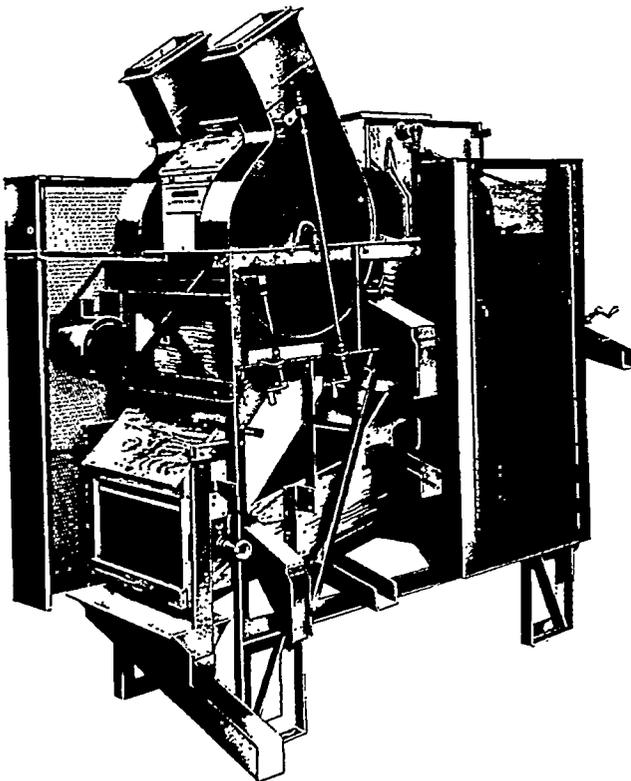


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### Crippen Tree Seed Cleaner/Sizer

The Crippen cleaner is a small-capacity cleaner designed for forest tree seed. It uses four screens with a final air (terminal velocity) cleaning to cull out immature and unfilled seeds. Mobile brushes underneath clear the screens of blockage. Seeds and the heaviest liftings are visible in all separations. Air jets are adjustable.



#### Crippen Cleaner/Sizer:

Crippen Mfg. Co., Inc.  
700 W End St.  
Alma, MI 48801  
(517) 463-2119

### Clipper M-2BC

This is probably the most common air-screen cleaner for processing tree seed. It has two screens for sizing and scalping. Cleaning brushes under the screens prevent seed from lodging in the screens.



#### Clipper M-2BC:

Seedburo Equipment Co.  
1022 W Jackson Blvd.  
Chicago, IL 60607-2990  
(312) 738-3700

<b>Air Screen and Screen Separators:</b>			
Adasco, Inc. P.O. Box 58 Mound, MN 55364 (612) 472-6422	Damas Vester Aaby Industrivej 2 DK-5600 Fouborg Danmark	International Forest Seed Co. P.O. Box 490 Blair Farm Rd. Odenville, AL 35120 (205) 629-5726	Prater Industries., Inc. 1515 S 55th Court Chicago, IL 60650 (312) 656-8500
Ag-Machinery & Safety, Inc. (AMOS) P.O. Box 5613 Lafayette, IN 47903 (317) 447-5073	Forsberg, Inc. P.O. Box 510 Thief River Falls, MN 56701 (218) 681-1927	Koppers, Inc. Sprout-Waldron Div. Muncy, PA 17756 (717) 546-8211	Prosem Rt. 4 Howick, Quebec Canada JOS 1G0
Blount Industrial Products 805 S Decker Dr. Bluffton, IN 46714 (219) 824-3400	Gustafson, Inc. 1400 Preston Rd., Suite 400 Plano, TX 75075-5112 (214) 985-8877	Lightfoot, Inc. 1526 Marlin Rd. Bloomer, WI 52724 (715) 568-2333	Rebel Industries, Inc. 5700 W Broading Crystal, MN 55428 (800) 328-8348
Buhler-Miag, Inc. 1100 Xenium Ln. Minneapolis, MN 55441 (612) 545-1401	Hance Corp. 235 E Broadway Westerville, OH 43081 (614) 882-7400	MAGIK Corp. P.O. Box 467 Harlan, IA 51537 (712) 755-5016	Satake (U.S.A.), Inc. 11999 Katy Freeway Suite 505 Houston, TX 77079 (713) 493-6828
Carter-Day Co. 500-73rd Ave. NE Minneapolis, MN 55432 (612) 571-1000	Harlan Contracting Co. 1101 Chatburn Ave. Harlan, IA 51537 (712) 755-5016	Mater International, Inc. 101 SW Western Blvd. Corvallis, OR 97333 (503) 753-7335	Seedbuco Equipment Co. 1022 W Jackson Blvd. Chicago, IL 60607 (312) 738-3700
Corn States Hybrid Serv., Inc. P.O. Box 2706 2505 McKinley Ave. Des Moines, IA 50325 (575) 285-3091	Henry Simon, Inc. 2955 Fairfax Trafficway Kansas City, KS 66115 (913) 621 6466	McLoughlin Ward and Co. 409 South 23rd St. Jackson, MI 49203 (517) 787-5030	Southpine, Inc. P.O. Box 53017 Birmingham, AL 35253 (205) 879-1099
Corn States Metal Fabricators P.O. Box 65635 1323 Maple St. Des Moines, IA 50265 (515) 225-7961	Hoffman Mfg. Co. 325 11th Ave. SE Albany, OR 97321 (503) 926-2920	Nasco 901 Janesville Ave. Ft. Atkinson, WI 58538 (414) 563-2446	Snow Corp. P.O. Box 12067 4350 McKinley St. Omaha, NE 68112 (402) 453-2200
Crippen Mfg. Co. 700 W End St. Alma, MN 48801 (517) 463-2119	S. Howes Co., Inc. 1974 Miller St. Silver Creek, NY 14136 (716) 934-2611	Oliver Mfg. Co., Inc. P.O. Box 512 Rocky Ford, CO 81067 (303) 254-6371	Triple/S Dynamics 1031 S Haskell Ave. Dallas, TX 75223 (214) 828-8600
	Huntley Mfg. Co. 6069 Peerless St. Brocton, NY 14716 (716) 792-9134	Pearson Industries, Inc. P.O. Box Z, U.S. Rte. 34 E Galva, IL 61434 (309) 932-8171	

## Air (Terminal Velocity) Separators

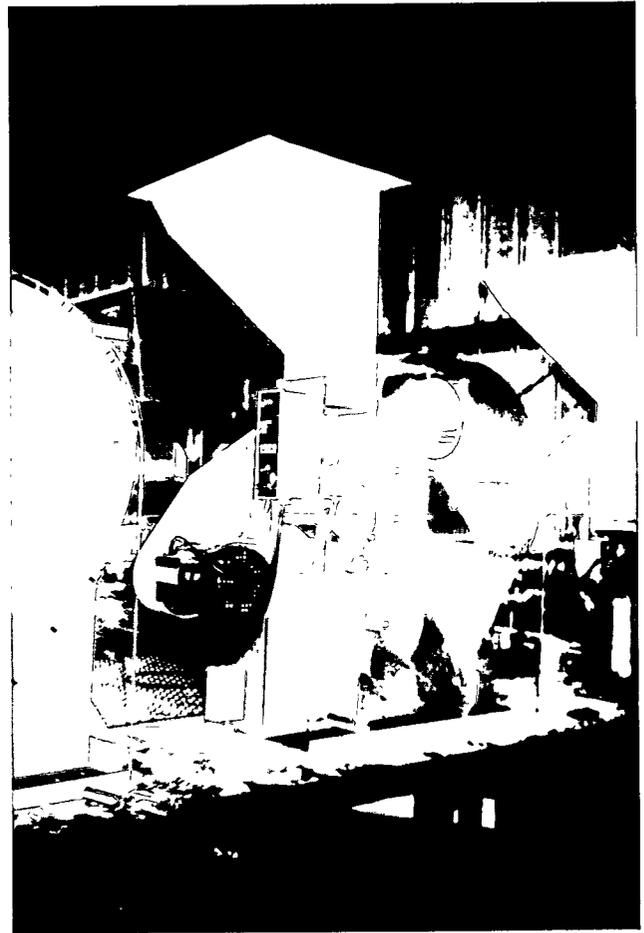
Air separation is used in separating seeds from other debris and removing empty seeds. It is a popular method, often used alone or in combination with air-screen and gravity separation. Air separators depend on the principle of terminal velocity, the air velocity needed to suspend a particle in a rising air current. The terminal velocity of a particle is determined by its specific gravity, shape, and surface texture. When the velocity of air in a column is adjusted to a certain level and material enters the air column, the material with a terminal velocity less than the air column velocity will be lifted, while the material with greater terminal velocity than the air column will drop.

When seeds are of the same shape and volume but differ in specific gravity, air can separate the light from the heavy seed. Also, if the seeds are of the same specific gravity but different in shape, they may also be separated by this process.

The difference between aspirators and pneumatic separators is that the fan is located at the discharge with aspirators and at the intake with pneumatic separators. Airstream volume and velocity are regulated by the speed of fans and size of the entrance or exit.

## Southpine Seed Aspirator

Southpine offers a closed-system aspirator that separates viable from non-viable seed. The readings for the aspiration controller can be saved to use if the same batch of seeds is run again.



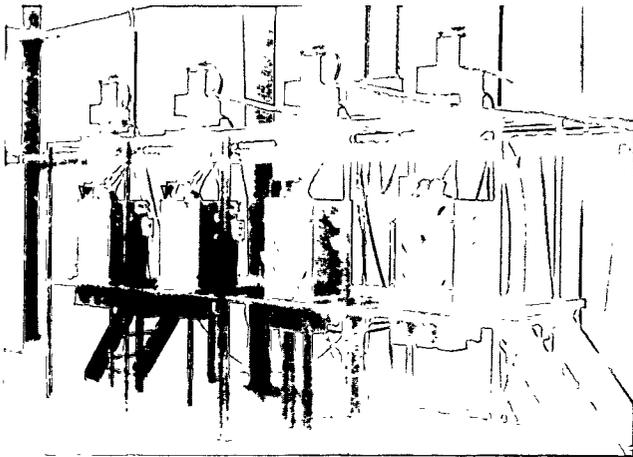
### Southpine Seed Aspirator:

Southpine, Inc.  
P.O. Box 530127  
Birmingham, AL 35253  
(205) 879-1099

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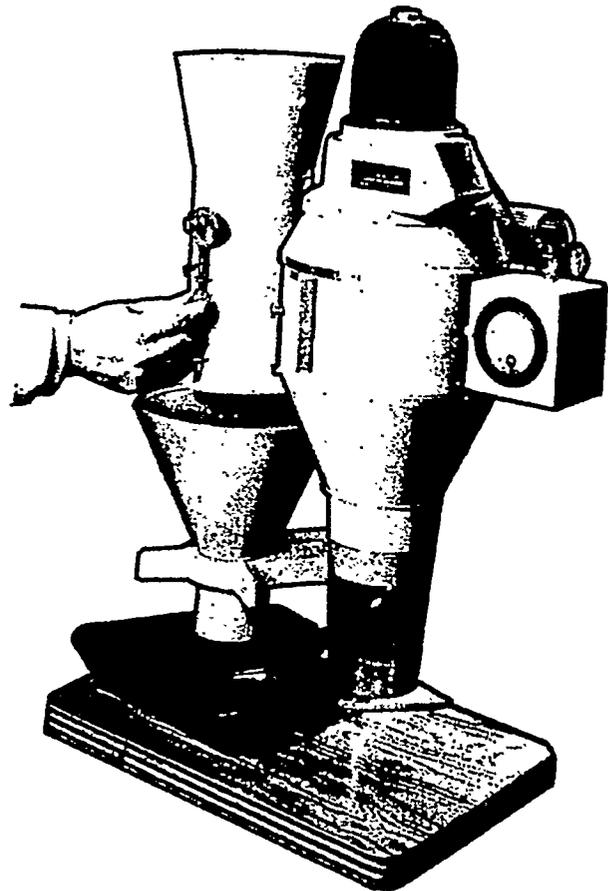
## International Forest Seed Aspirator

This is a closed-system aspirator that separates undewinged and empty seeds from viable seeds.



## Bates Laboratory Aspirator

This is a small laboratory aspirator designed for separating small samples of seed. It is available with a rheostat for variable fan speed, a necessity for use in processing tree seed.



**International Forest Seed  
Aspirator:**

International Forest Seed Co.  
P.O. Box 490  
Blair Farm Rd.  
Odenville, AL 35120  
(205) 629-5726

**Bates Aspirator:**

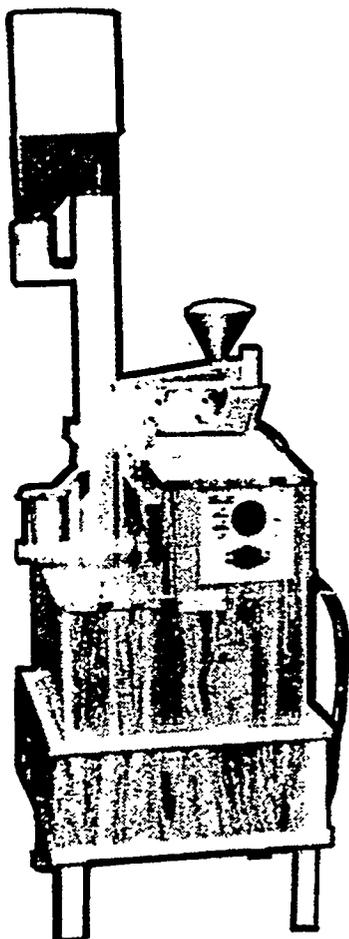
Seedbro Equipment Co.  
1022 W Jackson Blvd.  
Chicago, IL 60607-2990  
(312) 738-3700

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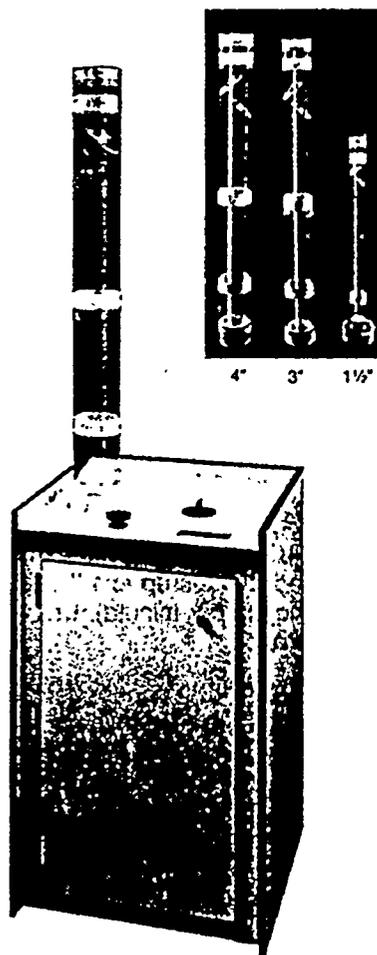
### Continuous Seed Blower (MAT-OSU Continuous Seed Separator)

This is a continuous feed pneumatic separator with vibratory feeder and controls for regulating airflow and feed rate. Capacity is rated at 16 to 140 pounds per hour depending on seed weight.



### South Dakota Seed Blower

The blower is a pneumatic separator of laboratory size. This model can be equipped with a 1- and 1/2-inch, 3-inch, or 4-inch diameter column. This separator is a batch type rather than a continuous flow separator. It is useful for very small tree improvement seed lots.



#### Continuous Seed Blower:

Mater International, Inc.  
101 SW Western Blvd.  
Corvallis, OR 97333  
(503) 753-7335

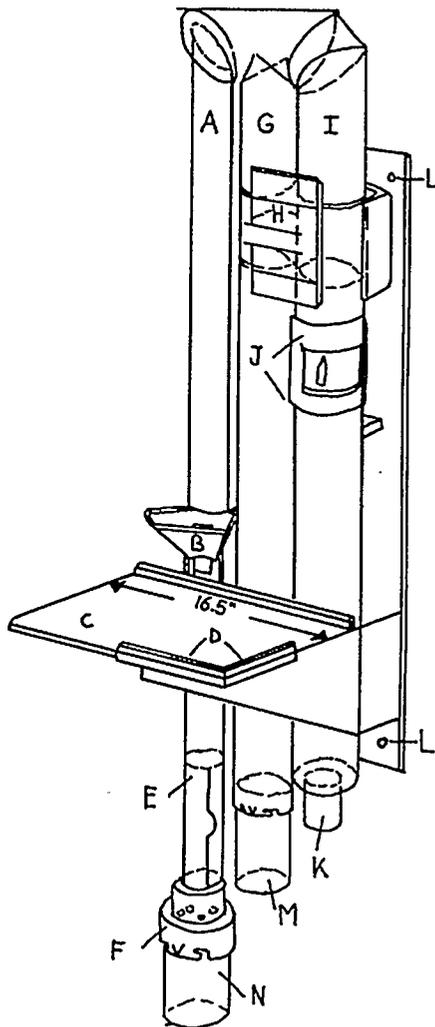
Seedburo Equipment Co.  
1022 W Jackson Blvd.  
Chicago, IL 60607-2990  
(312) 738-3700

#### South Dakota Seed Blower:

Seedburo Equipment Co.  
1022 W Jackson Blvd.  
Chicago, IL 60607-2990  
(312) 738-3700

## Barnes Tree Seed Separator

This pneumatic separator works on tree seed of all sizes and is sensitive enough to provide sizing as well as basic cleaning. It can be used as a continuous-feed machine or on a "batch" basis.



### Barnes Tree Seed Separator:

Tree Improvement Enterprises  
P.O. Box 630  
1119- 1/2 S 4th St.  
Cottage Grove, OR 97424  
(503) 942-4066

### Air Separators:

Ag-Machinery & Safety, Inc.  
P.O. Box 5613  
Lafayette, IN 47903  
(317) 447-5073

American International Mfg. Co.  
1230 Fortna Ave.  
Woodland, CA 95695  
(916) 666-2446

Barnes Tree Improvement Co.,  
P.O. Box 630  
1210 Vincent Pl.  
Cottage Grove, OR 97424  
(503) 942-4066

Buhler-Miag, Inc.  
1100 Xenium Ln.  
Minneapolis, MN 55441  
(612) 545-1401

Carter-Day Co.  
500 73rd Ave., NE  
Minneapolis, MN 55432  
(612) 571-1000

Corn States Metal Fabricators  
P.O. Box 65635  
1323 Maple St.  
Des Moines, IA 50265  
(515) 225-7961

Damas Industrivej 2  
Vester Aaby  
DK-5600 Faaborg  
Danmark

Forsbergs, Inc.  
P.O. Box 510  
Thief River Falls, MN 56701  
(218) 681-1927

Geosource, Inc.  
9800 Townpark Dr.  
Houston, TX 77036  
(713) 981-9185

Gustafson, Inc.  
1400 Preston Rd.  
Suite 400  
Plano, TX 75075-5112  
(214) 985-8877

Hendrickson Enterprises  
4050 NE Minnesota Ave.  
Corvallis, OR 97330  
(503) 754-7610

Hoffman Mfg. Co.  
325 11th Ave. SE  
Albany, OR 97321  
(503) 926-2920

S. Howes, Co., Inc.  
1974 Miller St.  
Silver Creek, NY 14136  
(716) 934-2611

International Forest Seed Co.  
P.O. Box 490  
Blair Farm Rd.  
Odenville, AL 35120  
(205) 629-5726

Koppers, Inc.  
Sprout-Waldron Div.  
Muncy, PA 17756  
(717) 546-8211

MAC Equipment, Inc.  
P.O. Box 205  
S Highway 75  
Sabetha, KS 66534  
(913) 284-2191

Mater International, Inc.  
101 SW Western Blvd.  
Corvallis, OR 97333  
(503) 753-7335

Prater Industries, Inc.  
1515 S 55th Court  
Chicago, IL 60650  
(312) 656-8500

Prosum  
Rt. 4  
Howick, Quebec  
Canada JOS 1G0

Satake (U.S.A.), Inc.  
11999 Katy Freeway  
Suite 505  
Houston, TX 77079  
(713) 493-6828

Scientific Separators, Inc.  
621 17th St., Suite 1515  
Denver, CO 80293  
(303) 623-6178

Seedbuo Equipment Co.  
1022 W Jackson Blvd.  
Chicago, IL 60607-2990  
(312) 738-3700

Southpine, Inc.  
P.O. Box 530217  
Birmingham, AL 35253  
(205) 879-1099

Stultz Scientific Engineering  
3313 S 6th  
Highway Frontage Rd. W  
Springfield, IL 62703  
(217) 529-3723

Tree Improvement Enterprises  
P.O. Box 630  
1119 1/2 S 4th St.  
Cottage Grove, OR 97424  
(503) 942-4066

Triple/S Dynamics  
1031 S Haskell Ave.  
Dallas, TX 75223  
(214) 828-8600

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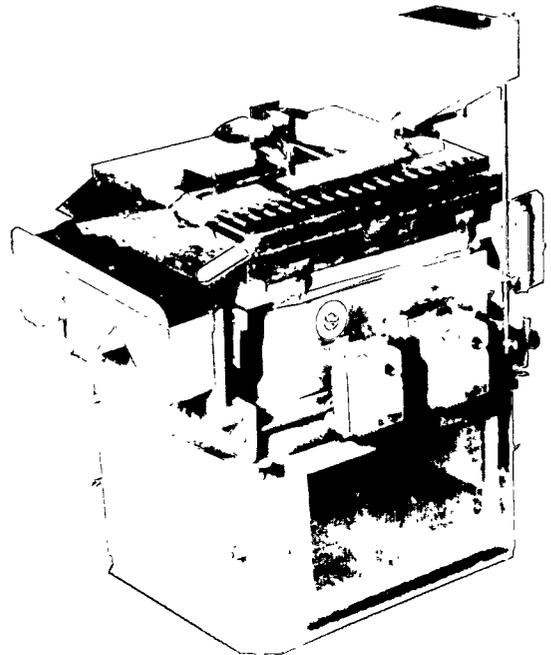
## Specific Gravity Separators

Gravity separators primarily are used to size seed and to separate filled seed from empty seed. They are also used as a final cleaning step. They are used to make separations based on either density, size, or shape.

The specific gravity of a seed is determined by its weight relative to its volume. Gravity separation can separate seeds from debris, seeds of the same size but different densities, and different-sized seeds of the same densities. However, it cannot separate seeds with a mixture of different sizes and densities. Gravity separation is used successfully to size tree seed of the same species. It also is an excellent tool for removing debris when the particles are of similar size or weight compared to the seed.

For separation, the seeds are fed onto a vibrating screen deck, where they are vertically stratified with air blowing through the deck. The light seeds or debris rise higher than the heavy seeds or debris. The oscillating motion of the deck "walks" the heavy material uphill. The air "floats" the light material downhill. Thus, the separation occurs, with the light material on the lower end of the deck, and the heavy material on the upper end of the deck.

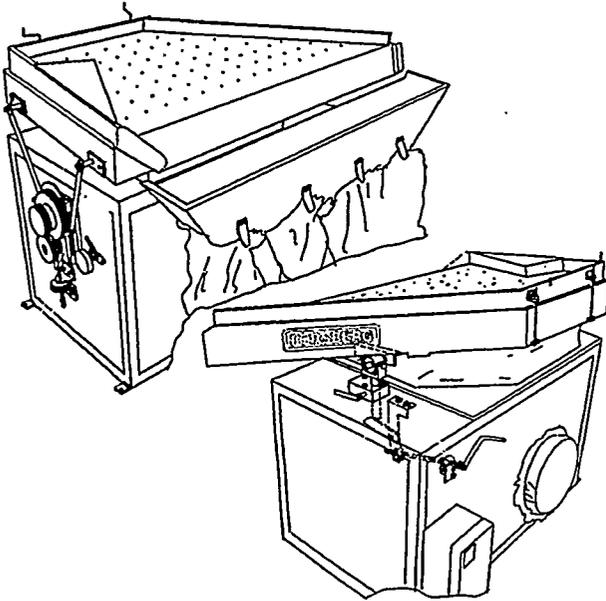
Decks are covered with porous material such as cloth, woven wire screen, or perforated sheet metal. The deck materials are chosen according to the mixture to be separated. To maintain a uniform bed of seed on the deck, a uniform rate of feed is necessary.



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## Reverse Separation Modification

A modification of the traditional gravity separator was developed at L.A. Moran Reforestation Center to do a reverse separation of seed. This modification essentially reverses the normal process and allows the heaviest seed to move downhill. The modification does not allow the gravity separator to do the normal tasks for which it was designed. It can only do reverse separations. Drawings of this modification are also available from the Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59801.



## McPherson Gravity Separator (With Reverse Separation)

With a modification such as the reverse separation modification, a gravity separator can do a separation that essentially reverses the normal process and the heaviest material moves downhill on the table. A.W. McPherson and Associates offers a gravity separator with a modification that can be used for both a normal gravity separator and reverse separations.

### Reverse Separation Modification:

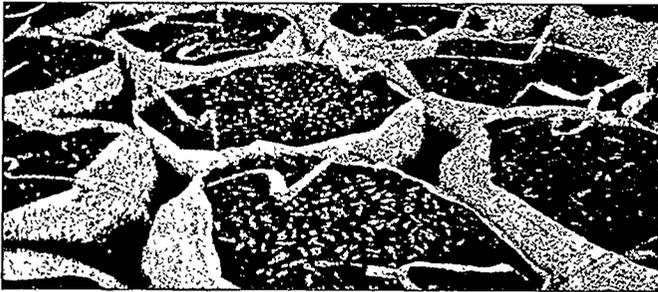
L.A. Moran Reforestation Center  
California Department of Forestry  
P.O. Box 1590  
5800 Chiles Rd.  
Davis, CA 95616  
(916) 322-2299

### McPherson Gravity Separator:

A.W. McPherson and Assoc., Inc.  
P.O. Box 5011  
1406 Howell Dr.  
Monroe, LA 71203  
(318) 343-5957

<p><b>Specific Gravity Separators:</b></p> <p><b>Blount Industrial Products</b> 805 S Decker Dr. Bluffton, IN 46714 (219) 824-3400</p> <p><b>Buhler-Miag, Inc.</b> 1100 Xenium Lane Minneapolis, MN 55441 (612) 545-1401</p> <p><b>W.C. Cantrell</b> P.O. Box 11216 3245 May (76110) Ft. Worth, TX 76109 (817) 923-7382</p> <p><b>Carter-Day Co.</b> 500 73rd Ave. NE Minneapolis, MN 55432 (612) 571-1000</p>	<p><b>Equipment Specialists, Inc.</b> P.O. Box 392 Rt. 48 W Taylorville, IL 62568 (217) 287-7227</p> <p><b>Forsbergs, Inc.</b> P.O. Box 510 Thief River Falls, MN 56701 (218) 681-1927</p> <p><b>Gustafson, Inc.</b> 1400 Preston Rd. Suite 400 Plano, TX 75075-5112 (214) 985-8877</p> <p><b>Hance Corp.</b> 235 E Broadway Westerville, OH 43081 (614) 882-7400</p>	<p><b>Henry Simon, Inc.</b> 2955 Fairfax Trafficway Kansas City, KS 66115 (913) 621-6466</p> <p><b>Lewis M. Carter (LMC) Mfg.</b> P.O. Box 428 Donalsonville, GA 31745 (912) 524-2197</p> <p><b>McLoughlin Ward and Co.</b> 409 S 23rd St. Jackson, MI 49203 (517) 787-5030</p> <p><b>Oliver Mfg. Co., Inc.</b> P.O. Box 512 Rocky Ford, CO 81067 (303) 254-6371</p>	<p><b>Satake (U.S.A.), Inc.</b> 11999 Katy Freeway Suite 505 Houston, TX 77079 (713) 493-6828</p> <p><b>Seedburo Equipment Co.</b> 1022 W Jackson Blvd. Chicago, IL 60607 (312) 738-3700</p> <p><b>Triple/S Dynamics</b> 1031 S Haskell Ave. Dallas, TX 75223 (214) 828-8600</p>
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## 2.6 Seed Drying



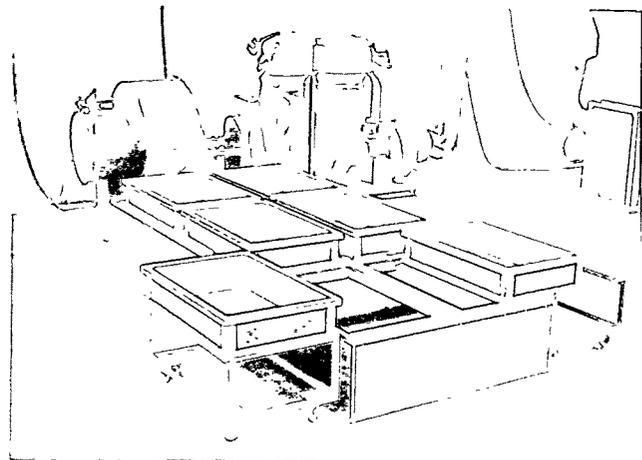
*Seed must be redried after wet dewing. Seed may be damaged if placed into cold storage with moisture contents above 10 percent. Most nurseries build their own drying ovens or modify them from commercially available drying ovens.*

### Dryers

Seed dryers use the same principles as cone dryers. The main difference is that usually the dryers are smaller and of a more simple design. Normally the temperature and air flow are the only variables that are controlled. Some extractories have used modified egg incubators to dry seed.

### International Forest Seed Dryer

Up to 600 pounds of seed may be dried in an hour with this dryer. It consists of several boxes to direct airflow, eight dryer boxes, a fan, a gas burner, and a control panel. The stripped-down version is available without the fan, gas burner, or controls. The seeds are loaded 50 pounds to a box, and 12 boxes can be dried in an hour.

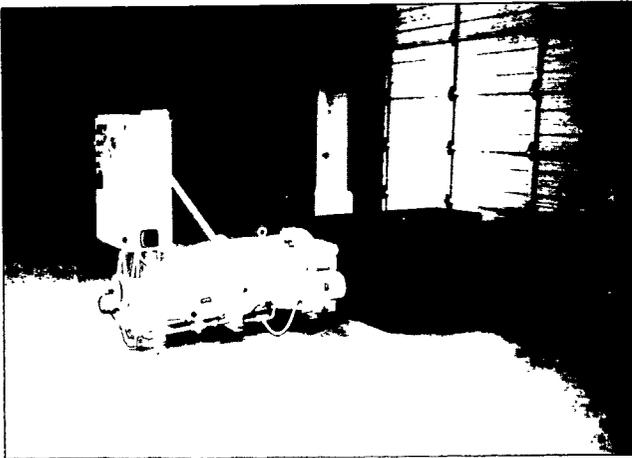


#### Seed Dryer:

International Forest Seed Co.  
P.O. Box 490  
Blair Farm Rd.  
Odenville, AL 35120  
(205) 629-5726

## Southpine Seed Dryer

The Southpine Seed Dryer has a tray base with air control dampers. Four seed drying trays with perforated metal on angle-iron framed tray bottoms, and a LP or natural gas direct-fired non-recirculating heating system with a tubular fan. The control panel includes a programmable digital temperature controller with two set points, one for air temperature and one for high limit shut down. The control dryer has a power switch with light indicator, manual/automatic selector switch, illuminated fan push/start button, illuminated burner start button, light to indicate pilot on, lowfire-automatic switch, manual switch to raise and lower burner firing level, and a stop switch. All of the control panel items are fully integrated into a factory prewired electrical enclosure. Included are all necessary fail-safe safety controls needed to comply with insurance standards.



### Seed Dryer:

Southpine, Inc.  
P.O. Box 530127  
Birmingham, AL 35253  
(205) 879-1099

## McPherson Seed Dryer

This standard small lot cone and seed dryer can be used to dry up to 72 separate lots at the same time. This unit can be expanded to accommodate up to 216 lots drying at one time.



### Seed Dryer:

A.W. McPherson & Assoc.  
P.O. Box 5011  
1406 Howell Dr.  
Monroe, LA 71203  
(318) 343-5957

### Dryers:

International Forest Seed Co.  
P.O. Box 490  
Blair Farm Rd.  
Odenville, AL 35120  
(205) 629-5726

A.W. McPherson & Assoc.  
P.O. Box 5011  
1406 Howell Dr.  
Monroe, LA 71203  
(318) 343-5957

Southpine, Inc.  
P.O. Box 530127  
Birmingham, AL 35253  
(205) 879-1099

## 2.7 Seed Testing



After the seedlot has been satisfactorily cleaned, certain tests must be performed to both describe the quality of the seedlot and provide information necessary for sowing calculations: purity, germination, and seeds per pound.

Seed purity is the percentage of the seedlot that is pure seed. For example, a seedlot with 95 percent purity has 5 percent debris, empty seed, and foreign seed by weight.

Germination percent is an indication of the potential viability of the seedlot, and is usually determined by the percentage of seeds germinating in a growth chamber within a given time period. Standardized germination tests are usually performed by specialized testing laboratories on a fee basis.

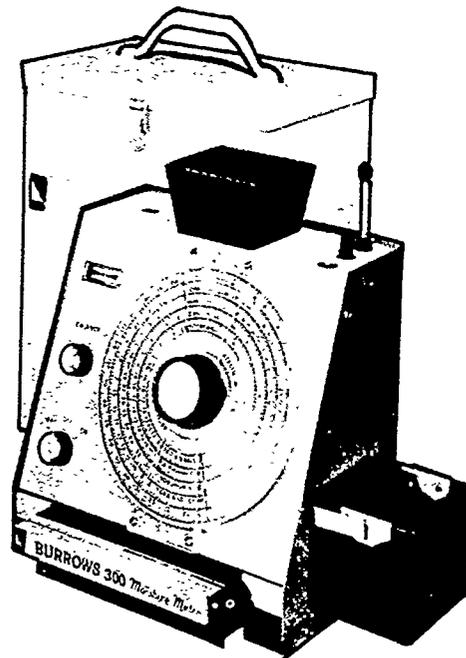
The number of seeds per pound varies between species and seedlots.

## Moisture Meters

Proper moisture content is essential if seeds are to maintain their viability during extended storage. Seed moisture content is normally determined by using moisture meters. They are available in a wide variety of sizes and styles.

Moisture meters read out results immediately. For example, an 8 percent reading means that 8 percent of the total seed weight is water. The Forest Service provides a moisture chart for 44 tree species, including several tropical species. This chart can be obtained from:

National Tree Seed Lab  
P.O. Box 182-B  
5156 Riggins Mill Rd., Rte 1  
Dry Branch, GA 31020  
(912) 744-3312.



### Moisture Meters:

Almaco  
P.O. Box 296  
99 M Ave.  
Nevada, IA 50201  
(515) 382-3506

C.W. Brabender Instruments, Inc.  
P.O. Box 2127  
50 E Wesley St.  
South Hackensack, NJ 07606  
(201) 343-8425

Control-Tek Applications, Inc.  
172-34 Henley Rd.  
Jamaica, NY 11432  
(718) 526-6800

CSC Scientific Co., Inc.  
8325 Lee Highway  
Fairfax, VA 22031  
(800) 621-4778

Delmhorst Instrument Co.  
P.O. Box 68  
51 Indian Lane E  
Towaco, NJ 07082  
(201) 334-2557

Kernco Instrument Co., Inc.  
420 Kenazo Ave.  
El Paso, TX 79927  
(915) 852-3375

Ohaus Corp.  
P.O. Box 900  
29 Hanover Rd.  
Florham Pk., NJ 07932-0900  
(201) 377-9000

Seedbuero Equipment Co.  
1022 W Jackson Blvd.  
Chicago, IL 60607-2990  
(312) 738-3700

Solomat Instrumentation Div.  
Glenbrook Industrial Pk.  
652 Glenbrook Rd.  
Stamford, CT 06906  
(203) 348-9700

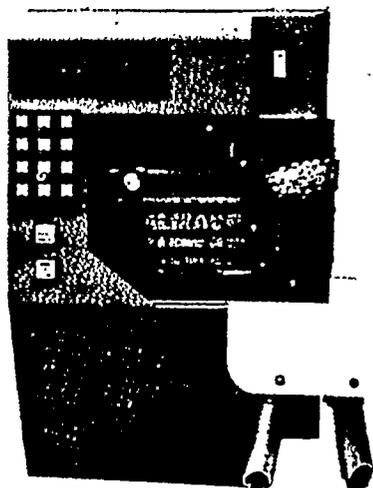
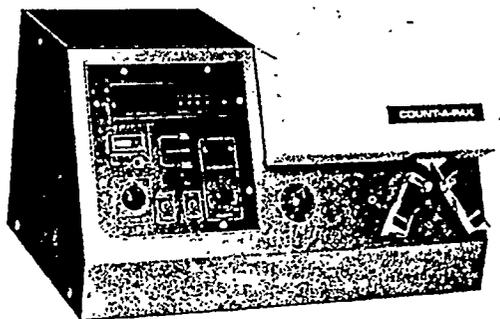
Southpine, Inc.  
P.O. Box 530127  
Birmingham, AL 35253  
(205) 879-1099

Testing Machines Inc.  
400 Bayview Ave.  
Amityville, NY 11701  
(516) 842-5220

## Seed Counters

These machines count the number of seeds in a given weight. This information is necessary as part of the seedlot history. It is used in calculating the amount of seed to sow for a given number of seedlings.

Most seed counters consist of a vibratory feeder and a photoelectric cell. Vibratory feeders with spiral-tracked hoppers space the seeds in single file, and then the seeds pass by the photoelectric cell and are counted. Most manufacturers provide models or attachments for any size seed.



### Seed Counters:

Almaco  
P.O. Box 296  
Nevada, IA 50201  
(515) 382-3506

The Old Mill Co.  
Savage Industrial Center  
Savage, MD 20763  
(301) 725-8181

Seedburo Equipment Co.  
1022 W Jackson Blvd.  
Chicago, IL 60607-2990  
(312) 738-3700

## X-Ray Machines

X-Ray machines are used as a rapid test of seed lot quality because they can detect the presence of empty or damaged seed in a seed lot. They are useful in the cleaning process for a final check of seed quality.



### X-Ray Machines:

Faxitron Series Hewlett Packard  
McMinneville Div.  
1700 SW Baker St.  
McMinneville, OR 97128  
(503) 472-5101

## 2.8 Seed Handling and Storage

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*After the final cleaning process, a seedlot can be stored under refrigeration for many years. Seed is a living perishable biological product that must be protected to retain its viability. A high moisture content and heating of the seed are two of the most common causes of viability loss.*

*Seed is stored at low temperatures, typically between 0° and 20° F. The storage containers must do two things: protect the seed from being damaged and maintain moisture content. This is usually accomplished by a double container—a sturdy outer container and an inner, moistureproof barrier. Periodically during the storage period, seedlots are routinely monitored for moisture content and germination.*

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### Drums and Cans

Metal and fiber drums are widely used for seed storage. Drums are often lined with plastic bags or by caulking the lids to provide a moisture barrier. Many sizes are available and drums can be made to order.





#### Drums and Cans:

Canpak, Inc.  
3351 Stokley St.  
Philadelphia, PA 19130  
(215) 223-5715

Consolidated Container Corp.  
735 N Third St, Dept. 110  
Minneapolis, MN 55401  
(612) 338-0753

Drum Service Co. of Florida  
803 Jones Ave.  
Zellwood, FL 32798  
(407) 889-5500

Eastern Steel Barrel Corp.  
4110 New Brunswick Ave.  
Piscataway, NJ 08854  
(201) 752-1211

Freund Can Co.  
199 West 8th St  
Chicago, IL 60620  
(312) 224-4230

General Container Corp.  
P.O. Box 686-T  
Hillside, NJ 07205  
(201) 687-8233

Natico, Inc.  
6700 S LeClaire Ave.  
Chicago, IL 60638  
(312) 767-2900

Pacific Rim  
Packaging Corp.  
P.O. Box 4026  
801-T Chesley Ave.  
Richmond, CA 94804-0026  
(800) 372-7311

Plastech International, Inc.  
P.O. Box C-5050  
John Fitch Indust. Pk.  
Warminster, PA 18974  
(215) 441-5200

Plyfiber Container Corp.  
Johnson Dr.  
Raritan NJ 08869  
(201) 526-8333

Skolnick Industries, Inc.  
4900 S Kilbourn Ave.  
Chicago, IL 60632  
(312) 735-0700

Sonoco Fibre Drum, Inc.  
One Parkway Center  
1850 Parkway Place  
Marietta, GA 30067  
(404) 423-2500

United States Plastic Corp.  
1376 Neubrecht  
Lima, OH 45801  
(419) 228-2242

Utensco  
United Molded Products Div.  
United Utensils Co., Inc.  
P.O. Box 710  
Port Washington, NY 11050  
(516) 838-7300

Van Leer Containers, Inc.  
4300-T W 130th St.  
Chicago, IL 60658  
(312) 568-3535

#### Bins and Containers:

Cartons and Boxes  
Corrugated Paper  
Products, Inc.  
13 Ranick Dr. W  
Amityville, NY 11701  
(516) 842-5100

Day-Pac, Inc.  
2208 Sandridge Rd.  
Dayton, OH 45439  
(513) 294-7311

Display Pack, Inc.  
1342 Monroe Ave. NW  
Grand Rapids, MI 49505  
(616) 451-3061

Gaylord Container Corp.  
210 Water St.  
Baltimore, OH 43105  
(614) 862-4161

Great Northern Corp.  
Plastics Group  
P.O. Box 939  
Appleton, WI 54912  
(414) 739-3671

International Paper Co.  
Container Div.  
6400 Poplar Avenue  
Memphis, TN 38119  
(800) 223-1268

T.R. Miller Mill Co.  
P.O. Box 708  
Brewton, AL 36427  
(205) 867-4331

NVF Co.  
P.O. Box 68-T  
Haley Dr.  
Yorklyn, DE 19736  
(302) 239-5281

Plashford Packaging Group  
1140 Hayden St.  
Fort Wayne, IN 46803  
(219) 423-9431

Plastech International, Inc.  
P.O. Box C-5050  
John Fitch Indust. Pk.  
Warminster, PA 18974  
(215) 441-5200

Regal Plastic Co.  
4401 E 11th St  
Kansas City, MO 64127  
(816) 483-3040

Tri-State, Inc.  
P.O. Box 337  
505 Fourth St  
Henderson, KY 42420-0337  
(502) 826-8361

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## Refrigerated Storage

Refrigerated storage of seed is a common and necessary practice. Sliding-floor and upright walk-in refrigerators of various sizes are available, with maximum operating temperatures ranging from -40° to 50°F. Many nurseries use custom-designed units from local refrigeration sources.



### Refrigerated Storage:

Bally Engineered Structures, Inc.  
P.O. Box 98  
20 N Front St.  
Bally, PA 19503-0098  
(215) 845-2311

Warren Refrigerator Co.  
1010 I-10 E  
Beaumont, TX 77703  
(409) 838-3791

The Geldback Refrigerator Co.  
P.O. Box 276-T  
1 Demarest Rd.  
Sparta, NJ 07871  
(201) 383-6368

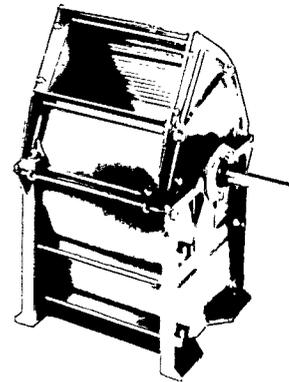
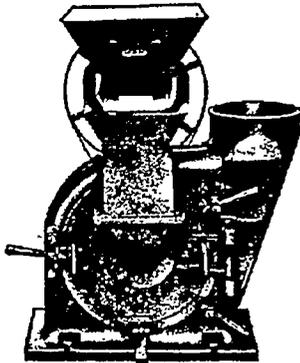
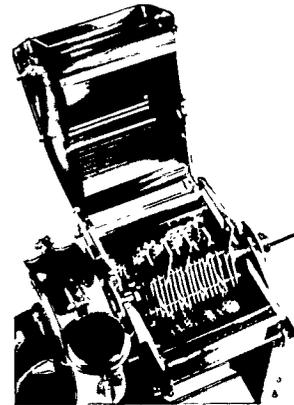
## 2.9 Miscellaneous Equipment



*Hammermills for grinding cones and other by-products of the seed process and dust control systems are an integral part of a seed extractory operation.*

### Hammermills

Hammermills may be used to grind spent cones and other waste into mulch. They consist of a hopper, a grinding chamber, and a discharge auger or spout. Cones are fed from the hopper into the grinding chamber where they are pulverized by rotating hammers. A fan then discharges the remnants through sieve screens. Most manufacturers provide screens of various sizes. Some hammermills are portable. Electric or gas motors as well as V-belts attached to a vehicle engine may be used to power hammermills.



#### Hammermills:

C.S. Bell Co.  
P.O. Box 291  
170 W Davis St.  
Triffin, OH 44883  
(419) 448-0791

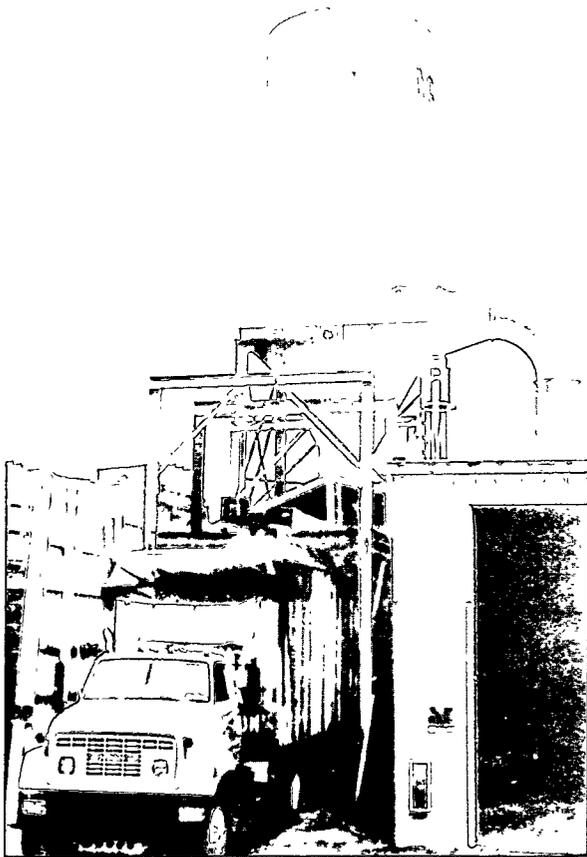
The Duplex Mill and Mfg. Co.  
P.O. Box 1266  
415 Sigler St.  
Springfield, OH 45501  
(513) 325-5555

Hege Equipment, Inc.  
P.O. Box 34 A  
Rt. 1  
Colwich, KS 67030  
(316) 796-0992

Prater Industries, Inc.  
1515 S 55th Court  
Chicago, IL 60650  
(312) 656-8500

## Dust Collection Systems

These systems are designed to remove particulate from the exhaust of seed-separating equipment. Basically two types are being used—a bag house or a cyclone separator. The cyclone separator is the most common.



### Southpine Transition Hopper

Most nurseries have developed their own system of bagging seed. Southpine has a large funnel mounted on a frame that allows seeds to be poured from a square drying box into a round fiber drum.



### Southpine Transition Hopper:

Southpine, Inc.  
P.O. Box 530127  
Birmingham, AL 35253  
(205) 879-1099

#### Dust Collection Systems:

Dixie Air Engineering Co., Inc.  
111 Kane St.  
Baltimore, MD 21224  
(301) 633-2644

Dustvent, Inc.  
100 W Fay St.  
Addison, IL 60101  
(312) 543-9007

Evans Process Equipment  
9875 W Grand Ledge Highway  
Sunfield, MI 48890  
(517) 566-8041

Forsbergs  
P.O. Box 510  
Thief River Falls, MN 56701  
(218) 681-1927

Hance Corp.  
235 E Broadway  
Westerville, OH 43081  
(614) 882-7400

Ideal Grain and Seed  
Cleaner Co.  
85 Second Ave. SE  
New Brighton, MN 55112  
(612) 636-7323

Kamas-Westrup  
P.O. Box 27  
DK-4200 Slagelse  
Denmark  
(0) 3 522564

Murphy-Rodgers, Inc.  
2301 Belgrave Ave.  
Huntington Park, CA 90255  
(213) 587-4118

Triple/S Dynamics  
1031 S Haskell Ave.  
Dallas, TX 75223  
(214) 828-8600

Tri-State Metal Fabricators, Inc.  
Bldg. 8,  
Spokane Industrial Park  
Spokane, WA 99216  
(509) 926-7165

