets that secure the cover to the deck grid Simply position a new cover on the deck and rivet in place like the old one was. The deck grid and new cover is now ready to be re-installed into the machine.

NEVER OPERATE THE MACHINE, UNLESS THE HOLD-DOWN CLAMPS HAVE BEEN RE-LATCHED AND ARE CLAMPING THE DECK HOLD-DOWN INTO OPERATING POSITION!

NEVER OPERATE THE MACHINE UNLESS THE INSPECTION WIN DOW IS SHUT, CLIPPED AND RETAINED!

TROUBLE SHOOTING

When separation quality deteriorates or there is a lack of performance by the machine there is always a reason. A general procedure for locating trouble would be to first re-check your machine adjustments, then re-check entire air system and lastly check the machine for mechanical failure. A few example problems and procedures for corrections are listed below.

1) POOR SEPARATION — LIGHT (CULL) MATERIAL IS TRAVELING TOO FAR UP ON DECK SURFACE.

Cause: Probably a plugged deck screen. Run material off deck with fan turned off. Remove deck, check and clean thoroughly. Replace and start up again.

2) MATERIAL RIDES TOO HIGH ON THE DECK AND PILES UP AT DEEP END.

Cause: Probably any one or combination of the following - not enough air, plugged deck screen, machine running too fast machine has too much pitch, or the deck is too low at the point end.

To correct, apply more air and raise the point of the deck somewhat. If this produces no results, the deck screen is probably plugged. If the deck screen is not plugged and the air is almost wide open, then check the rest of the air system, such as piping, filters, cyclones, etc., to be sure there is no unusual back pressures.

3) MATERIAL RIDES TOO LOW ON THE DECK SO POINT OF DECK IS NOT COVERED.

Cause: Too much air, machine running too slow, not enough feed to cover deck completely, or point of deck is raised too high.

Take obvious corrective action allowing the pattern of material on the deck time to re-adjust between correction ad justments. On machines with over a year of service, it would do well to check the surface of the deck covering to make sure it has not worn smooth. It is the roughness of the wire or the dimpling in the decks covering that makes the heavy particles move up the incline of the deck towards the point.

These examples are some common causes of problems en countered and are quite easily corrected. It should also be noted that any major change in the composition of the material being fed into the machine will obviously affect the amount of finished product being discharged.

If any further assistance is required or you have any questions about installation and operation, please contact Forsbergs, Inc., at the address or phone number listed in this manual.

DIRECTIONS For INSTALLATION and OPERATION

Of The

FORSBERG MODEL 50VM VACUUM STANDARD GRAVITY SEPARATOR

* * *

INSTALLATION

LOCATION:

Machine should be located under a bin with sufficient capacity to assure steady flow of material to machine. The machine is normally mounted on a stand so as to allow for the utilization of vibratory conveyors or bins to receive the out-put fractions of the machine.

FOUNDATION:

No special foundation is required if the floor is sound and free from vibration. The machine should be fastened to the floor with either bolts or lag screws. When the machine is mounted on a stand it is absolutely essential that there is no vibration of this base. A factory-made stand is recommended.

LEVEL THE MACHINE:

The machine is designed to operate when the air box of the Gravity Table is level. Use a long level and level in both directions.

ACCESS TO MACHINE:

Allow enough room at the head of the machine to permit easy removal of deck. Check this point before bolting machine to the floor by removing deck. Allow enough room around the machine for the operator to get at the controls.

FEED:

There are various methods of feeding a vacuum Gravity Table according to the type of product being processed. All of them feature some means of maintaining an air lock and providing a positive means of controlling the flow of material into the machine. Do not feed from an elevator leg, or other machine. Feed the machine from a bin when possible to help maintain a steady and even feed. Whatever feed device is used, should be kept full at all times.

PIPING:

Use at least twenty gauge metal to prevent collapsing of pipe. If lighter gauge metal is used it should be banded at intervals between the joints. Avoid sharp turns. Where a ninety degree turn must be made refer to PIPING INSTRUCTIONS. Any banding, if necessary would apply only on the suction side of the fan.

FAN:

The fan may be mounted remotely or on a special stand. Avoid sharp turns in discharge pipe as this will cause excessive air losses. Avoid ells whenever possible, and should they be necessary they should have a rading equal to two times the diameter of the pipe. SEE PIPING INSTRUCTIONS.

WIRING:

It is suggested that the drive motor and the fan motor start in the following order: (1) Start fan (2) Start deck-drive (about a three second delay will keep deck of material from losing its pattern). The same procedure should be used for stopping machine: (1) Stop fan (2) Stop deck-drive. (Again, about a three second delay will maintain deck pattern).

FILTERS:

Every Forsberg Gravity Separator is built to accommodate filters in the base of the machine. It is essential that these filters be cleaned periodically. PLUGGED FILTERS WILL CAUSE POOR SEPARATIONS. (We highly recommend the Forsberg AIRECYCLE, also known as a closed circuit air supply system. This eliminates the need for filters and cyclones.) When filters are used in the base of the machine it is recommended that a periodic schedule for cleaning be established.

CYCLONES:

When the Forsberg AIRECYCLE is not used, it is very common to discharge the air from the machine to outside atmosphere by means of cyclone dirt collectors. These must be properly sized. Too small a cyclone will cause back pressures and loss of air movement to the extent that poor separation results. Too large cyclones do a poor job of settling out the dirt. Factory will make recommendations as to size.

KEEP THE DECK CLEAN:

Clean the deck as required by using a brush and air hose. Periodically the deck should be removed and given a thorough cleaning since it is difficult to make sure the underside of the screen is clean when it is in the machine. This is where a spare deck comes in handy.

* * *

OPERATING INSTRUCTIONS

There are two steps in making a finished separation on the Forsberg Standard Vacuum Gravity Separator. First the material is separated into layers by the air, with the particles graduated from heavy to light, with the heaviest particles making up the bottom layer. Next, this stratified mass moves up and off the edge of the table with the heavy materials traveling up and the lightest materials traveling down. Therefore, when the material comes off the spill board the "lights" are at the lower end and the "heavies" at the upper end.

ADJUSTMENTS:

On the Forsberg Vacuum Gravity Separator there are several adjustments that have to be made initially, and which generally never need re-setting. Once the machine has been set the action is controlled by slight changes at four points, namely the air, the feed, the speed and the elevation of the deck. When making any of these adjustments it is very important that enough time be allowed for the table to react to each adjustment (30 seconds) before making any further changes.

AIR:

Distribution of the air through the deck is controlled by a unique feathering system built into the deck. This requires no adjustment and is permanently set at the factory. The volume of air is controlled by the quadrant located on the pipe coming out of the top of the hood. Air volume should be adjusted so that the material is freely agitated on the deck and caused to bubble without permitting the bubbles to break. Too active a bubbling action prevents the stratification of material. Too much air will cause the bed of material to shift to the lower end, and too little air will cause the bed of material to pile up near the upper end of the deck. The idea is to maintain a fully covered deck with uniform depth of material.

FEED:

The feed input to the separator must be adjusted so that a uniform flow is maintained at all times. The rate of feed will depend upon the type of material being separated. The important thing is to maintain a fully covered deck and to avoid piling up of product in any area.

SPEED:

The deck speed is controlled by the speed crank located at the input end of the machine. This adjustment works in conjunction with the air, feed, and deck elevation. As these are increased so must be speed stepped up to maintain a level load on the deck. This adjustment, when once set for a particular type of product will very seldom need changing.

Too high a speed will cause the material to pile up along the head board and to thin out at the low end of the deck. Too slow a speed will cause too deep a pile at the input end and thinning at the point end.

DECK ELEVATION:

Deck elevation is controlled by the lever on the head post of the machine which is used to raise and lower the deck as is required to maintain a level load on the deck. A reminder: When adjusting the pattern on the deck with this adjustment (or any other for that matter) be sure to make only a little adjustment at a time and allow the pattern on the deck time to re-adjust itself as mentioned previously. Raising the point will tend to thin out the material at the point end and may have to be compensated for by either an increase in speed or a decrease in air.

THRUST:

Secured by the lock screw in the center of the head post and controlled by the crank in the center of the head post. Release lock screw before operating crank and tighten securely after setting. Moving the base of the head post forward (away from the machine) increases the thrust, imparts a sharper blow to the deck, and makes the material travel more quickly to the point. Decreasing the thrust lessens the blow to the deck and reduces the speed with which the material travels toward the point. The thrust control is a setting which should be made at start-up, usually in a moderate position, and then be left unchanged unless the type of product changes drastically. It is preferable to make minor adjustments in the deck pattern by use of the air control and the deck elevation.

REAR ADJUSTMENT POSTS (2):

Located at the rear corners of the deck cage. When the base of the post is set as far forward as possible, the deck at that point is lowered slightly and the degree of throw at that point is increased. Adjusting these posts to opposite settings imparts a slight torque to the deck and causes the material to travel in an arc. A normal setting for the left rear post, located under the feed, is to have the base very near the extreme forward position and the right rear post under the "lights" discharge spouts very near to the extreme rear position. Once these posts are set in this position they will probably never be changed.

DECK LEVEL CONTROL CRANKS (2):

Located on the backside of the deck (opposite the discharge side) these adjustments control the rate of spill-off. They raise and lower the side of the deck to increase or decrease the flow over the spill board. These are seldom changed except when feed rates into the machine are changed.

GENERAL:

Familiarize yourself with the operation of each of these adjustments by starting the machine and making them one at a time just to see what it will do to the material.

To start the machine set the rear adjustment posts with the left rear post very near to the extreme forward position and the right rear post very near to the extreme backward position. Lock the posts into position by tightening the lock nut. Set the elevation of the deck on the head post about mid-way and the thrust also in a mid-way position. Lock both settings into position. Open the air volume mid-way and start the machine. Start feeding the machine and allow material to cover the deck. If it tends to pile up at the feed input end, increase speed. After the deck has been covered, increase or decrease air flow to bring about proper bubbling effect. Check to see that deck is loaded uniformly at all points. If the material piles up at the point end of the deck, increase elevation of the deck. Make only slight adjustment and allow machine to operate at least 30 seconds before making any further changes. Should the material still be piled at the point and applying more air causes too much blowing, then move the base of the head post (using the thrust control knob) in towards the machine to soften the thrust. Check samples from both high and low end discharge spouts. Move dividers to cut material at proper point. Make only slight adjustments at a time and allow machine to reform pattern between each adjustment.

PREPARATION OF PRODUCT - GENERAL:

The quality of all gravity separations is greatly increased when the product is sized to a certain degree of uniformity ahead of the Gravity Table.

For most separations it is highly recommended that the product be aspirated and screened when heavy concentrations of light materials are present in order to remove a good portion of the airborne impurities and also to remove the fine dust and dirt that could cause plugging of the Gravity Table screen cover.

THE IMPORTANCE OF CLEAN AIR:

The importance of clean air can not be over-emphasized. Ninety per cent of all separation problems are usually related to air problems. For example, a fine mesh deck may become plugged on the underside. Result — not enough air or no air at all passing through the deck; therefore, poor separations. All filters, filtration systems, or any other of the components involved in the handling of air must be maintained in good condition. If not, poor separations could result.

DECKS:

Many different kinds of decks are available according to the type of product being separated. It is advisable to carry a spare deck on hand to avoid downtime and to provide for scheduled maintenance.

MAINTENANCE:

Even though Forsberg Gravity Separators are well known for their low maintenance costs, every good machine does need a certain amount of housekeeping and care. The bearings in the machine are one of the most vital parts and as such they should receive proper attention. The bearings are factory lubricated and sealed and require only very small amounts of grease. The manufacturer's specifications are enclosed and should be read and followed closely. The drive belt on the motor should be occasionally checked to make sure that it is kept tight to prevent any variation of speed.

* * *

TROUBLE SHOOTING

When separations deteriorate from former performance, there is always a reason. A general procedure to locate trouble would be to first of all re-check your machine adjustments, then re-check entire air system and lastly check the machine for mechanical failure. A few example problems and procedures for correction are listed below.

(1) POOR SEPARATION - LIGHT MATERIAL COMING OUT HIGH ON THE TABLE.

Cause: Probably a plugged deck. Run material off deck with the fan turned off. Remove deck, check and clean thoroughly. Replace and start up again.

(2) MATERIAL RIDES TOO HIGH ON DECK AND CROWDS THE HEAD BOARD.

Cause: Probably any one or any combination of the following — not enough air, plugged deck, machine running too fast, machine has too much pitch, or the deck is too low at the point end.

To correct, apply more air and raise the point of the deck somewhat. If this produces no result, the deck is probably plugged. If the deck is not plugged and the air is almost wide open then check the rest of the air system such as piping, filters, (make sure the latter are not plugged) cyclones, etc. to make sure there are no unusual back pressures.

(3) MATERIAL RIDES TOO LOW ON DECK, POINT OF DECK NOT COVERED.

Cause: Too much air, machine running too slow, not enough feed to cover deck completely, or point of deck raised too high.

Take obvious corrective action allowing the deck time to re-adjust its pattern between corrections. On machines with over a year of service it would do well to check the surface of the deck covering to make sure it has not worn smooth. It is the roughness of the wire or the dimpling in the deck covering that makes the heavy particles move up to the top.

The above examples are some of the common causes of problems encountered and are quite easily correctable. It should also be noted that any major change in the composition of the material being fed into the machine will obviously affect the amount of finished product coming off the spill board.

FORSBERG

FORSBERGS, INC.
Box 510
Thief River Falls, Minnesota 56701
Telephone (218) 681-1927

Printed U.S.A.

Trouble Guide List for Forsberg Gravity Separator

Before making any repairs or looking for trouble with gravity separator, check over the machine for correct rotation of motor, obstructions to the air intake, that it has a steady and uniform feed from an overhead bin and not from an elevator leg, that the machine is sitting on a firm and level foundation, and that it is securely fastened to the floor.

Trouble	Where to Look for Remedy
UNSTEADY OR VARIATION IN SEED UPON DECK.	Check for loose bearings, faulty or worn belt, loose belts, stuck speed changing pulley, or machine being unlevel or not secured to the floor. Check retaining rubber washer on speed crank, making sure it is not turning.
"DEAD SPOTS" ON DECK WHERE STOCK BECOMES UNEVEN.	Remove deck and clean thoroughly with brush and air hose if possible. Check air intake and filter for possible obstructions or plugged filters.
UNABLE TO MAKE STOCK CARRY ALL THE WAY UP ON DECK, OR ALL THE WAY DOWN ON DECK.	Check speed changer pulley and make sure that it is working freely. Check eccentric bearings and pillow blocks and make sure they are not stuck or loose. Check rear adjusting posts and make sure they are tight and working.
TOO MUCH VIBRATION IN DECK OR FRONT OF DECK NOT TRAVELING TRUE.	Check rear post and front post making sure that none of the pins or bushings have become frozen or worn. On old style machines check fabric pads on eccentrics and make sure they are tight. Replace only with a fabric pad and not rubber.
A STICKING RETURN ELEVATOR.	Check belt or chain in elevator and make sure it is running directly in the center of leg, and not striking or dragging on any portion. Check driving mechanism making sure it is tight and secure.
UNABLE TO ATTAIN A STEADY SPEED ON DECK.	Check motor for low voltage, check all belts, making sure there is no slippage. Check speed changer, making sure the spring tension is right. Check rubber retaining washer on speed crank and make sure that it is not turning.
EXCESSIVE VIBRATION IN BODY OF MACHINE.	Check frame of machine and make sure it is resting firmly on the floor at all points and is securely fastened. Make sure that floor is not wobbly. And if there is vibration the floor must be supported.
POUNDING OR THUMPING NOISE IN MACHINE.	Check all bearings and make sure they are all tight, and that all set-screws are securely tightened.

PIPING INSTRUCTIONS

When installing machine and blower, care must be taken in designing the duct system to avoid sharp turns which add greatly to the friction and lowers the efficiency of the system.

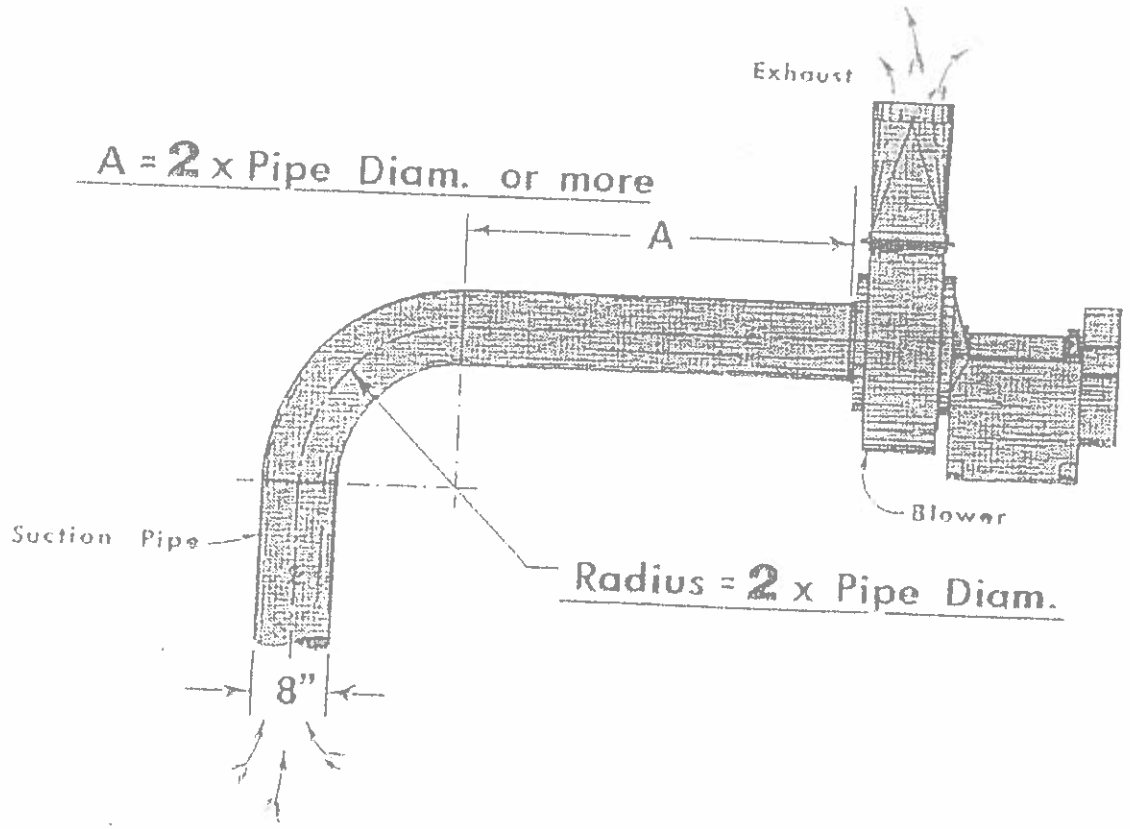
All ells should have a center line radius of two times pipe diameter, if possible, and not less than one and one half. Also when an ell is used at the inlet of a blower, a straight section of two diameters or more should be used between, if possible. (see A below)

The diameter of the pipe must not be less than the fittings on blower and machine and should be at least 20 gauge, if lighter each section must be banded to prevent collapsing on the suction side.

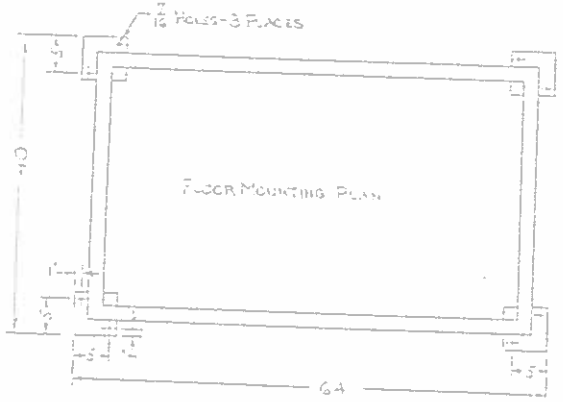
Keeping piping as short as possible, preferably a combined inlet and outlet total of not more than twenty feet.

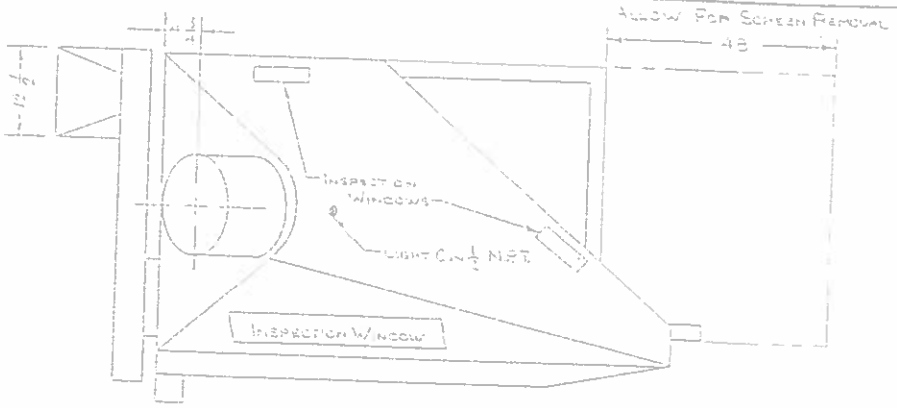
When using a cyclone, it must be a size recommended by the manufacturer which will accept the maximum CFM of the blower with not more than 2" of pressure drop.

Each machine must have an individual blower as it is difficult to maintain uniform vacuum with a central supply system.



Example: 8" Pipe Diam. Radius = 16"
A = 16" or more

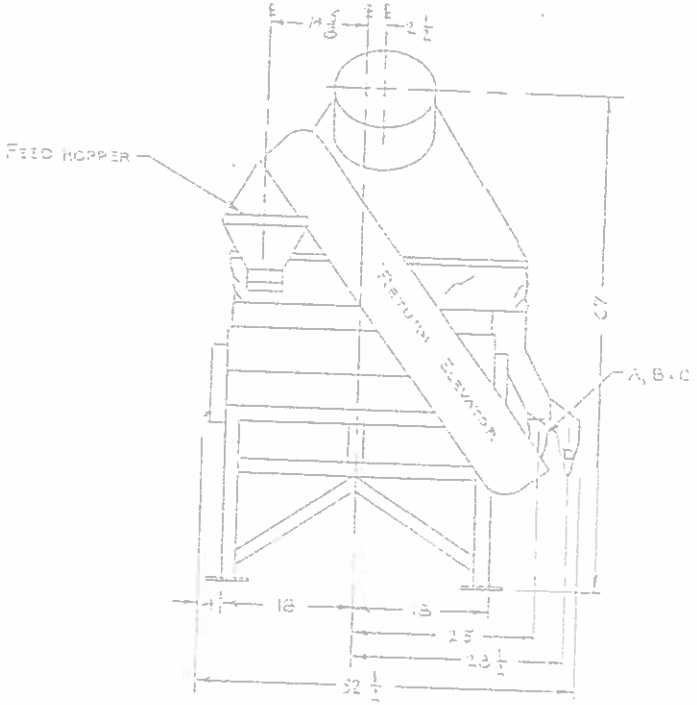




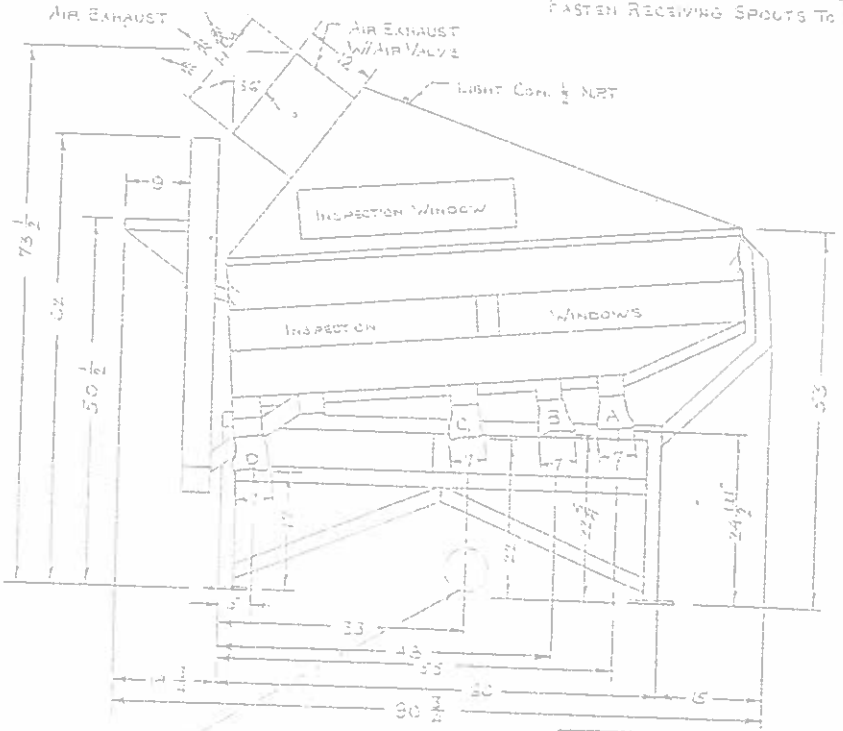
TOP VIEW

A-HEAVY MATERIALS OUTLET
B&C-PRODUCT OUTLET
C-CULL DISCHARGE

NOTE: DISCHARGE SPOUTS COLLAPSE TO DIMENSION SHOWN FOR PURPOSE OF AIR LOCKS. DO NOT FASTEN RECEIVING SPOUTS TO MACHINE.



REAR VIEW



DELIVERY SIDE VIEW

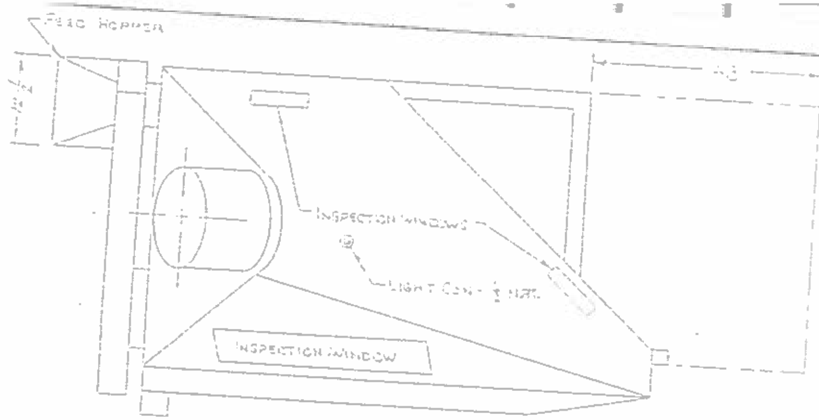
PROVIDE FLEXIBLE CONNECTION FOR 1" I.P.S. BOOT PIPE FLOOR

Forsberg's Inc.
Thief River Falls, Minn.

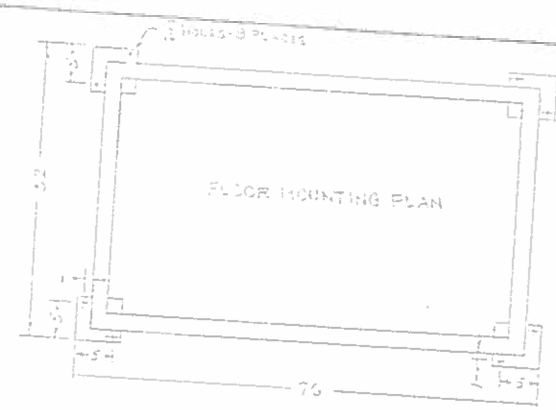
INSTALLATION: 40-V GRAVITY OPEN FRAME

A-295


FORSBERG

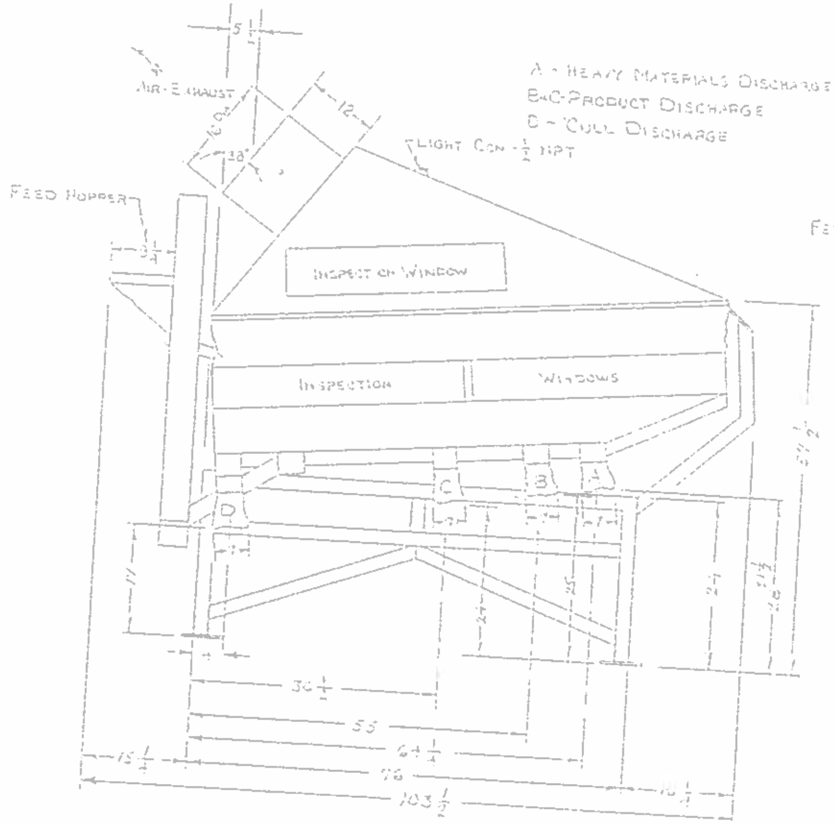


TOP VIEW

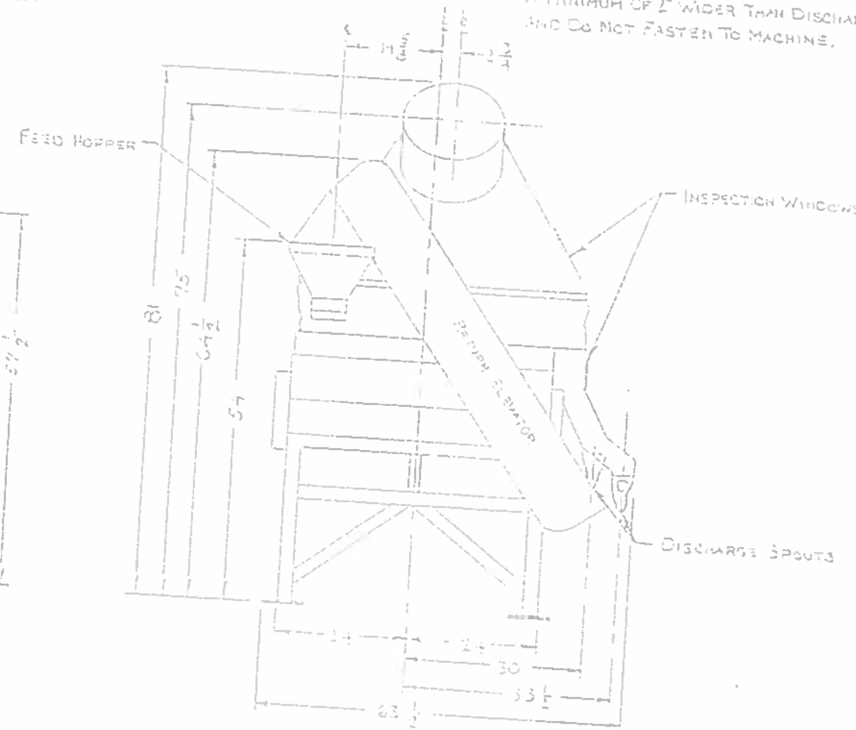


NOTE: Discharge Spouts Collapse To Dimension Shown For Purpose Of Air Locks. Make Receiving Spouts A Minimum Of 2" Wider Than Discharge Spouts And Do Not Fasten To Machine.

A - Heavy Materials Discharge
B - By-Product Discharge
C - Cull Discharge



DELIVERY SIDE



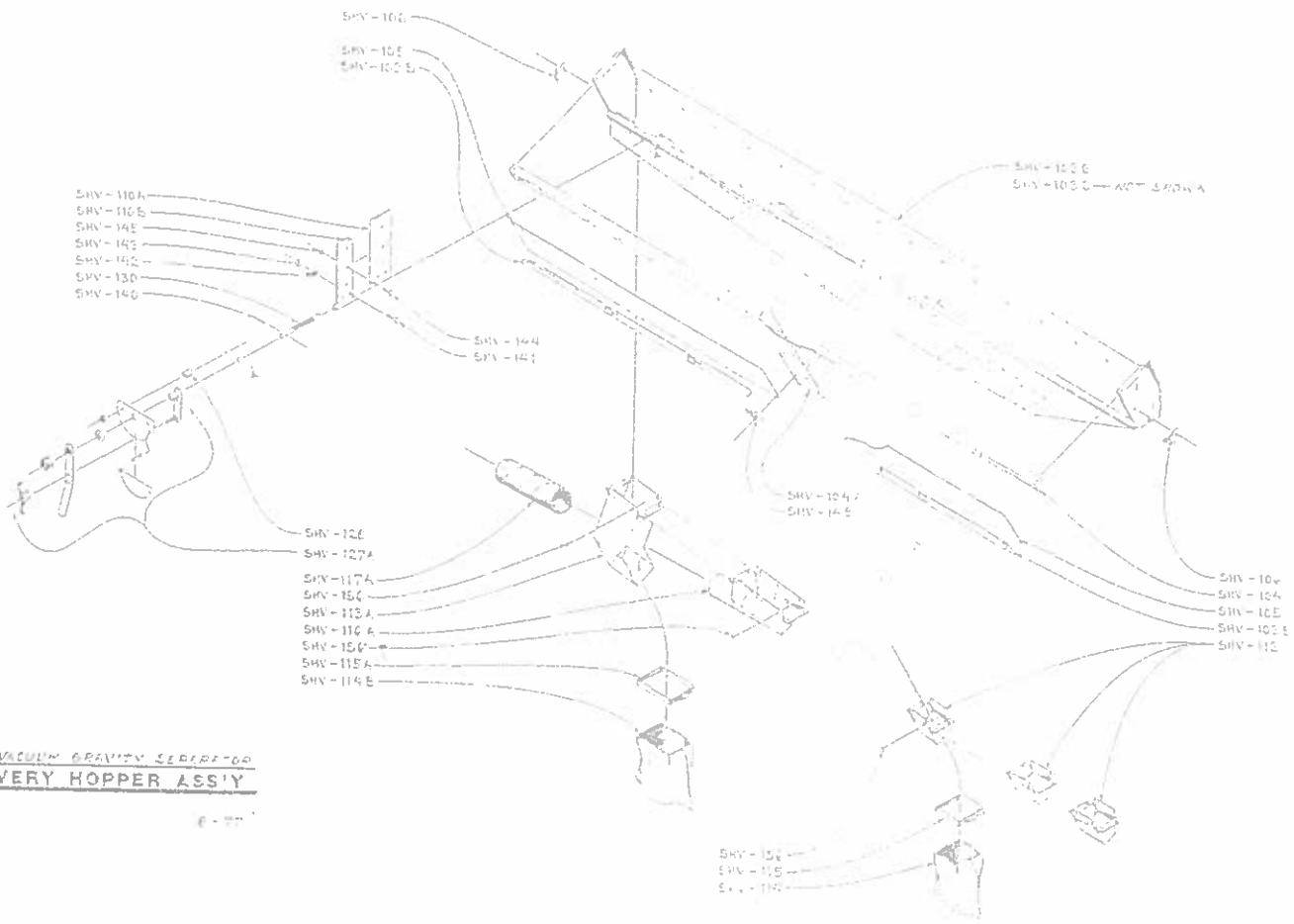
REAR VIEW

Forsberg's Inc.
Thief River Falls, Minn.

NTS

Enlarge Glass Hood
Added Spout B

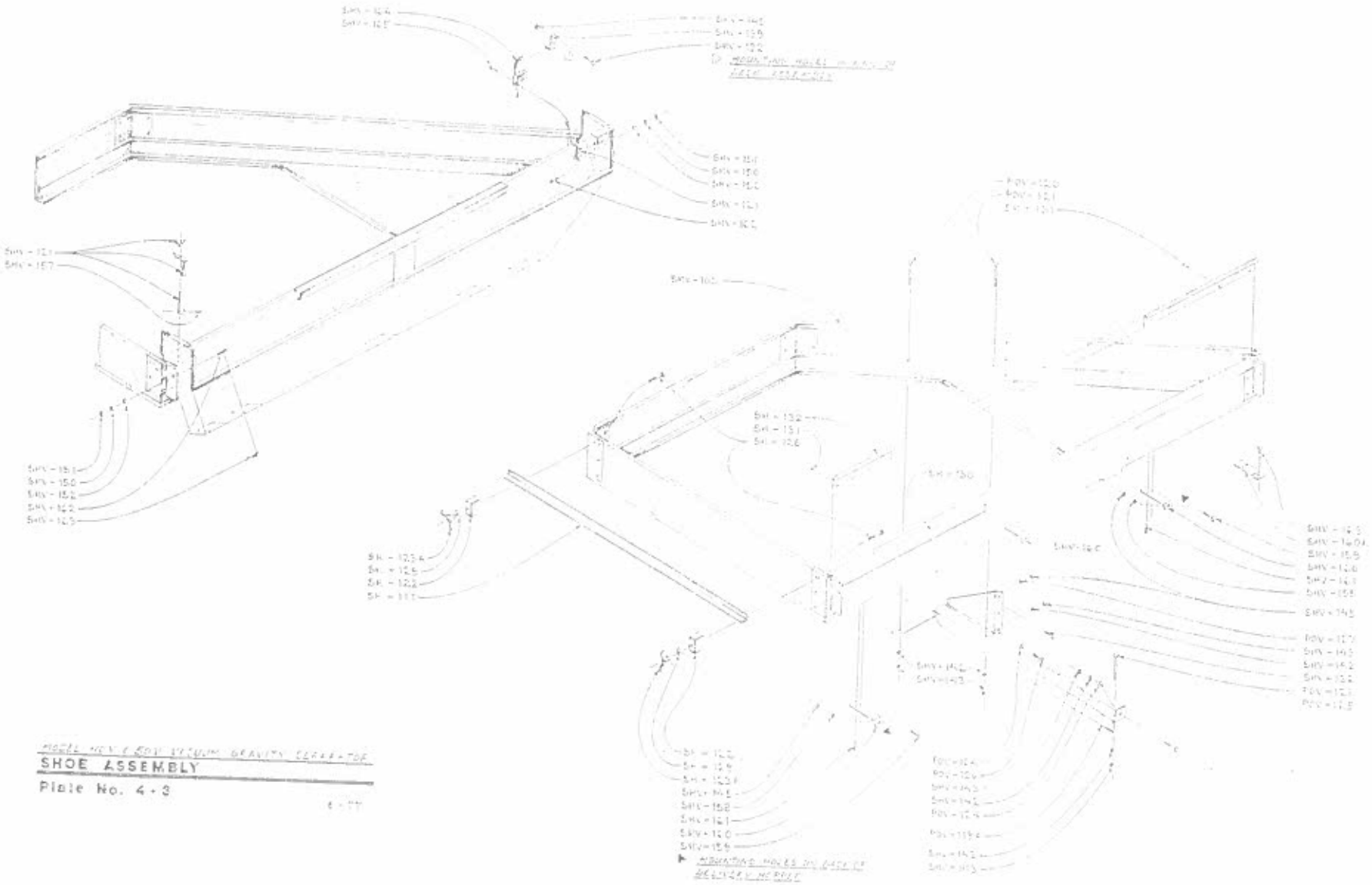
Open Frame 50-V Gravity



MODEL SCWL 32 V VACUUM GRAVITY SEEDER-GR

PEANUT DELIVERY HOPPER ASS'Y

Plate No. 4-2



MODEL NO. E 800 STATIUM GRAVITY CLEAVAGE TOE

SHOE ASSEMBLY

Plate No. 4-3

4-77

MODEL 40-V AND 50-V VACUUM GRAVITY SEPARATOR

SHOE ASSEMBLY

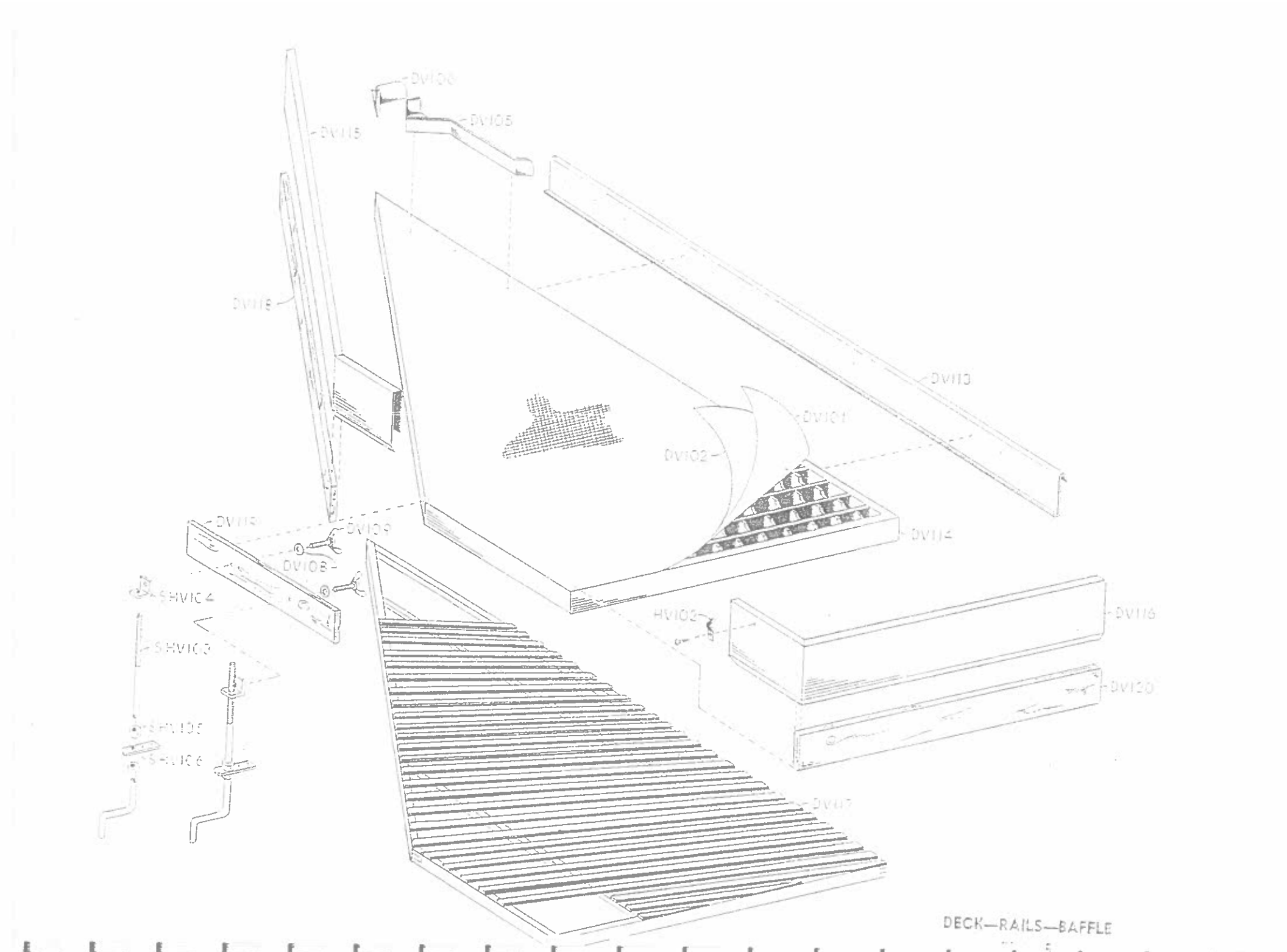
Plate 4-3
Parts List

Part No.	Description
SHV 100	Shoe
SHV 121	Deck Clamp, Complete
SHV 132	Bolt
SHV 139	Deck Holddown Bracket
SHV 142	Lock Washer
SHV 143	Nut
*SHV 145	Nut
SHV 150	Lock Washer
SHV 151	Nut
SHV 152	Washer
SHV 157	Screw
*SHV 158	Lock Washer
SHV 159	Bolt
SHV 160	Shoe - Hopper Bracket
SHV 160A	Shoe - Metal Hopper Bracket
SHV 161	Screw
SHV 162	Bolt
*SHV 163	Bolt
SHV 164	Deck Holddown Toggle
SHV 165	Bolt
SH 111	Deck Clamp Iron
SH 122	Deck Clamp
SH 123A	Wing Nut
SH 128	Bolt
SH 129	Washer
SH 130	Metal Hopper Support Board
SH 131	Nail
SH 132	Metal Edge Strip
POV 119A	Shoe Bracket - 50-V ONLY
POV 120	Bolt
POV 121	Bolt
POV 124	Washer
POV 125	Bolt
POV 126	Bolt
POV 127	Lock Washer

*Used when Metal Hopper is attached to Shoe.

SERIAL NUMBER OF MACHINE MUST BE STATED WHEN ORDERING PARTS

Forsbergs, Inc.
Thief River Falls, Minnesota 56701
Phone No.: 218 - 681-1927



DECK—RAILS—BAFFLE

PARTS LIST

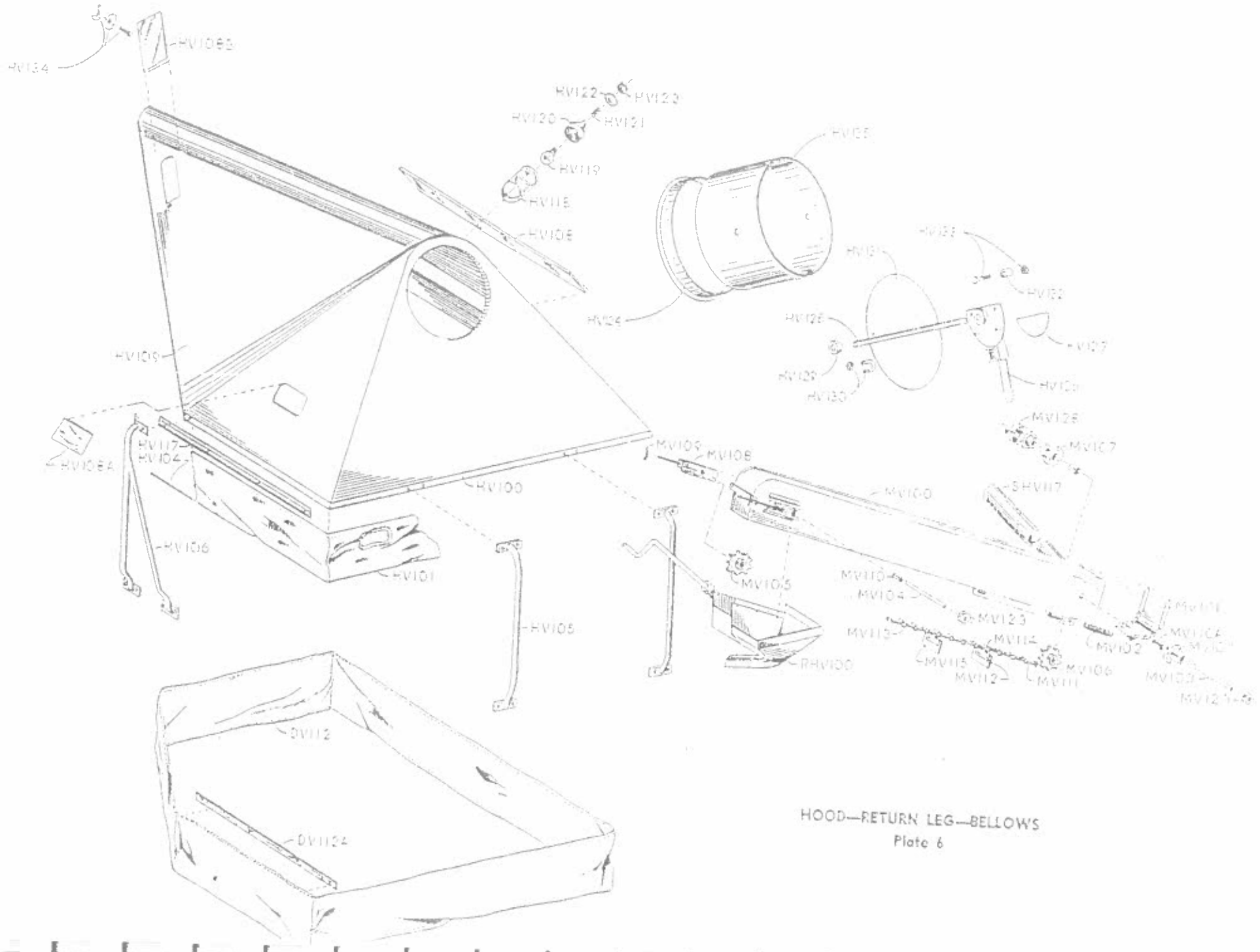
MODEL 40-V & 50-V VACUUM GRAVITY SEPARATORS

PART NO.	DESCRIPTION
*DV 100	Cloth Seed Deck (Legumes, etc.)
*DV 100-A	Steel Wire Small Grain Deck (Wheat, Oats, Barley, etc.)
*DV 100-A-1	Rubber Wire Small Grain Deck (Wheat, Oats, Barley, etc.)
*DV 100-B	Fine Steel Wire Deck (Wheat Germ, Wild Rice, etc.)
*DV 100-C	Steel Wire and Overlay Coarse Grain Deck (Corn, Beans, Peas)
DV 100-D	Rubber Wire Coarse Grain Deck (Beans, Peas, etc.)
DV 101	Steel Wire Small Grain Deck Cover (Wheat, Oats, Barley, etc.)
**DV 101-1	Rubber Wire Small Grain Deck Cover (Wheat, Oats, Barley, etc.)
**DV 101-2	Fine Steel Wire Deck Cover (Corn, Beans, Peas, etc.)
DV 102	Steel Wire Overlay for Coarse Grains (Wheat Germ, Wild Rice)
**DV 103-1	Cloth Seed Deck Covering (Legumes, etc.)
**DV 104	Rubber Wire Coarse Grain Deck Cover (Beans, Peas, etc.)
DV 105	Dam Iron
DV 106	Point Plate
DV 108	Washer
DV 109	Wing Nut
DV 113	Deck Rail
DV 114	Deck Frame
DV 115	Side Rail
DV 116	Rear Rail
DV 117	Baffle
DV 118	Rail Liner (Angle)
DV 119	Rail Liner (Side)
DV 120	Rail Liner (Rear)
HV 102	Spring Clip
SH 103	Elevating Crank
SH 104	Bracket
SH 105	Collar
SH 106	Bracket

SERIAL NUMBER OF MACHINE MUST BE INCLUDED WHEN ORDERING PARTS

* - Deck of each individual type covering not pictured.

** - Different type deck coverings not pictured.



HOOD—RETURN LEG—BELLOWS
Plate 6

PARTS LIST

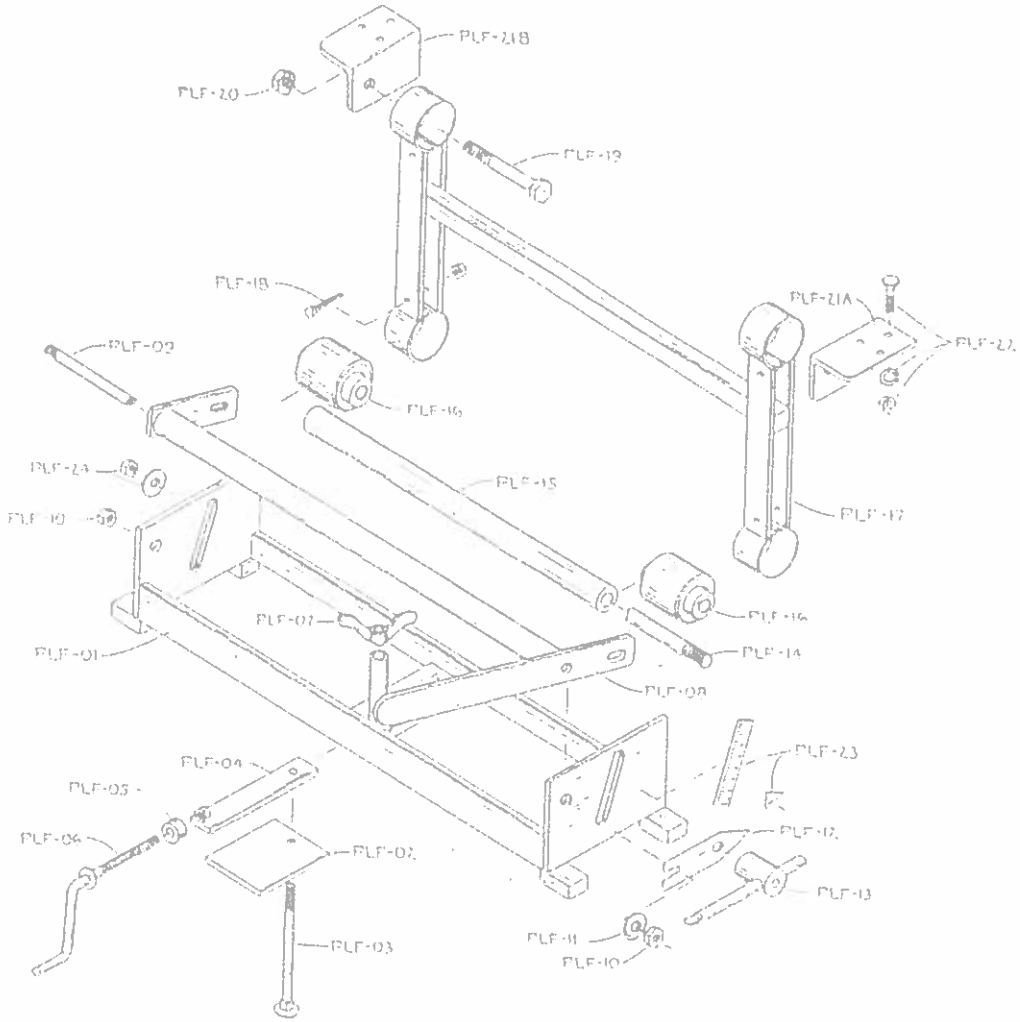
MODEL 40-V & 50-V VACUUM GRAVITY SEPARATORS

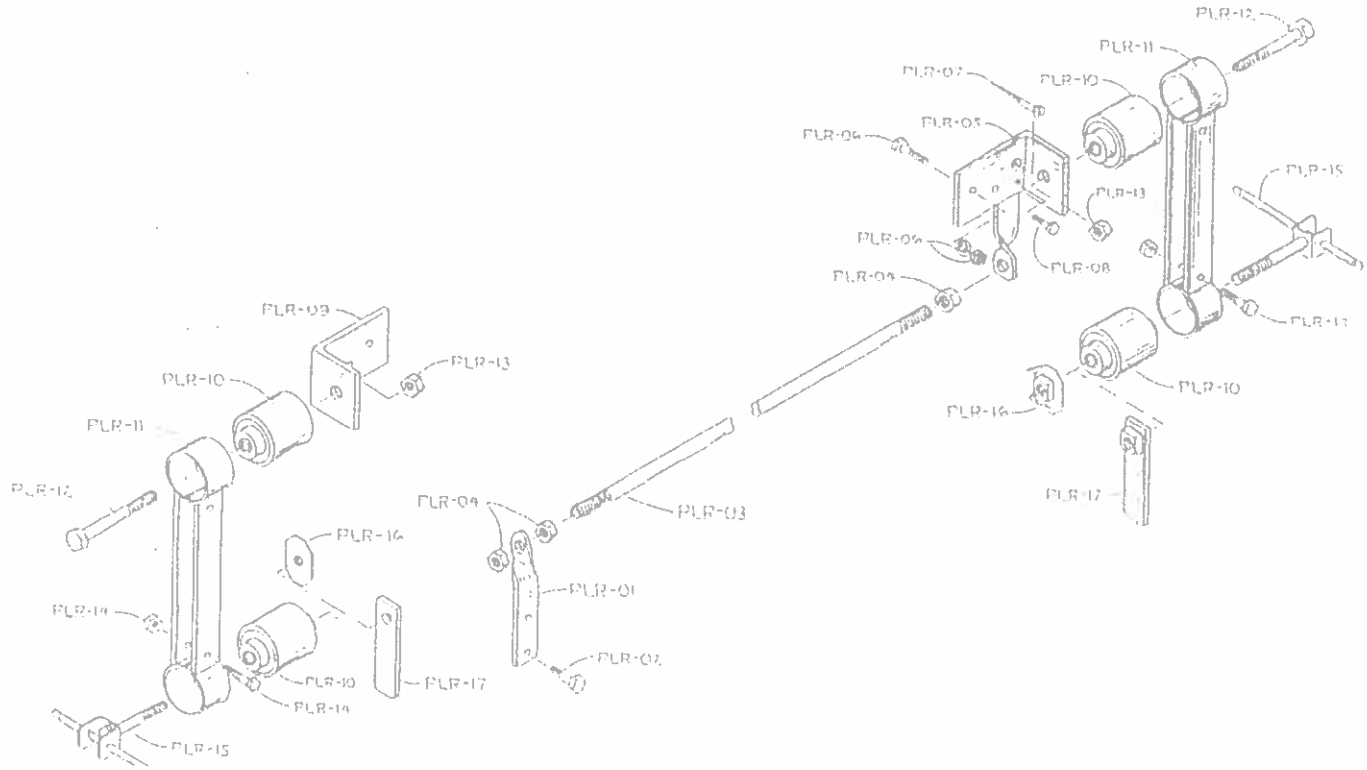
PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
HV 100	Hood, Fiberglass	HV 100-A	Return Leg Assembly
HV 101	Bellows (upper)	HV 100	Return Leg
HV 104	Bellows Rods	HV 101	Cap
HV 105	Hood Bracket (rear)	HV 102	Spring
HV 106	Hood Bracket (side)	HV 103	Shaft (lower)
HV 107**	Hood Bracket (front)	HV 104	Shaft (upper)
HV 108	Window	HV 105	Sprocket (upper)
HV 108-A	Window	HV 106	Sprocket (lower)
HV 108-B	Window	HV 107	Bearing (lower)
HV 117	Bellows Holding	HV 108	Bearing (upper)
HV 118	Plastic Globe	HV 109	Ring Nut
HV 119	Light Bulb	HV 110	Bushing (upper)
HV 120	Receptacle	HV 110-A	Bushing (lower)
HV 121	Nipple	HV 111	Chain Complete
HV 122	Washer	HV 112	Flight Plate
HV 123	Nut	HV 113	Chain Link
HV 124	Ring	HV 114	Attachment Link
HV 125	Valve Housing	HV 115	Rubber Flight
HV 126	Quadrant	HV 127	Collar
HV 127	Decal	HV 128	Flexible Coupling
HV 128	Shaft		
HV 129	Collar	SBV 117	Rubber Tube
HV 130	Clamp		
HV 131	Damper	RHV 100	Hopper
HV 132	Spacer		
HV 133	Bolt & Nut	DV 112	Lower Bellow
HV 134	Fasteners	DV 112-A	Bellow Sticks

** Part not pictured.

Serial Number must be included when ordering parts.

FORSBERGS, INC.
Thief River Falls, MN 56701


PLF-21B
PLF-20
PLF-19
PLF-18
PLF-21A
PLF-22
PLF-02
PLF-16
PLF-24
PLF-15
PLF-10
PLF-17
PLF-07
PLF-16
PLF-01
PLF-14
PLF-08
PLF-23
PLF-04
PLF-05
PLF-12
PLF-06
PLF-02
PLF-13
PLF-03
PLF-11
PLF-10


PLR-12
PLR-11
PLR-07
PLR-10
PLR-05
PLR-06
PLR-15
PLR-13
PLR-08
PLR-09
PLR-08
PLR-14
PLR-10
PLR-13
PLR-10
PLR-11
PLR-16
PLR-12
PLR-17
PLR-04
PLR-03
PLR-16
PLR-01
PLR-14
PLR-10
PLR-17
PLR-14
PLR-02
PLR-15

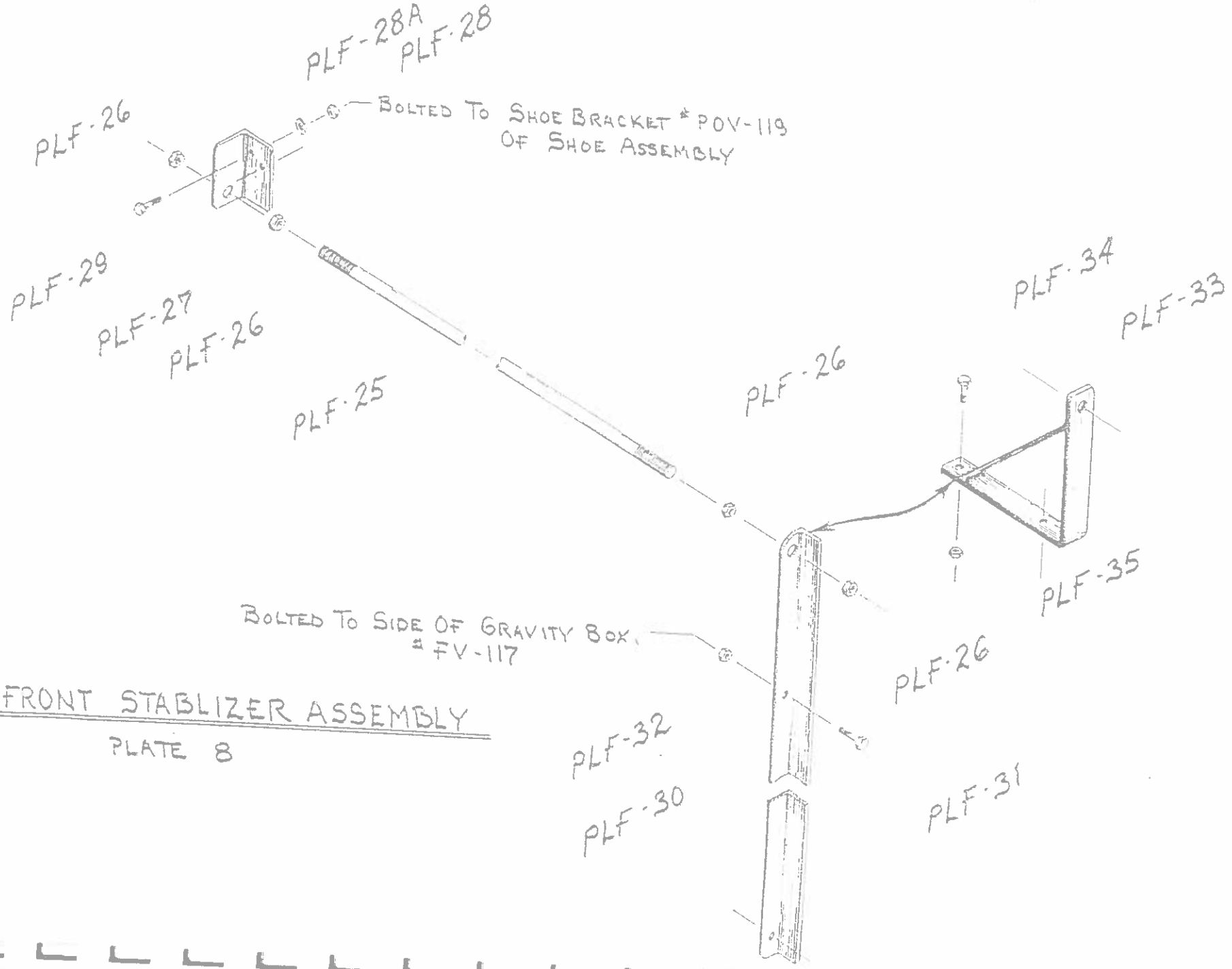
PARTS LIST

MODEL 40-V & 50-V VACUUM GRAVITY SEPARATORS

PART NO.	DESCRIPTION
PLF 100	Front Post, complete
PLF 01	Base
PLF 02	Plate
PLF 03	Bolt
PLF 04	Plate
PLF 05	Collar
PLF 06	Crank
PLF 07	Wing Nut
PLF 08	Control
PLF 09	3/8" Rod
PLF 10	Nut
PLF 11	5/16" Washer
PLF 12	Indicator
PLF 13	Lock
PLF 14	7/16" Rod
PLF 15	Spacer
PLF 16	Bushing (4 required)
PLF 17	Link
PLF 18	Bolt with Nut (4 required)
PLF 19	Bolt (2 required)
PLF 20	Nut (2 required)
PLF 21-A	Angle (right)
PLF 21-B	Angle (left)
PLF 22	Bolt, Washer and Nut
PLF 23	Decals (set - 4 pieces)
PLF 24	Washer and Nut
PLF 25	Front Stabilizer Bar
PLR 100	Rear Post Unit, complete
PLR 01	Plate
PLR 02	Bolt (2 required)
PLR 03	Rod
PLR 04	Nut (4 required)
PLR 05	Bracket (right)
PLR 06	Bolt, Washer and Nut (4 required)
PLR 07	Wood Screw (2 required)
PLR 08	Screw (2 required)
PLR 09	Bracket (left)
PLR 10	Bushing (4 required)
PLR 11	Link (2 required)
PLR 12	Bolt (2 required)
PLR 13	Nut (2 required)
PLR 14	Bolt with Nut (4 required)
PLR 15	Bolt (2 required)
PLR 16	Nut (2 required)
PLR 17	Nut (for open frame; 2 required)

Serial Number of machine must be included when ordering parts.

FORSBERGS, INC.
Thief River Falls, MN 56701



FRONT STABLIZER ASSEMBLY

PLATE 8

PARTS LIST

MODEL 40-V & 50-V VACUUM GRAVITY SEPARATORS

FRONT STABILIZER ASSEMBLY

PART NO.	DESCRIPTION
PLF 25	Stabilizer Bar
PLF 25-C	Stabilizer Assembly, complete
PLF 26	Nut
PLF 27	Bracket - Shoe
PLF 28	Nut
PLF 28-A	Washer
PLF 29	Bolt
PLF 30	Bracket - Box
PLF 31	Bolt
PLF 32	Nut
PLF 33*	L - Bracket - Box
PLF 34	Bolt
PLF 35	Nut

*Used in place of PLF 30.

Serial Number of machine must be included when ordering parts.

FORSBERGS, INC.
Thief River Falls, MN 56701

DAMAGE CLAIMS AND WARRANTY

A. DAMAGE CLAIMS

1. Thoroughly examine the enclosure as soon as it is received. If damaged, write on the face of the freight bill a complete and detailed description of the damage. Have the carrier's agent sign the description.

2. Immediately notify the delivering carrier of the damage or loss. This notification may be given either in person or by telephone. Written confirmation must be mailed within 48 hours. Railroads and motor carriers are understandably reluctant to make adjustments for damaged merchandise unless inspected and reported promptly.

3. Risk of loss of, or damage to merchandise remains with the buyer. It is the buyer's responsibility to file a claim with the carrier involved.

4. Immediately advise your FORSBERG representative, distributor, or the factory so that we may assist you.

B. WARRANTY AND CONDITIONS

1. WARRANTY: We warrant that this product will be free from defects in material and workmanship for a period of one year from the date of shipment thereof or the product's total rated life, whichever first occurs. Within the warranty period we shall repair or replace such products which are returned to us with shipping charges prepaid and which are determined by us to be defective. This warranty will not apply to any product which has been subjected to misuse, negligence, or accident; or misapplied or modified or repaired by unauthorized persons; or improperly installed.

2. INSPECTION: Buyer shall inspect the product promptly after receipt and shall notify us at our office in writing of any claims, including claims of breach of warranty, within thirty days after the buyer discovers or should have discovered the facts upon which the claim is based. Failure of the buyer to give written notice of a claim within the time period shall be deemed to be a waiver of such claim.

3. DISCLAIMER: The provisions of paragraph 1 are our sole obligation and exclude all other remedies or warranties, expressed or implied, including warranties of MERCHANTABILITY and FITNESS FOR A PURPOSE, whether or not purposes or specifications are described herein. We further disclaim any responsibility whatsoever to the customer or to any person for injury to person or damage to or loss of property or value caused by any product which has been subjected to misuse, negligence, or accident; or misapplied; or modified or repaired by unauthorized persons; or improperly installed.

4. LIMITATION OF LIABILITY: Under no circumstances shall the company be liable for any incidental, consequential or special damages, losses, of expenses, arising from the contract for this product, or in connection with the use of, or inability to use, our product for any purpose whatsoever.

FORSBERGS, INC.
P.O. BOX 510
THIEF RIVER FALLS, MN 56701