Calidria ASBESTOS
UNION CARBIDE CORPORATION • MINING & METALS DIVISION • P.O. BOX 579 • NIAGARA FALLS, N. Y. 14302 TEL: 716-278-3376

PLAINTIFF'S EXHIBIT
UC-3683

CALIDRIA "PELLETIZED SG-210"

FOR READY-MIX TAPE JOINT COMPOUNDS

UNION CARBIDE CORPORATION
MINING AND METALS DIVISION
NIAGARA FALLS, NEW YORK

C2536

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CALIDRIA "PELLETIZED SG-210"

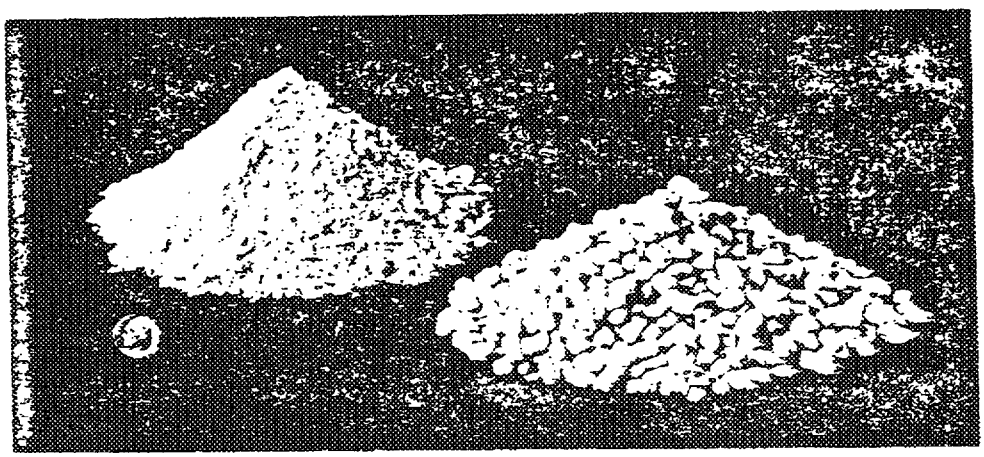
FOR READY-MIX TAPE JOINT COMPOUNDS

INTRODUCTION

Over the past several years, "Calidria" asbestos SG-210 has become widely established as the preferred form of asbestos for the manufacture of ready-mix tape joint compounds. The high fiber content of this well-refined asbestos permits a substantial reduction in the quantity of asbestos needed in typical formulations. Its fine grind and uniform quality give a whiter, smoother mud with consistent properties from batch to batch.

Users of the various types of ground or "powdered" asbestos are well aware of the new occupational safety and environmental regulations which require careful control of airborne asbestos dust levels. They are also aware of the energy shortage and its effects on transporation costs. As a means to minimize the impact of these problems, Union Carbide is introducing a pelletized version of SG-210, specifically designed for use in tape joint compounds.

The pellets, about 1/4" in diameter and 3/8" long, are shown below in comparison with ground asbestos. The pellets are free-flowing and can be handled and metered in conventional solids handling equipment. Dust levels will obviously be sharply reduced or essentially eliminated.



Ground Asbestos Pelletized Asbestos

The bulk density of the pellets is 45 pounds per cubic foot or about three times that of SG-210. A carload contains 120,000 pounds which results in a freight savings in the range of 0.6-1.0 cents per pound depending on destination. Bulk carloads of 180,000 pounds are available at further savings if the usage is sufficiently large to justify the storage facilities.

The advantages of reduced freight costs and lower dust generation of the pelletized form of asbestos are partially offset by one problem, i.e., the mixing equipment ordinarily used to blend tape joint compounds does not have

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enough shear to open the pellets completely. It is thus necessary to add a pellet feeder, a small high-shear wet mixing device, and a means to transport the slurry from the mud mixer to the processing sequence. It is estimated that a capital expenditure in the range of $4,000-10,000 would be required to provide this equipment. It is also well known that the order of addition of ingredients can effect the mud properties. Some rebalancing of the formulation may be required.

At the present time, pelletized "Calidria" asbestos is widely used in the manufacture of vinyl-asbestos floor tile and in certain grades of paper. Extensive experience is available on pellet handling and the preparation of asbestos slurries. Union Carbide is also prepared to provide slurry samples for testing and several "repulpers" are available for extended loan for in-plant use. We are not, however, in a position to provide complete mud formulations and must rely on you for this. This report, therefore, summarizes the concept, indicates the economies, and provides additional background information to help you assess how pellets might fit into your manufacturing operation. We feel that pellets are the way of the future and stand ready to assist wherever possible in your evaluation of this new approach to asbestos use.

PELLET OPENING

A schematic diagram of one equipment arrangement of a "pellet repulper" is shown in Figure 1. One pallet of 40 bags (2000 lbs.) of pelletized asbestos is dumped into a feed hopper. This quantity can easily be dumped in 10-20 minutes and in a typical installation is about a day's supply of asbestos. The pellets have a bulk density of about 45 pounds per cubic foot so the hopper would be only about 3 feet square and 6 feet high.

When asbestos is needed, the pellets are moved by a screw or vibratory feeder into the top of a small impact mill. Water is fed simultaneously to the mill at a controlled rate to give a slurry of about 5% solids. The slurry drops into a holding tank. One hundred pounds of asbestos in a 5% slurry will require about a 250 gallon tank. At the start of each mud blend, the required amount of slurry is pumped over to the mud mixer.

Once the pellet hopper is loaded, the entire slurry preparation can be operated very easily by remote push-button control or by automatic cycle timer. The pellets flow freely from the bottom of the feed hopper. They are virtually dust free but the feeder can be totally enclosed if desired.

This kind of equipment has been used commercially for the continuous preparation of slurry for feed to paper making systems. A photograph of a self-contained, portable pellet repulper is shown in Figure 2. A unit as small as this with a 10-15 H.P. Fitz or Reitz mill can open 200-900 pounds per hour of pellets. It would thus operate only a moderate portion of the time in tape joint compound manufacture. This particular unit is intended for continuous operation and has a smaller sump than indicated in the schematic layout of Figure 1. It is estimated that the total cost of a repulper setup of this general type is $5,000-10,000.

There are obviously a number of other ways to arrange the slurry opening equipment. The mill could discharge directly into the mud mixer and eliminate the slurry hold tank. Slurry would enter the mixer over roughly a 10-minute period

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while the other dry ingredients were added simultaneously. If bagged pellets are used, the size of the hopper could also be reduced and two or three bags could be dumped manually for each batch of mud.

FORMULATING WITH CALIDRIA "PELLETIZED SG-210"

The maximum solids content for a repulper slurry is approximately 5% by weight. This is about the highest solids content in a well-opened slurry that can be pumped. If some part of the surfactant used in the formulation is introduced into the water to the mill, however, it is possible to attain several percent higher solids.

It is also well recognized that the order in which the ingredients are added can have a significant bearing on rheological properties of the mud. Mixing a specific tape joint formulation starting with an asbestos slurry may give a different mud than the one obtained when the same ingredients are dry blended and added together into the water in the mud mixer. For this reason, it is necessary to check and probably adjust your formulation to allow for the asbestos slurry base. Limited experience indicates that this is not a serious problem but it obviously must be checked for each formulation. Union Carbide is, therefore, prepared to supply, at your request, gallon and larger quantities of slurry, prepared in a repulper like that shown in Figure 2, for your use in checking formulations.

PELLET PACKAGING

"Calidria" asbestos pellets are packaged in 50-pound multiwall paper bags stacked 40 to a pallet. A carload is made up of 60 pallets for a total of 120,000 pounds. Pelletized asbestos is also available in 180,000-pound bulk hopper cars and is now being handled this way on a regular commercial basis. The pellets flow freely from the cars and can be moved by conventional pneumatic or mechanical equipment.

Asbestos usage at even the largest mud manufacturing plants may be too small to justify the investment in bulk asbestos facilities. If, however, bulk handling equipment is available for limestone or other large volume raw material, the incremental cost to apply it to the asbestos may be minimal.

In addition to these two "packages" Union Carbide is investigating the use of large, one-way bags containing 1000-2000 pounds each. These bags are typified by the St. Regis "Sling-Bins" for which illustrative literature is included in Appendix II. With the Sling-Bins, the Feed Hopper in Figure 2 would become the receptical for the large bag of pellets. It could be lowered in, the lid closed, and the bag opened by external control. With the pellets, the bag should drain clear of asbestos. We feel that this kind of material handling is the optimum for the usage levels typical of plants manufacturing tape joint compounds. Its adoption, however, will depend on the interest expressed by the end man who receives the package. For the immediate future, it is probably best to think in terms of the pellets in 50- or 100-pound bags.

ECONOMICS

"Pelletized SG-210" is priced the same as SG-210. The higher bulk density, however, allows substantial savings in freight. This saving ranges

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from 0.6 to 1.13¢/lb. for the 50-pound bags, depending on the part of the country to which the shipment is sent. This is illustrated in Table I. Bulk shipment provides additional savings of about 0.15¢/lb.

As a specific example of these figures, consider a tape joint compound manufacturing plant using 50,000 pounds of asbestos per month. At a freight saving of 1¢/lb., a $5,000 investment in repulping equipment would pay off in 10 months. It is important to realize that these figures do not include any credit for the substantial reduction in warehouse requirements, reduced dust levels that are characteristic of pelletized asbestos, and the potential saving in dust control equipment. Dust control could be the overriding factor in a decision to change to the use of pellets.

CONCLUSIONS

We feel that pelletized asbestos in the "Sling-Bin" type package is the efficient, economical "way of the future" for the asbestos usage rates typical of the tape joint manufacturing industry. The higher bulk density of the pellets keeps transportation, storage, and handling costs under control. Dust problems are greatly reduced and automatic operation is easy to achieve. A capital investment for "opening" equipment is needed but this is relatively modest and the freight savings of 0.6-1.0¢/lb. of asbestos give rapid payoff.

Union Carbide stands ready to supply you with technical consultation on pellet handling and opening. Typical asbestos slurries for checking your formulations can be provided easily and several portable repulpers are also available for loan for in-plant testing.

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SCHEMATIC DIAGRAM

PELLET OPENING EQUIPMENT

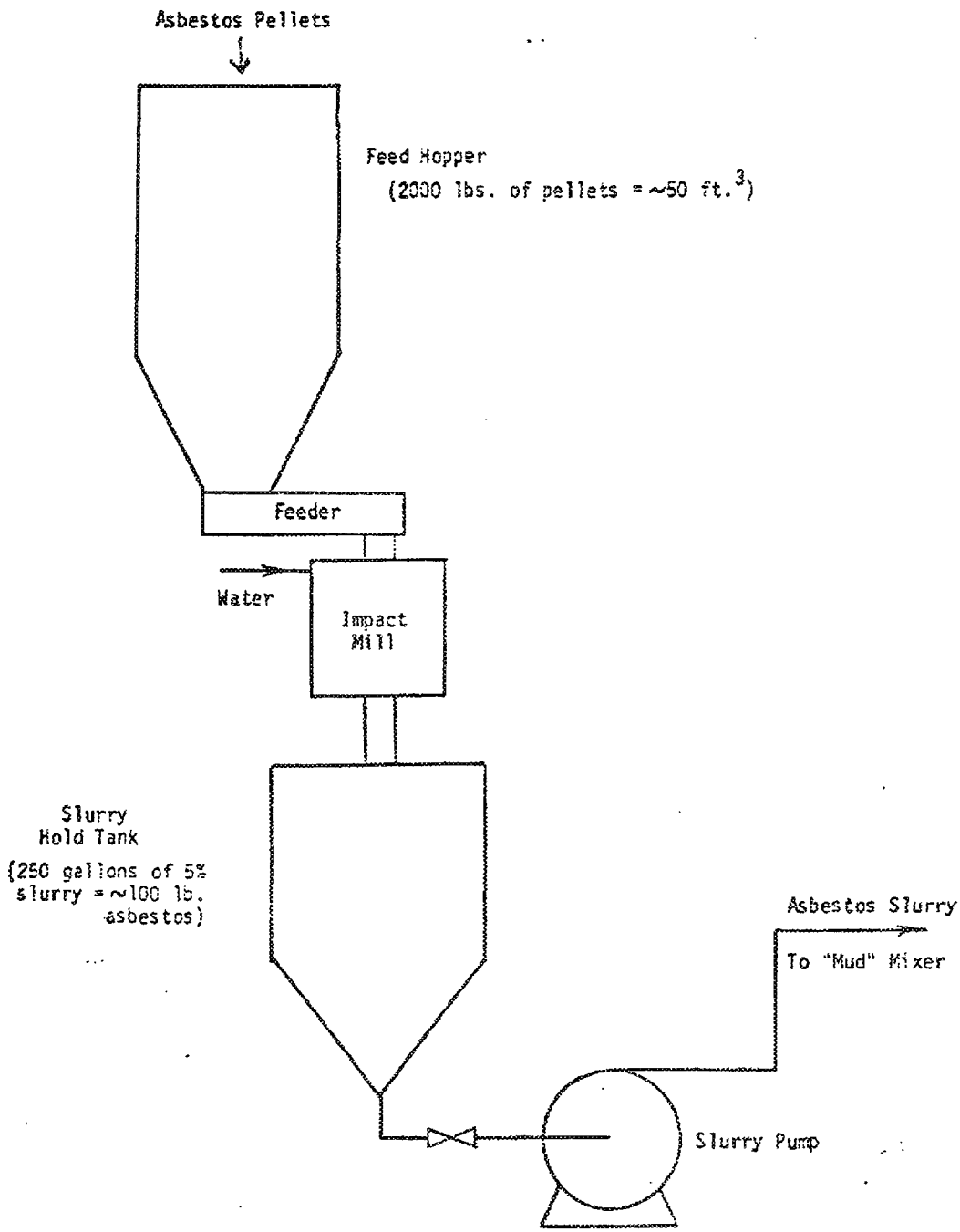


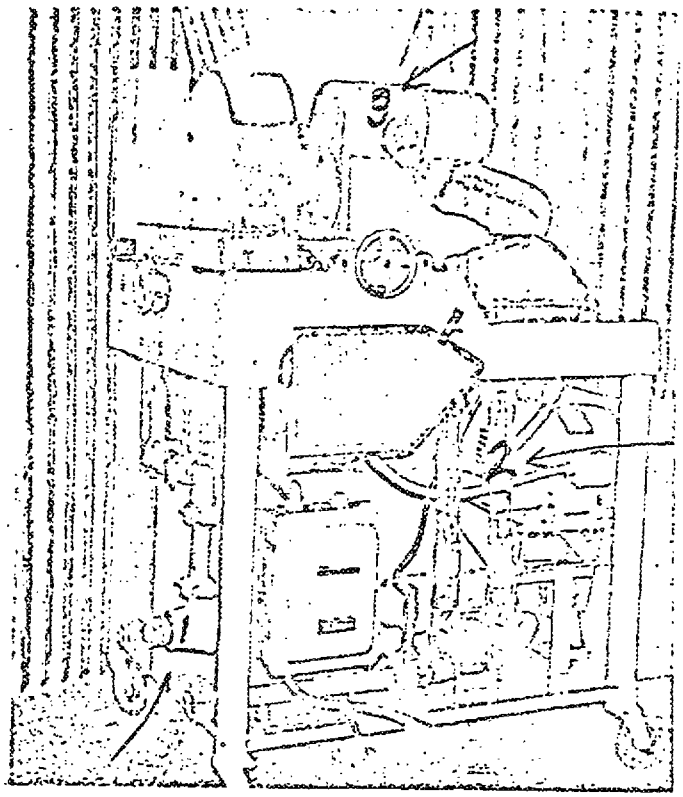
Figure 1

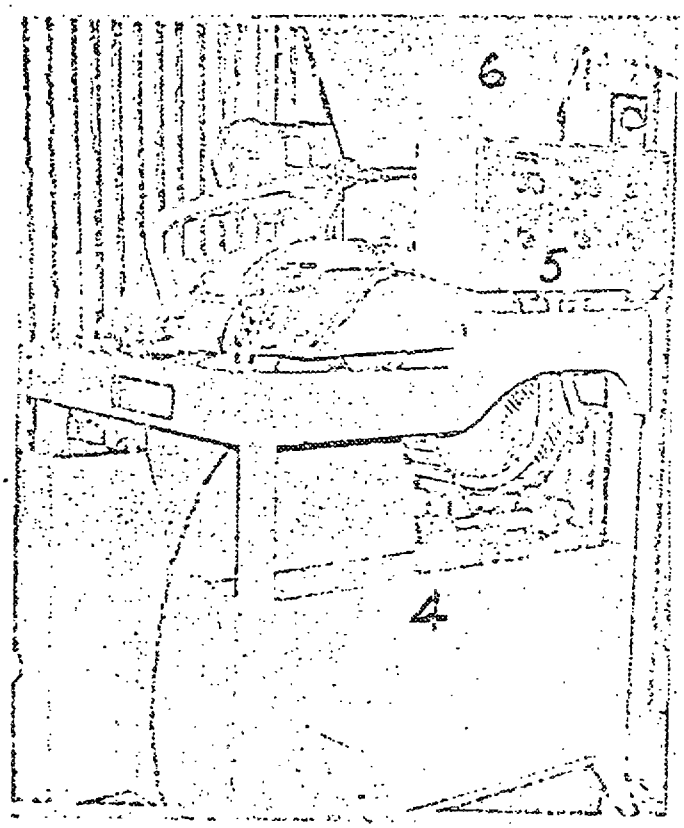
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PHOTOGRAPHS
PORTABLE REPULPER

View showing Slurry Discharge (1)
Rotameters (2) and
Screw Feed Speed Adjustments (3)





View showing Sump (4)
Control Panel (5) and
Feed Hopper (6)

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Figure 2

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TABLE I

DELIVERED COST COMPARISON

OPEN FIBER VS. PELLETIZED ASBESTOS

Product	Carload Weight (lbs.)	Price[1] (¢/lb.)	Approximate Freight[2] (¢/lb.)		Approximate Delivered Cost ¢/lb.	Saving Via Pellets (¢/lb.)
SG-210 (Open Fiber)	54,600	5.0	Northeast	3.26[3]	8.26	----
			Texas	2.25[3]	7.25	----
			Georgia	2.80[3]	7.80	----
			Florida	3.33[3]	8.33	----
"Pelletized SG-210"	120,000	5.0	Northeast	2.13	7.13	1.13
in bags			Texas	1.60	6.60	0.65
			Georgia	2.17	7.17	0.63
			Florida	2.35	7.35	0.98
"Pelletized SG-210"	180,000	4.5	Northeast	2.01	6.51	1.75
in bulk			Texas	1.43	5.93	1.32
			Georgia	(1.99)[4]	6.49	1.31
			Florida	(2.17)[4]	6.67	1.66

(1) F.O.B. Welby, California 1/1/74.

(2) As of 2/22/74.

(3) Based on 60,000-pound minimum load.

(4) Bulk rates have not been set for these areas. Rates have been estimated at the same 0.18¢/lb. differential from the 120,000 lb. rate that applies to the Northeast.

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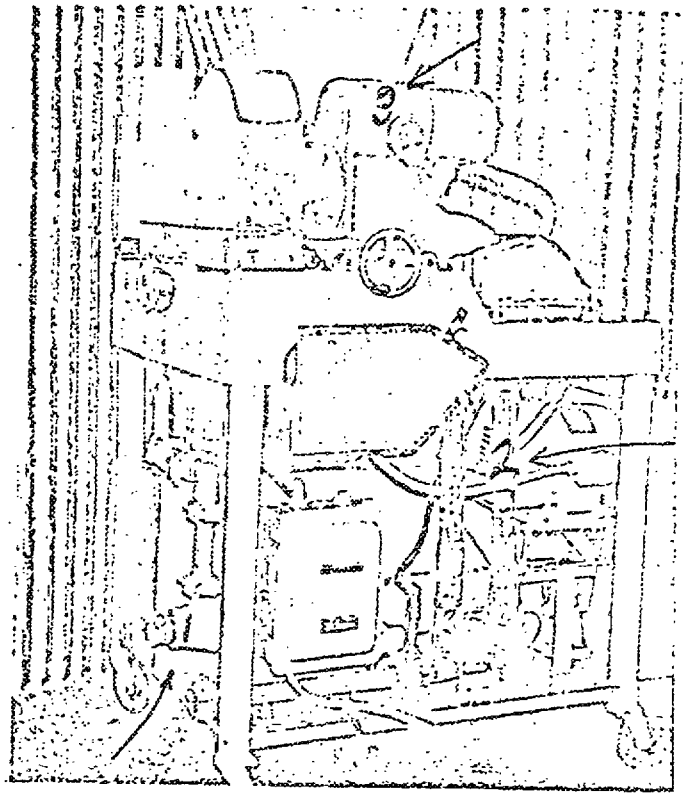
APPENDIX I

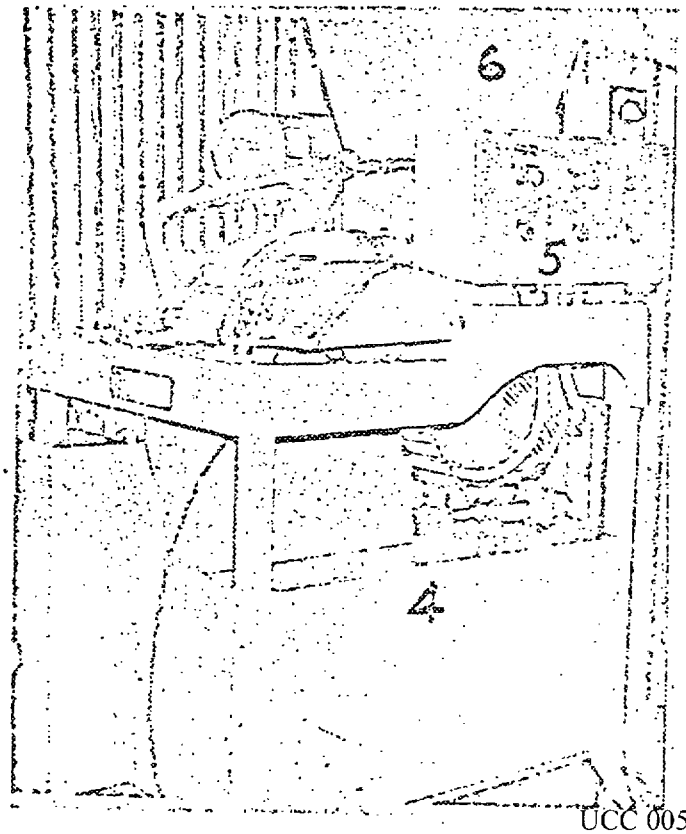
PELLET REPULPING EQUIPMENT

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PHOTOGRAPHS
PORTABLE REPULPER

View showing Slurry Discharge (1)
Rotameters (2) and
Screw Feed Speed Adjustments (3)





View showing Sump (4)
Control Panel (5) and
Feed Hopper (6)

(1846)

Figure 2

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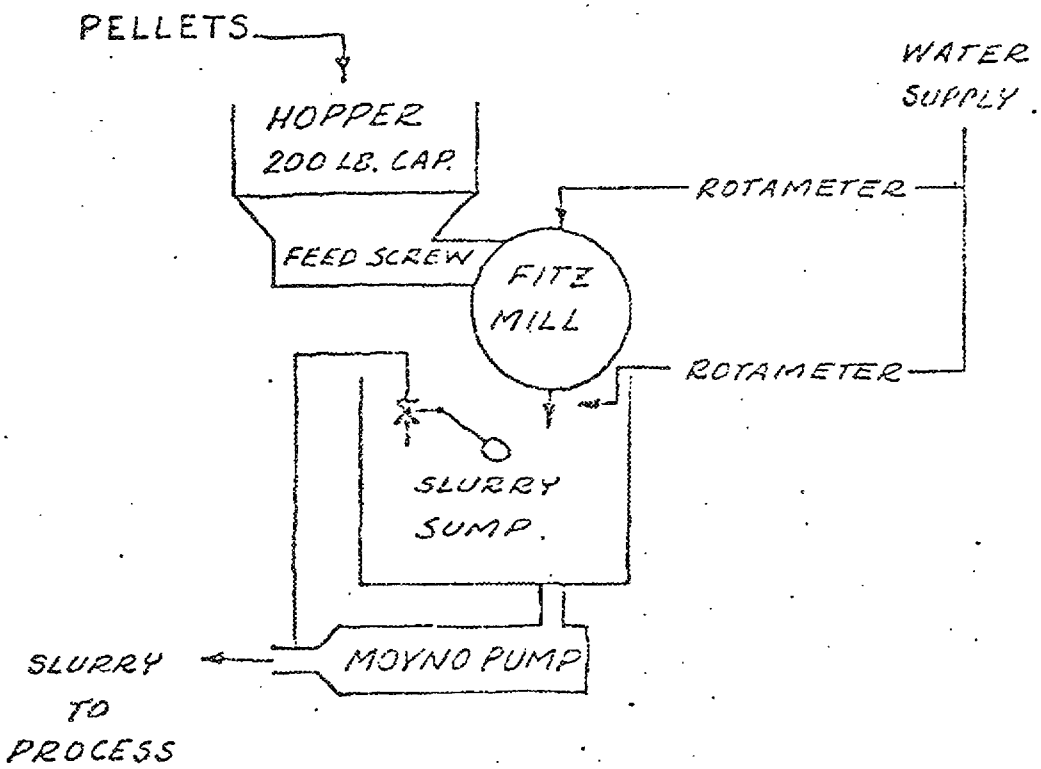


FIG. 1
SCHEMATIC
FLOWSHEET
FITZMILL REPULPER

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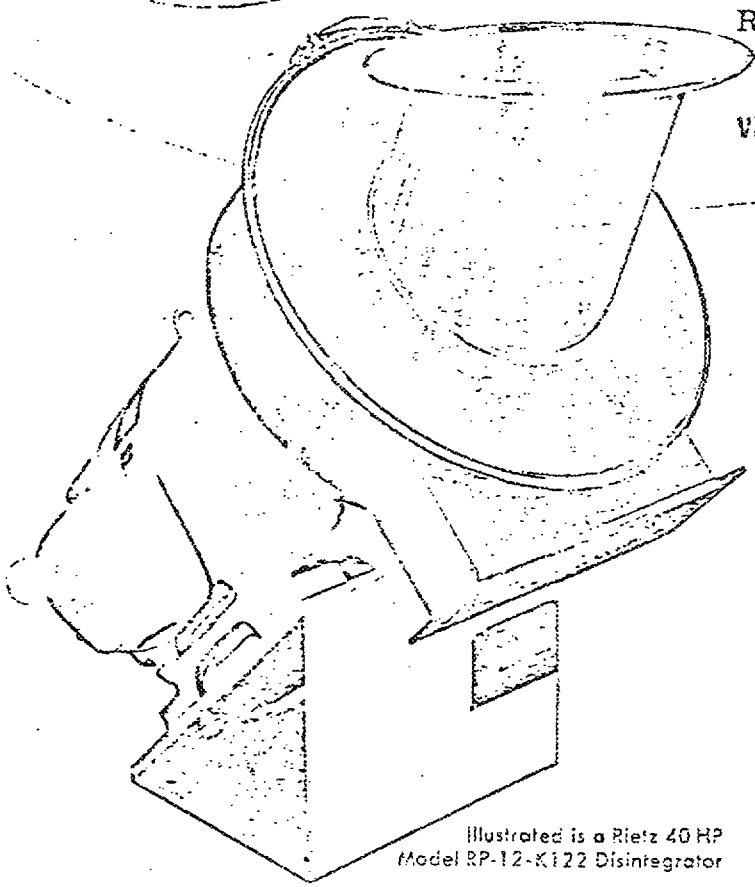
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RP Model Disintegrators

are designed for specific adaptation to size reduction requirements in the Food Process Industries.

Rietz RP Distintegrators offer

VERY LOW INITIAL COST
VERY LOW OPERATING COST
VERY HIGH EFFICIENCY



Illustrated is a Rietz 40 HP Model RP-12-K122 Disintegrator

RUGGED SIMPLE DESIGN / Rietz RP design has reduced the complex operations of feeding, grinding and discharging to the ultimate in efficient simplicity. Fixed speed* direct-connected drive eliminates belts, gears and accompanying maintenance problems. 45° feed and discharge chutes speed product handling and shorten distance between inlet and outlet to reduce over-all vertical space requirements. Complete self-contained unit reduces weight and requires less floor space.

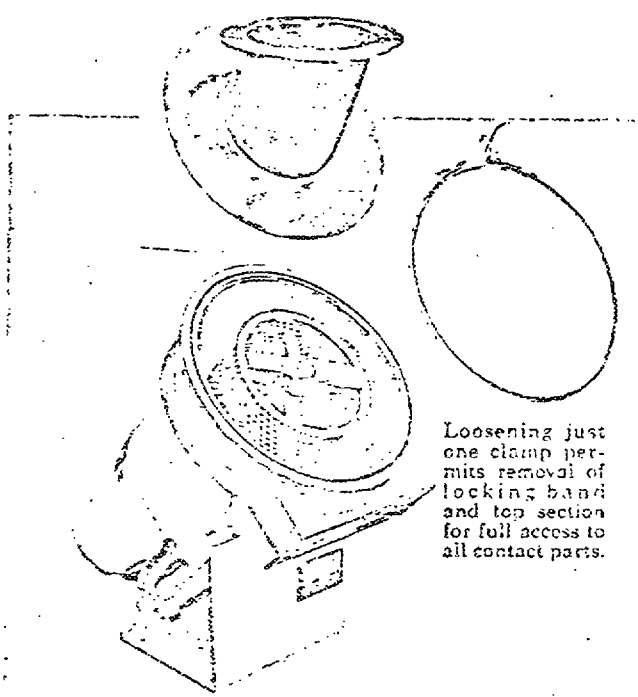
All of these features combine to make Rietz RP Disintegrators uniquely efficient machines measured either by

capacity per dollar of cost
or by
operating cost per output unit.

**All models of RP's are also available with direct-connected variable speed motors.*

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see other side for information on
PRODUCT APPLICATION SIZE AND MODEL SPECIFICATIONS
VARIOUS STANDARD FEED AND DISCHARGE DESIGNS



Loosening just one clamp permits removal of locking band and top section for full access to all contact parts.

FAST EASY CLEANING / Rietz RP Disintegrators are unmatched in ease and speed of cleaning. As illustrated, releasing one clamp exposes all contact parts* for quick, thorough cleaning. Stainless bowl and top are free of joints, cracks and crevices.

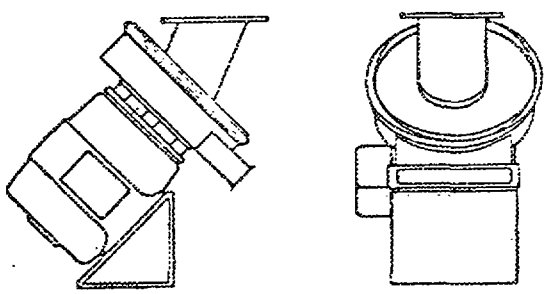
Illustration also shows RP operating principle. Rigid hammers disintegrate product on high speed impact. Combined centrifugal force and positive hammer action force product through 360° stainless steel screen. Screens are available in many mesh sizes, are quickly removable and replaceable for cleaning or interchange.

**All contact parts are of stainless steel for complete sanitation.*

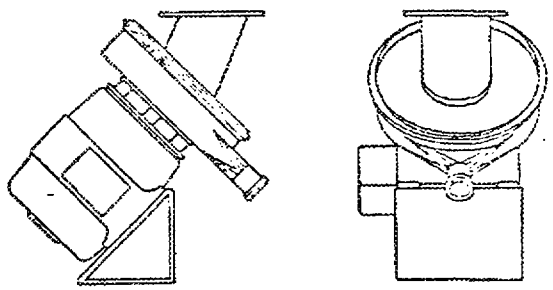
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Rietz RP's offer built-in adaptability

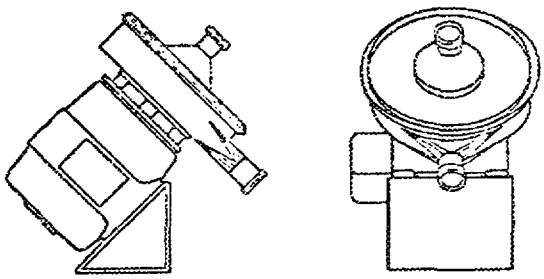
Three standard feed and discharge combinations are available to meet the process requirements of your particular products. The top and bowl sections illustrated below may also be ordered in any set of combinations for special situations.



Round Chute Inlet and Rectangular Outlet for Solids



Round Chute Inlet and Sanitary Thread Outlet for Purees



Sanitary Thread Inlet and Outlet for Liquids

SOME PROVEN APPLICATIONS FOR

RP DISINTEGRATORS

GRINDING — PULPING — CRUSHING
Fruits / Fats / Food Wastes / Horse-radish / Cheese

PUREEING
Vegetables / Fruits / Cooked Meats

SIFTING — CRUMBLING
Breads and Crackers / Flour

BLENDING — MIXING
Pastes / Cake and Pie Mix

SPECIFICATIONS
RIETZ RP SERIES DISINTEGRATORS

MODEL NO.	HP RANGE	RPM RANGE	ROTOR DIA.	SCREEN HEIGHT	CAPACITY EXAMPLES T/HR. THRU ⅜" SCREEN	
					TOMATOES	APPLES
RP-8-K115	5 to 10	1800 3600	8"	2⅜"	7.5	5
RP-8-K126	10 to 20	1800 3600	8"	6¼"	15	10
RP-12-K122	20 to 40	1800 3600	12"	6¼"	30	20
RP-18-K133	40 to 75	1800 3600	18"	9⅜"	60	40

MANUFACTURING COMPANY

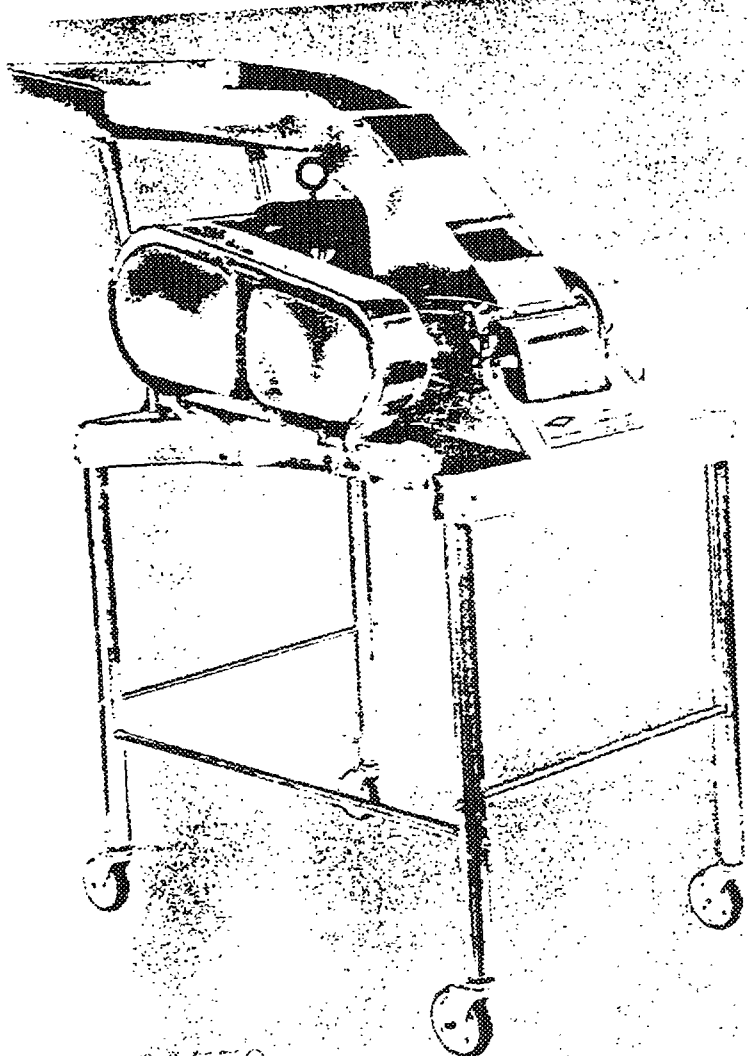
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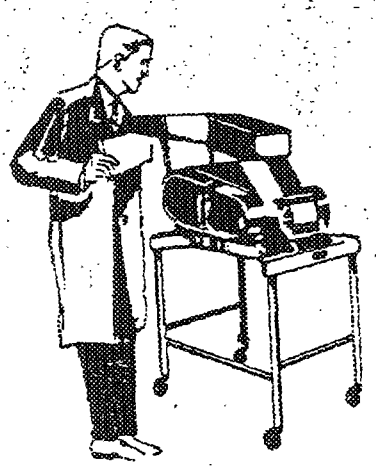
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Bulletin
No. 152

FITZ·MILL

model D comminuting machine





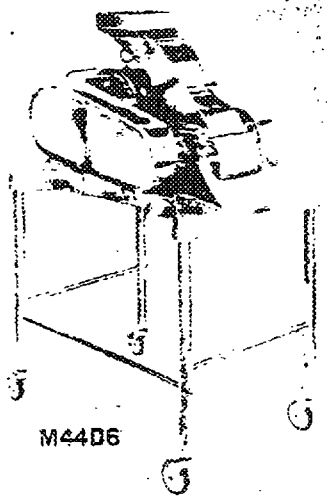
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THE FITZPATRICK COMPANY

832 INDUSTRIAL DRIVE, ELMHURST, ILLINOIS 60126

UCC 005924

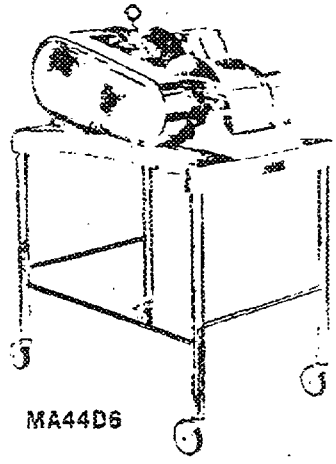
- Speeds up to 10,000 RPM.
- Water-jacketing for temperature controlled processing.
- Available in Stainless Steel and non-corrosive alloys.
- Sizes to fit production needs. Pilot Plant and Laboratory units available. Model D units up to 40 HP.
- Belt, gear, chain, direct and variable speed drives.



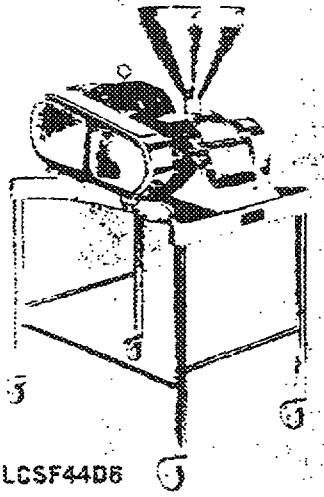
M44D6

CODE M44D6. Corresponds to Code S44D6 except not equipped with holding pan and hood. Intended for auxiliary feeders.

CODE MA44D6. Similar to basic unit but equipped with short, round throat inlet to permit close coupling to outlet of conveying feed chutes. Bead on top of throat allows dustless operation by use of rubber boot or other readily removable socks for attachment to feed.



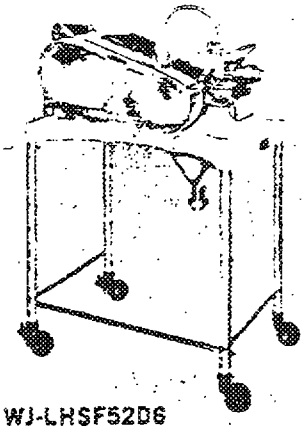
MA44D6



LCSF44D6

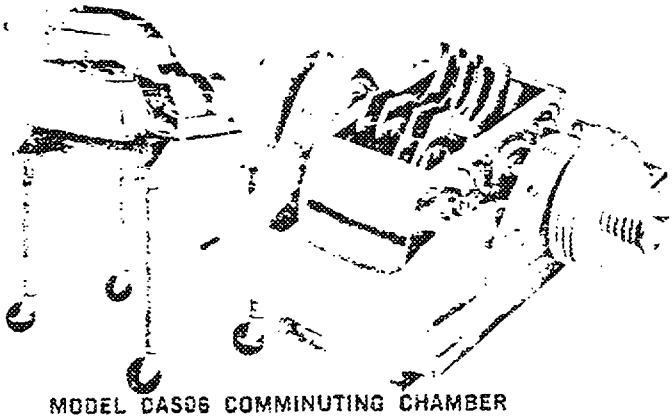
CODE LCSF44D6. Comparable to basic unit except equipped with cone having 15-quart holding capacity and sanitary coupling. Used for processing liquids or slurries, on batch or openline systems. Cones of other capacities available. Normally used with fixed blades.

CODE WJ-LHSF52D6. Water-jacketing of throat and chamber sidewalls permits controlled processing of temperature sensitive materials for closed-line processing of liquids and slurries.

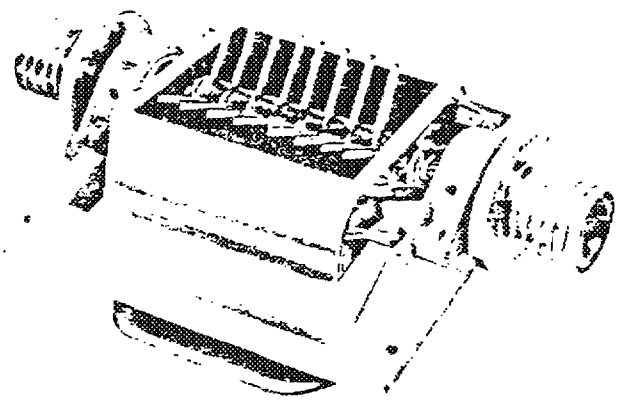


WJ-LHSF52D6

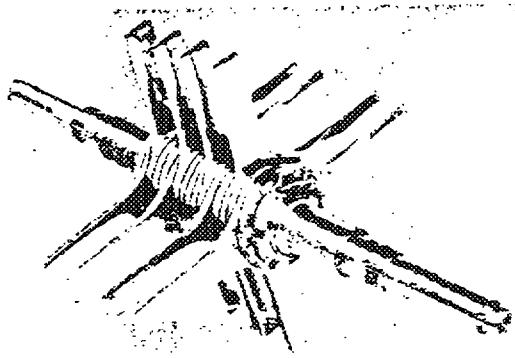
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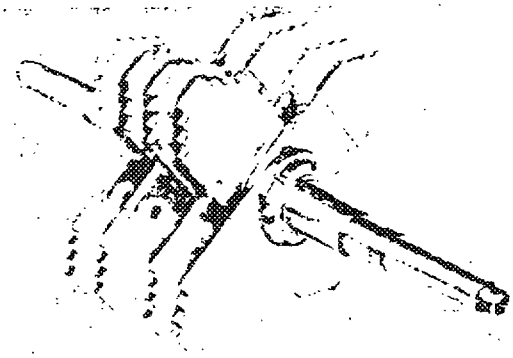
MODEL DAS06 COMMINUTING CHAMBER
Remote outboard pillow-block bearing supports for rotor shaft, reversible assembly with Code 575 fixed blades, knife-impact edges.



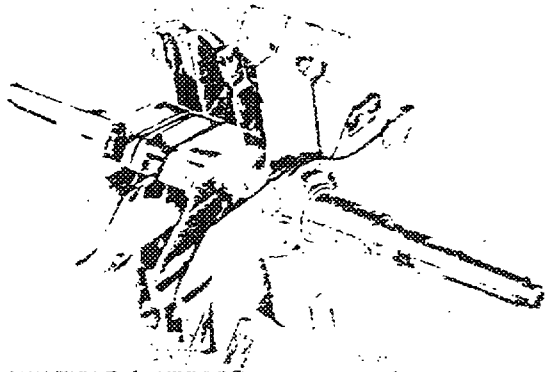
MODEL DKAS012 COMMINUTING CHAMBER
Similar to DAS06 except double-width chamber of heavier construction.



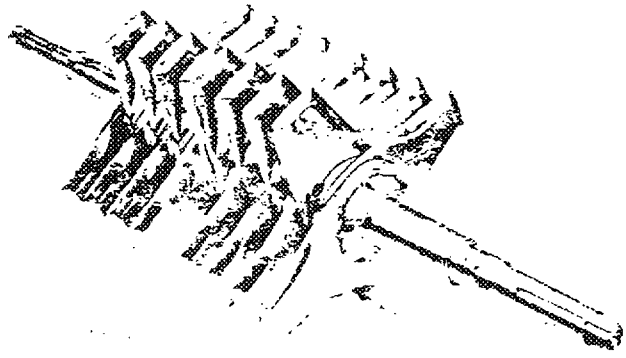
FIXED BLADES—BROACHED
Code DS-225 fixed blades illustrated with knife edge on one side; impact on the other.



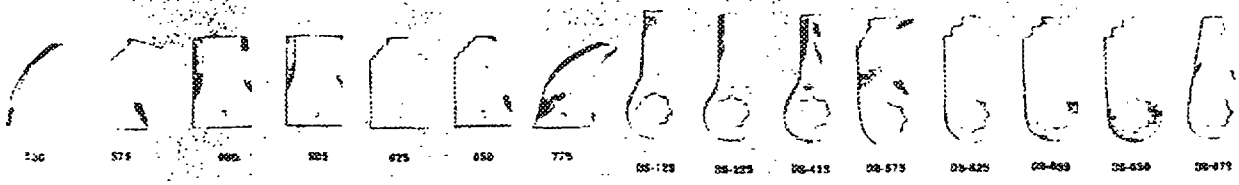
FIXED BLADES—BROACHED—REMOVABLE TIP
Code DS-625-RT fixed blades shown with impact edge on both sides. Tips are replaceable without disassembling rotor.

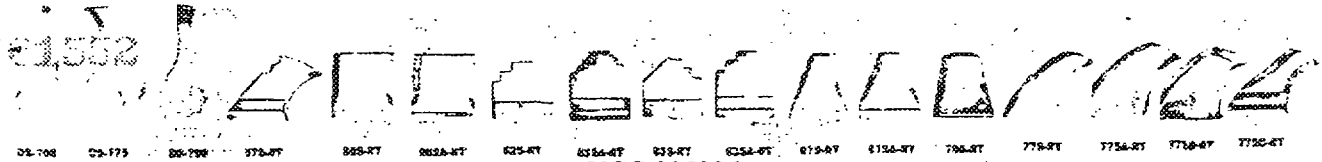


MULTIPLE COVERAGE
Code DS-790 fixed blades provide multiple coverage. One of many special blade patterns available to match application needs.



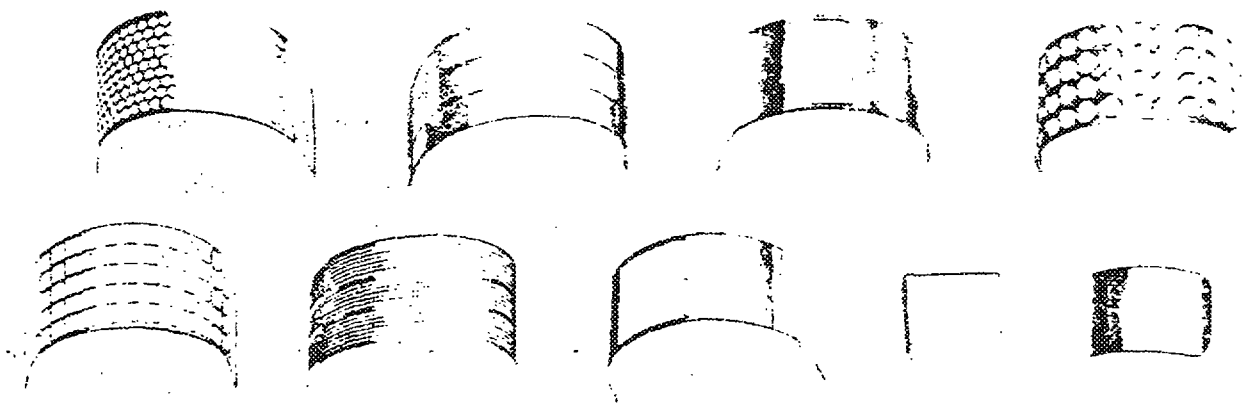
DOUBLE-WIDTH ROTOR
Code DKS012-700 blades shown with fixed, broached, knife edge on both sides and top. Full 12" in width, rotor available in all blade styles.





UCC 005926

More than 200 different sizes of screens in various gauges and materials stocked for immediate shipment. Round, square, striated, woven wire mesh, diagonally and straight slotted, weir, electrolytic, bar, and drilled openings or other special designs made to order.



FitzMill SPECIFICATIONS

The comminuting equipment identified by the trade mark, FitzMill®, is manufactured in four general size ranges: Model M, Model D, Model F, and Model H. The machines in each size have the same rotor diameter (extended blade periphery) but are available in various rotor lengths. The specifications of the standard models available are:

Model	Screen Area (Sq. In.)	Rotor Dimensions (Inches) Diameter	Length	Horsepower Approx.	Number of Hammers
M5	63	4¼	8	5	16
D6	109	5¾	10½	15	16 or 32
D12	257	12	10½	30	32
F8	199	7¾	14½	50	16 or 32
F12	309	11½	14½	60	32
F20	529	19½	14½	75	48
H30	986	28⅜	17	150	48

The construction of all types and sizes follows the same pattern of careful selection of the best materials available, precision workmanship, and rigid inspection including adequate "run in" time of each machine manufactured.

FEED THROATS AND HOPPERS

These parts and similar parts requiring fabrication are constructed from Type 304 Stainless Steel or Type 316 Stainless Steel when required. Other alloys are available if required.

SCREENS

Standard Stainless Steel screens, both perforated and mesh, in more than 200 selections are carried in stock for immediate shipment. Perforated types from .015" openings to 1.5" openings, mesh sizes from 325 to 2. Many types for special applications are also available.

SHAFTS AND ROTORS

All shafts are hardened and tempered Type 416 Stainless Steel —stress relieved before machining. Rotors of solid Type 303 Stainless Steel machines with same precision as shafts. In addition to rotor and shaft combinations, splined shafts for mounting broached blades are available for all type machines.

BLADES

Over 200 types of blades are normally available from stock. Standard material is hardened and tempered Types 414 and 420 Stainless Steel. Hard surfacing or special inserts for abrasive products. Mounting pins for rotor mounted blades are Type 420 and 440 Stainless Steel. Other types of special steels or other metals are also available.

COMMINUTING CHAMBER

All castings required for comminuting chamber construction are normally Type 316 Stainless Steel polished before machining to prevent distortion. Other alloys can be provided for special applications.

BEARINGS

Dual row self-aligning ball bearings with precision-machine bronze or pressed steel cages with high overload factor. Bearings are manufactured to special dimensions to meet rigid specifications. Mounted in outboard type housing cast integral with comminuting chamber or remote outboard mounted in pillow block housings.

MOTORS AND STARTERS

All types and enclosures available.

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APPENDIX II

MANUFACTURER'S LITERATURE - ST. REGIS SLING-BINS

C1554

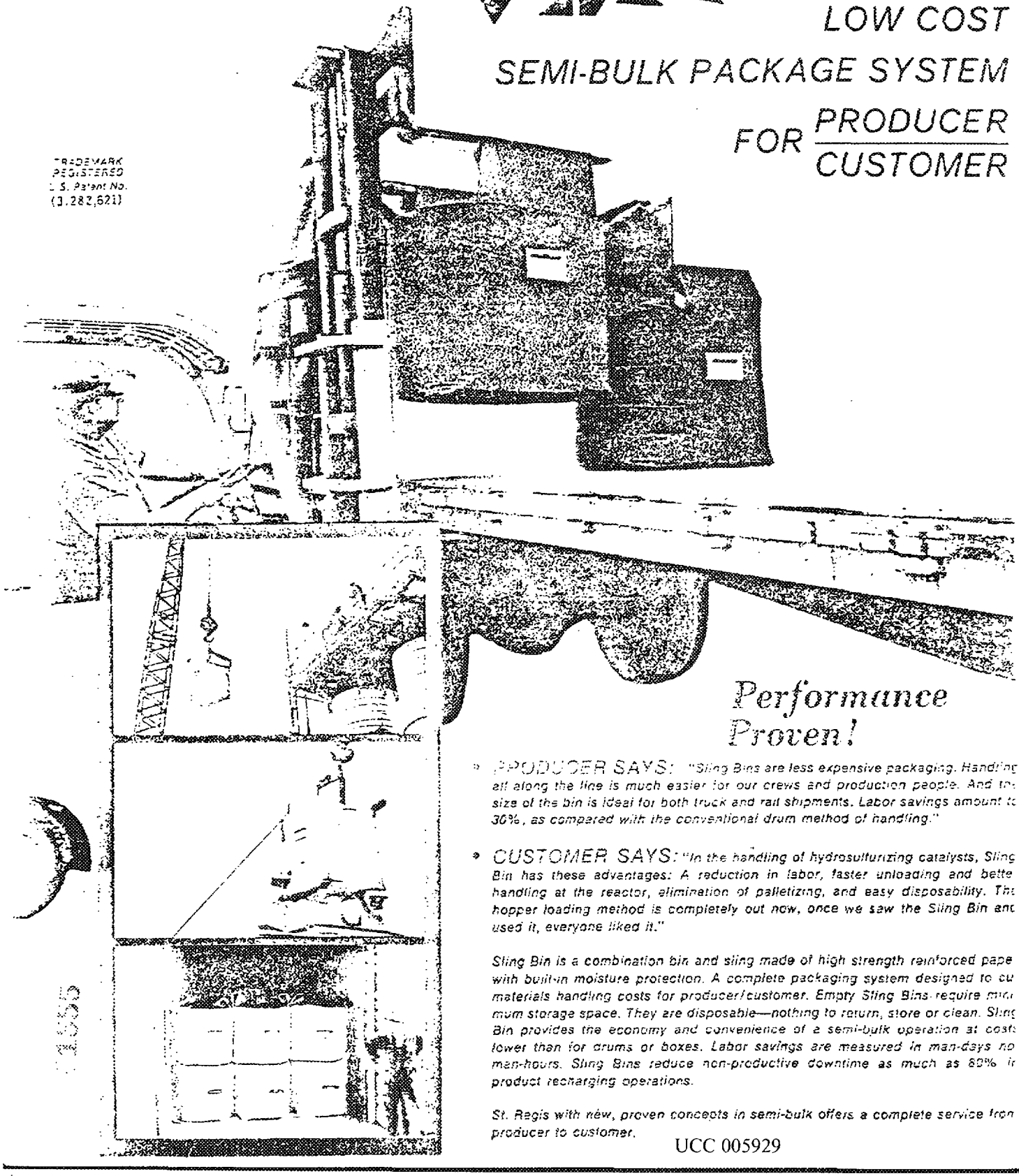
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ST REGIS

Sling Bins

LOW COST SEMI-BULK PACKAGE SYSTEM FOR PRODUCER / CUSTOMER

TRADEMARK REGISTERED U. S. Patent No. (3,282,621)



Performance Proven!

- PRODUCER SAYS: "Sling Bins are less expensive packaging. Handling all along the line is much easier for our crews and production people. And the size of the bin is ideal for both truck and rail shipments. Labor savings amount to 30%, as compared with the conventional drum method of handling."

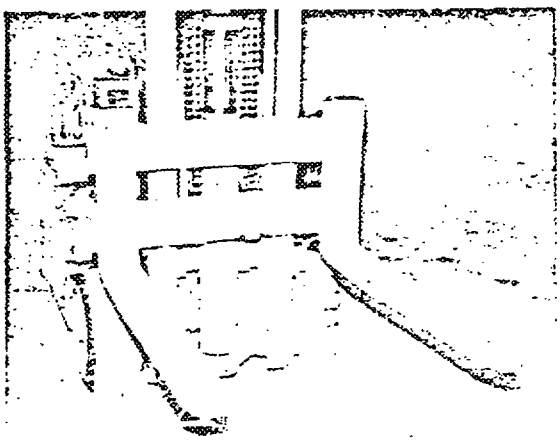
- CUSTOMER SAYS: "In the handling of hydrosulfurizing catalysts, Sling Bin has these advantages: A reduction in labor, faster unloading and better handling at the reactor, elimination of palletizing, and easy disposability. The hopper loading method is completely out now, once we saw the Sling Bin and used it, everyone liked it."

Sling Bin is a combination bin and sling made of high strength reinforced paper with built-in moisture protection. A complete packaging system designed to cut materials handling costs for producer/customer. Empty Sling Bins require minimum storage space. They are disposable—nothing to return, store or clean. Sling Bin provides the economy and convenience of a semi-bulk operation at costs lower than for drums or boxes. Labor savings are measured in man-days not man-hours. Sling Bins reduce non-productive downtime as much as 80% in product recharging operations.

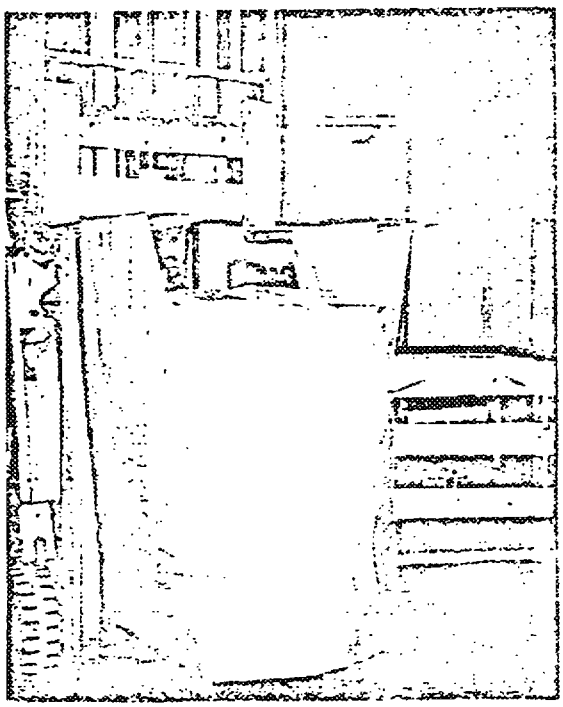
St. Regis with new, proven concepts in semi-bulk offers a complete service from producer to customer.

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26. Standard fork lift truck.



27. Handling with standard fork lift truck.

HANDLING SLING BINS

Sling Bins can be handled by standard fork lift trucks, hoists and cranes.

Sling constructions are determined by weight and usage requirements. They are designed to withstand the rigors of normal lift truck handling which include traveling over rough floors, across rail tracks, etc.

HANDLING WITH FORK LIFT TRUCKS USING STANDARD FORKS

In handling with fork lift trucks, tine widths up to 6" may be used, however, it is preferable not to use tines wider than 5". Round tines, if available, are best.

Tines should be long enough to go completely through the sling loop with the tapered or pointed tips of the tines extending beyond the end of the sling and also allow a couple of inches clearance between the bin gusset and the front end of the lift truck.

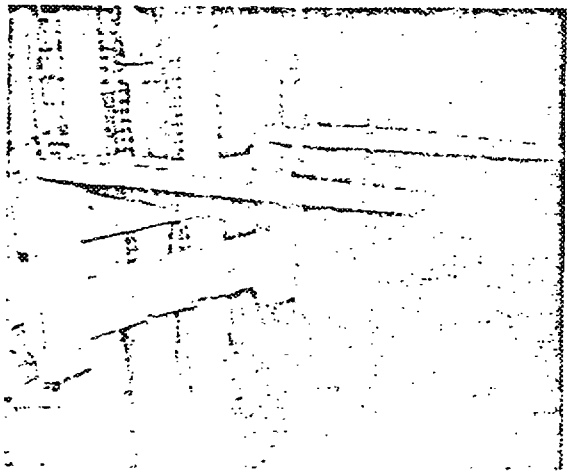
When picking up filled units initially, the tines should be spaced so that the dimension between the outside edges of the tines is a couple of inches wider than the width of the filled bin. This is done to pull in the bin sides and establish a consistent bin shape, and to "set" the sling loops. When the filled units must be placed close to the walls of a rail car or truck, the outside edges of the tines should be even with the outside of the bin.

After initial handling, it will be noted that the sling loops retain the shape of the tines. Sling loop shape retention is due to flat wires embedded in the sling construction at each of its four ends. This sling feature makes it easy for operators to rehandle units. If for any reason the sling loops are folded, crushed or squeezed such as they might be in stacking or shipping, the built-in wires provide for re-shaping of the loops for rehandling.

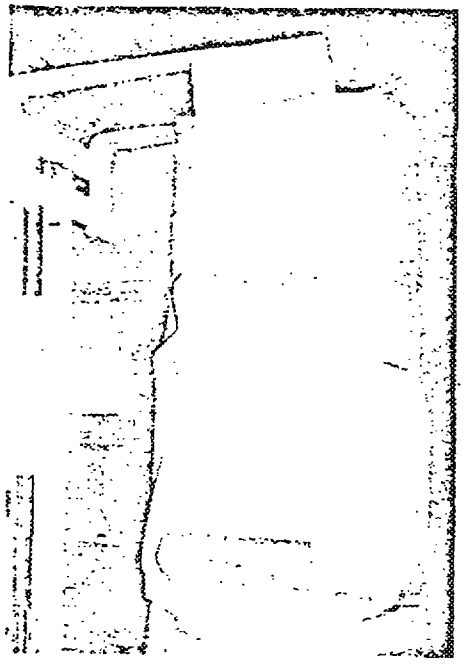
LIFTING HEIGHT LIMITATIONS

The handling of Sling Bins with standard fork lift equipment is shown in Photos 26 and 27. Since Sling Bins are top handled, a large part of the lifting height range of a lift truck is lost just in raising the unit for normal transporting. The loss in lifting height frequently limits stacking capability of the lift truck. In addition, the mast height of the lift truck at the required operating level of the tines may prevent double stacking in trucks and possible rail cars.

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28. Inverted forks on standard fork lift.



29. Triple stacking using inverted forks.

USING INVERTED FORKS

With many lift truck models, it is possible to overcome the stacking height and mast height problems by inverting the forks as shown in Photo 28. With some model trucks, inverted forks when elevated, are higher than the mast top and therefore permit maximum utilization of head room in trucks, rail cars and storage areas. Photo 29 shows a high lift unit with inverted forks above the mast being used to triple stack Sling Bins.

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30. Slip on tines for handling wide Sling Bins.

WIDE SLING BINS

Sling Bins having general widths of 3'3" and wider when empty, fill out to 3'10" and more due to expansion. When these larger units are filled to the correct level it is frequently difficult or impossible to pick them up with standard forks either because the tines cannot be spread far enough or the slings cannot be brought together sufficiently for easy entry.

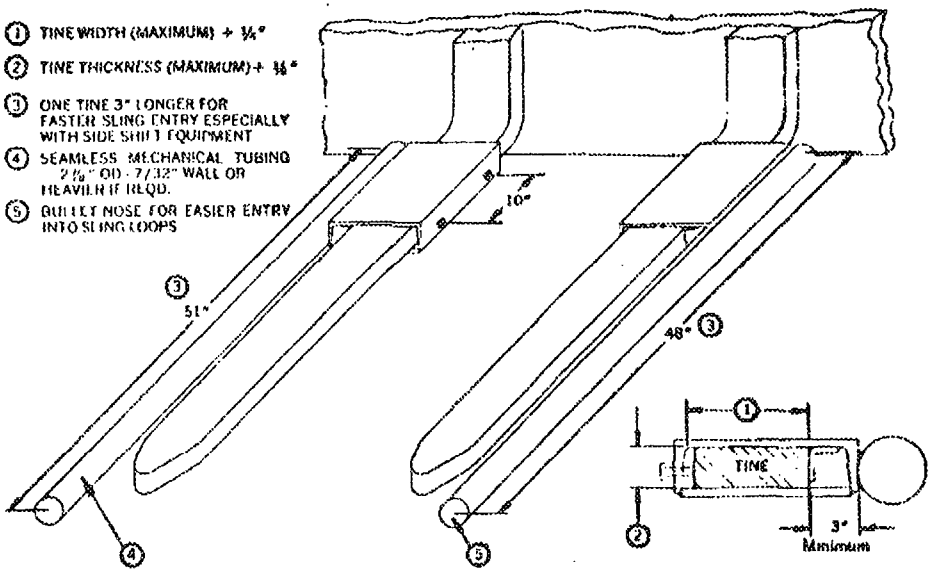
The problem of handling wide units with standard fork lift equipment is readily solved by using a set of inexpensive slip-on tines—Photo 30. The effective width of the forks is increased considerably with this equipment—Photos 31 and 32. The original details of the construction of the slip-on tines are shown in Sketch #3. The sketch shows that one tine should be longer than the other. This is recommended for easy threading of the tines into the sling loops. If the fork truck is equipped with a side shift, having one tine longer is particularly useful because, with the sling loops open, a lift truck operator can insert the longer tine into one loop a couple of inches, side shift to line up the second tine with the other loop and then enter fully for pick-up.

Off-set hooks to handle wide Sling Bins can be made up special by fork lift equipment repair companies or can be fabricated locally. These would replace standard forks.

LEANING SLING BINS

Photos 33 and 34 show how a tilted or leaning Sling Bin may be picked up by lift truck when it is difficult or impossible to get the tines through the sling loops. Pick up is accomplished by using two lengths of 2" pipe (longer than the sling width) through the sling loops, and a chain threaded through the pipes criss crossed and secured over one or both tines of the fork lift. This method of handling Sling Bins can be employed when units are shifted badly in shipment and are moved into positions or attitudes that are difficult to get at for normal lift truck handling.

If a Sling Bin persists in leaning to one side after it has been picked up and set down, it can usually be lighted in the following manner. Pick the unit up again with the pipes and chain, put a board under the low side of the bin to hold it level. Remove the chain and pipes, pick the unit up with the tines of the fork lift, place a 2" x 4" or 4" x 4" board (longer than the unit width) on the high side and set the unit down on the board a few inches until level. With most products this procedure pushes the material in the bin from the high side to the low side thus leveling the bin. Photo 35.



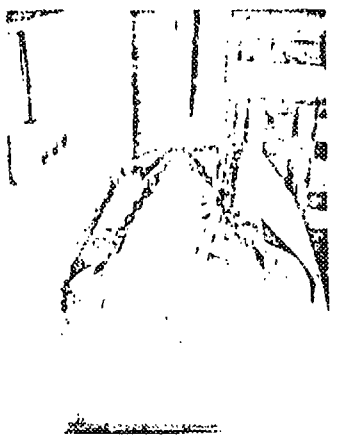
SLIP-ON TINES FOR STANDARD FORK LIFT TRUCKS FOR LIFTING WIDE SLING BINS
SKETCH NO. 3



31. Slip on tines (round) installed on standard forks.



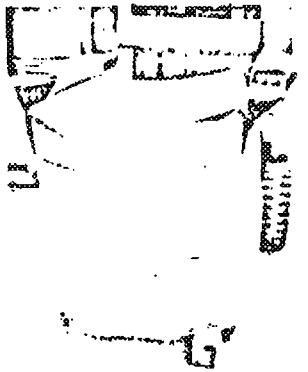
32. Slip on tines used to handle wide Sling Bins.



33. Picking up a leaning Sling Bin with pipes and chain.



34. Pipes and chain through the Sling Bin handle slots up when fork entry is difficult.



35. Using a 4" x 4" to right a leaning Sling Bin.

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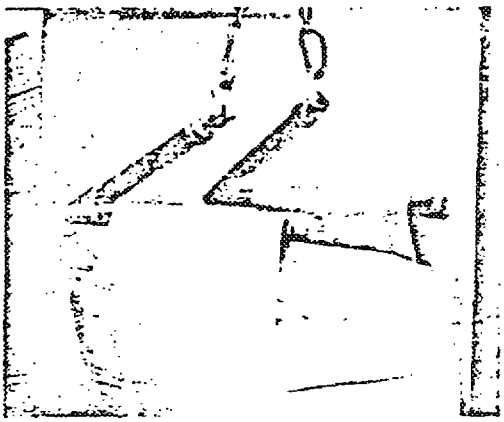
HANDLING WITH HOISTS AND CRANES

Sling Bins can be readily lifted vertically to great heights by hoists, cranes and similar equipment. The ability to handle Sling Bins in this manner makes them very functional for product charging in many operations.

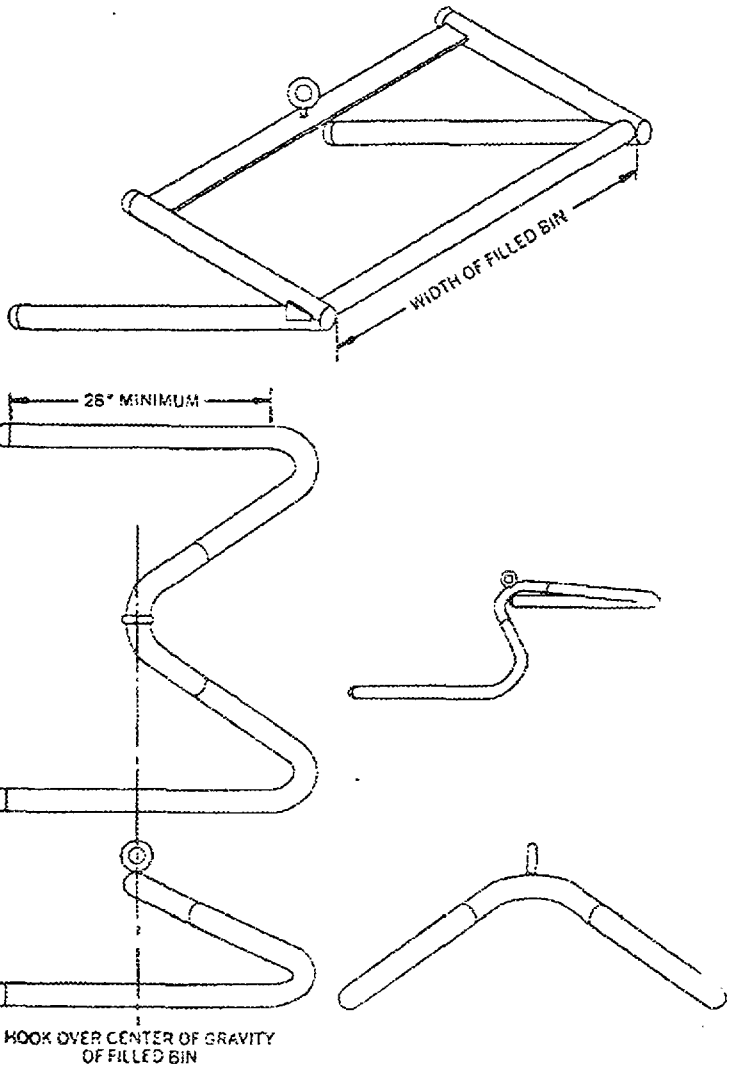
Handling Sling Bins with vertical lifting equipment requires the use of "center of gravity" lifting bars which make it possible to lift the Sling Bin level and distribute the weight of the filled unit across the entire width of the sling. They can be fabricated as two separate units as shown in Photo 36 or as fixed width units as shown in Sketch #4 (two types shown).

The "center of gravity" lifting bars shown are inexpensive and can be readily fabricated to suit requirements at each location.

Vertical handling with the equipment described is used to move Sling Bins into and out of barges and ship holds, and to elevate materials for charging into batch hoppers, reactors, supply bins, towers, etc. Photos 37 and 38 illustrate this usage.



36. "Center of Gravity" Lifting Bars.

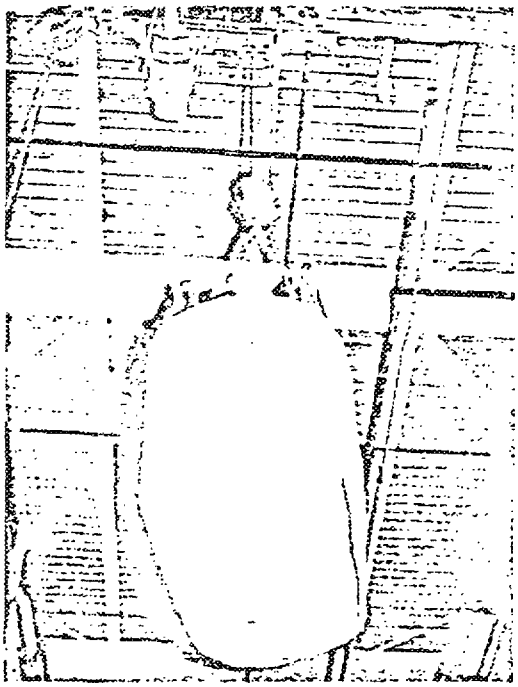


SLING BIN "CENTER OF GRAVITY" LIFTING DEVICES

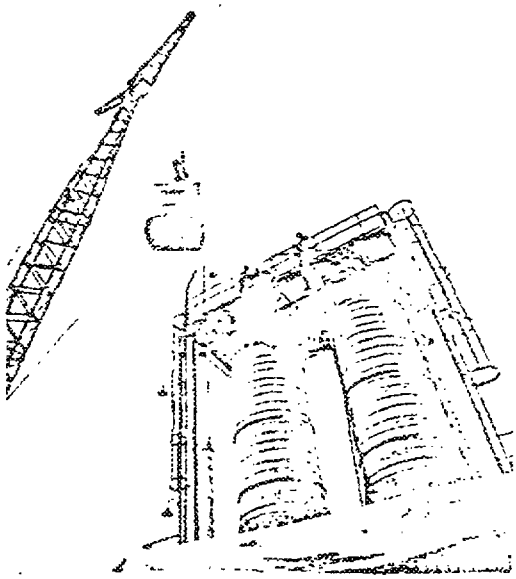
SKETCH NO. 4

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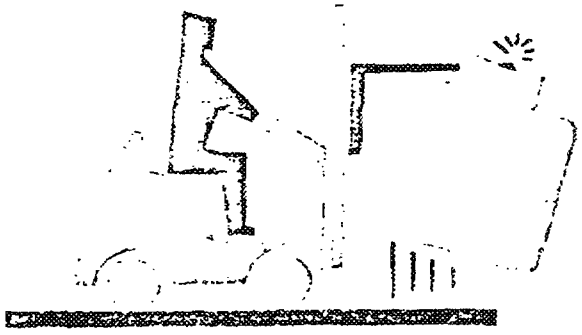


37. Sling Bin used for batch operation.



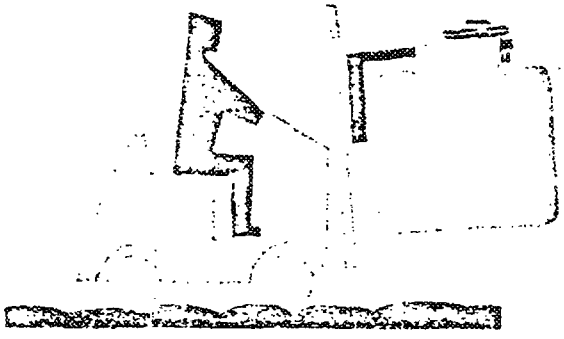
38. Catalyst charging operation.

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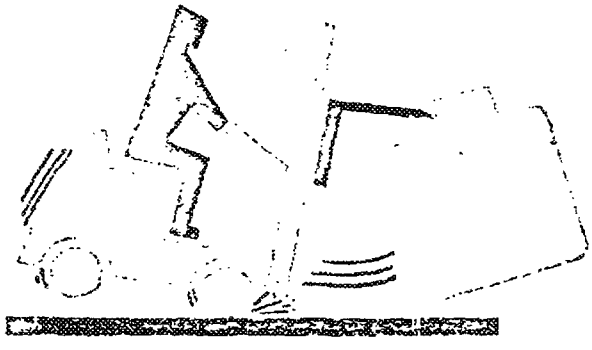
IMPORTANT HANDLING "DON'TS"

1. *Don't try to pick up a Sling Bin with the lifting equipment partly through the slings. Be sure the tines or lifting bars extend beyond the ends of the slings. The parallel sides of the tines should engage the full width of the slings.*



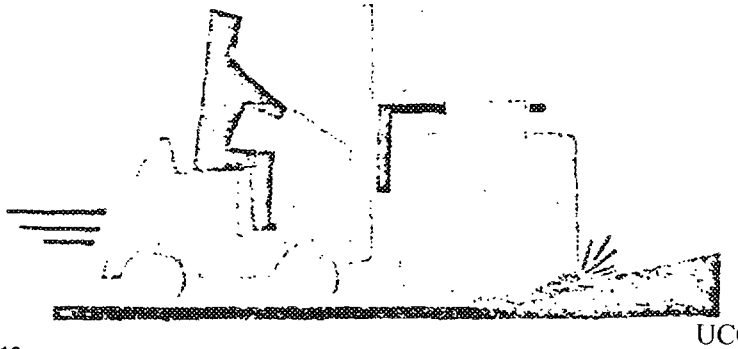
2. *Don't pick up a filled unit with the bin against the front end (mast base) of the lift truck. Leave a couple of inches clearance to avoid puncture or other damage.*

3. *Don't tilt the forks—try to handle units reasonably level to avoid excessive strain of the sling edges when traveling over rough floors.*



4. *Don't pick up units with partially torn slings—repair them first, using 1" to 3" wide pressure sensitive filament tape such as 3M Scotch Brand No. 880 or equivalent. Apply the tape across the tear and rub with a blunt instrument to insure good adhesion.*

5. *Don't stop or start too fast when carrying filled units with a fork lift.*

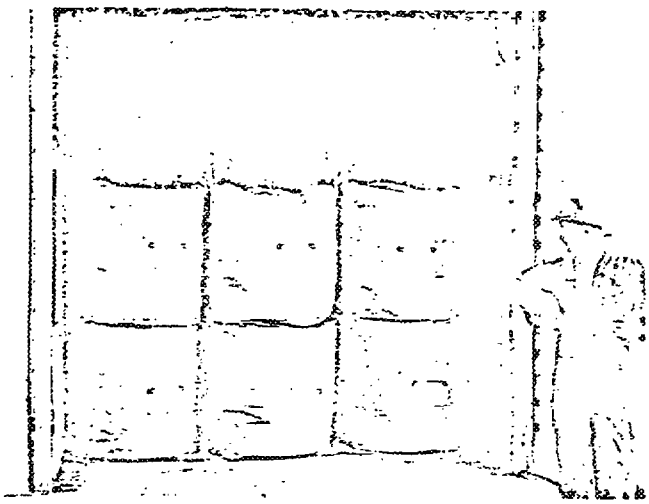


6. *Don't negotiate ramps, up or down, without first elevating the Sling Bin sufficiently to avoid hitting the floor with the leading edge of the bin. Tilt forks to carry the unit level up or down the ramp.*

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40. Shipping Sling Bins in a rail car—2 high.

SHIPPING AND STORING SLING BINS

Sling Bins can be shipped in rail cars, van trucks, gondola trucks and ships as well as on flat bed trucks and barges. They are ideal for containerized shipments.

Size and construction of the units must be determined for each application for most effective use of the shipping vehicle employed.

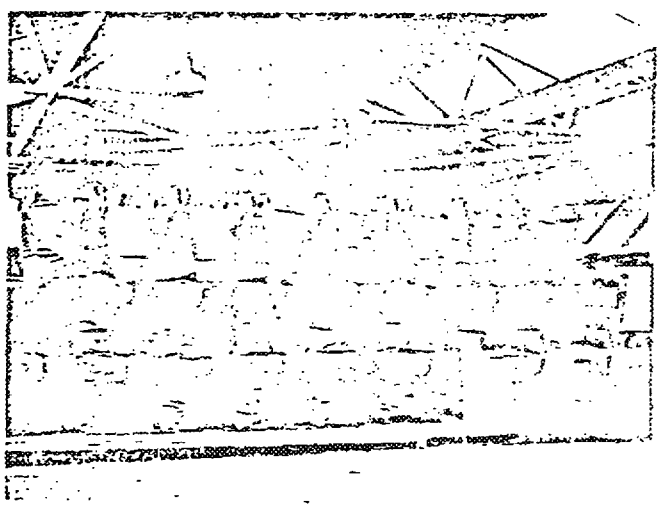
Units can be shipped double tiered. Filled unit weight, size and construction will determine ability to double tier for shipment.

Photo 40 shows 30 cu. ft. Sling Bins (filled capacity) stowed 3 wide, 2 high in a rail car. Each unit contains 1400 lbs., net weight.

Sling Bins can be stored 2, 3 or 4 high depending on net weight per unit and construction. They can be stacked one over one for double tiering, however, for 3 and 4 high stacking, pyramiding is recommended.

Photo 41 illustrates 3 high stacking with the top row set in pyramid fashion. The units shown have 30 cu. ft. filled capacity and 1400 lbs. net weight each.

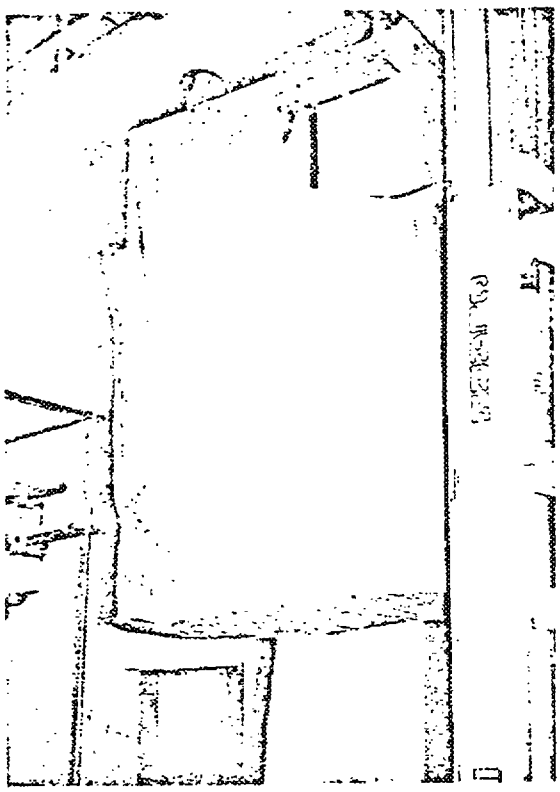
Sling Bins may also be stored and stacked on pallets for more rapid handling in and out of warehouses.



41. Storing Sling Bins 3 high. Note—The third tier is stacked pyramid fashion.

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42. Emptying through V-cut in bottom of Bin.

EMPTYING SLING BINS

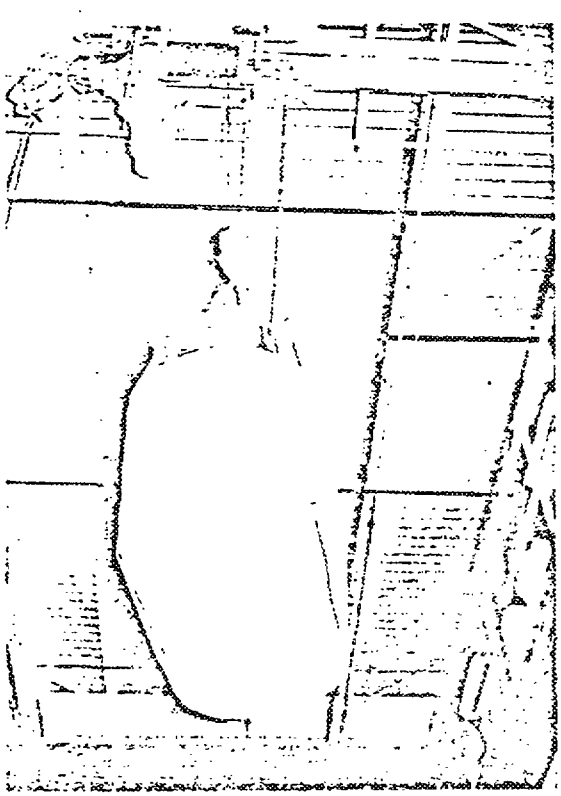
Sling Bins can be top emptied by vacuum or by using a box dumper modified to handle a flexible container.

The ability to readily bottom empty a Sling Bin is one of its important features. Bottom emptying can be accomplished in a few ways.

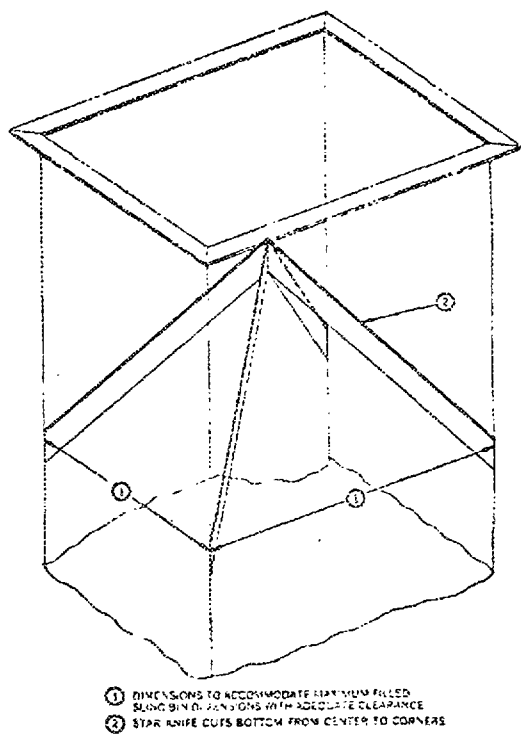
The bin bottom may be cut open either manually or mechanically depending on requirements and available equipment.

Photo 42 shows a bin being emptied through a small V-cut in the bottom of the bin. This method of emptying permits control of the flow of granular, palleted and other free flowing products, and also makes it possible to empty the bin in increments down to 1/4 to 1/3 of the bin contents. The V-cut can be taped after each portion of the contents are emptied. Photo 43.

In order to empty compacted and "sticky" products, it is necessary to cut practically the complete bottom of the bin. This is done by lowering the bin on to a star knife which will cut the bottom open from the center to the four corners of the bin. This method of emptying is very fast and thorough. Sketch #5 shows a star knife installed in the top of a bin. The knife blades are positioned to cut the bin bottom from the center to the corners.



43. Partially empty Bins can be sealed and handled after removal of some product.



① DIMENSIONS TO ACCOMMODATE FULLY OR PARTIALLY FILLED SLING BIN DIMENSIONS WITH ADEQUATE CLEARANCE
② STAR KNIFE CUTS BOTTOM FROM CENTER TO CORNERS

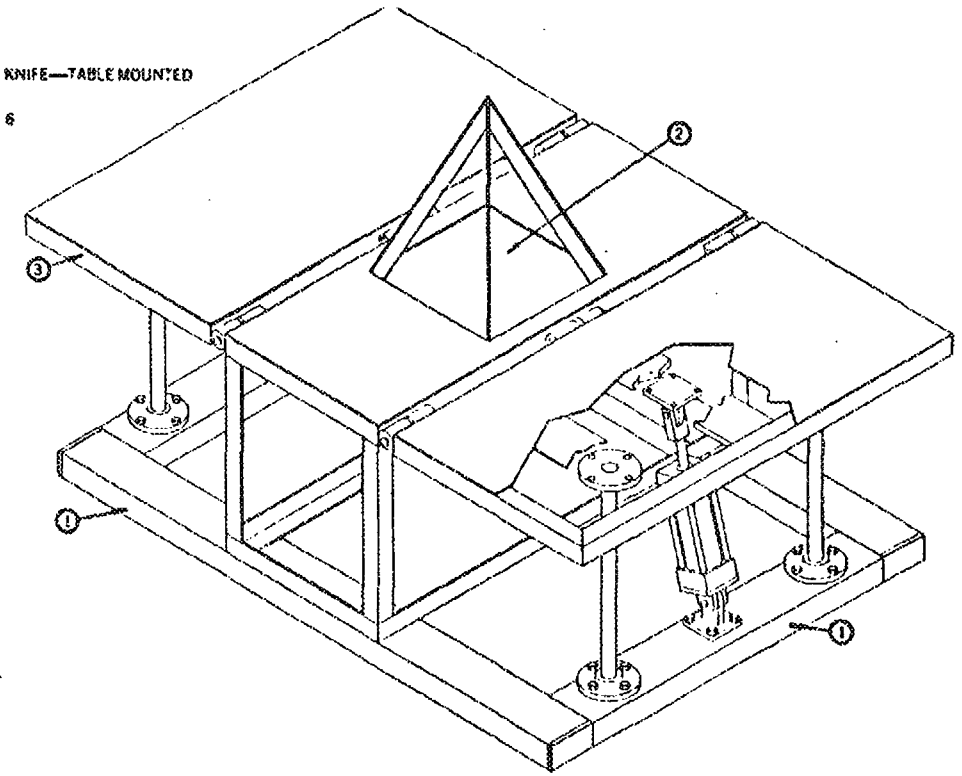
SLING BIN BOTTOM EMPTYING STAR KNIFE
SKETCH NO. 5

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SLING BIN BOTTOM EMPTYING STAR KNIFE—TABLE MOUNTED

SKETCH NO. 6



1. MAY BE INSTALLED PERMANENTLY OVER A BIN OR SET ON LEGS AND CASTERS FOR PORTABILITY.
2. WITH A SMALL CATCH HOPPER AND SLIDE VALVE INSTALLED UNDER THE STAR KNIFE, SLING BINS MAY BE USED AS SMALL SUPPLY BINS.
3. SIDE PLATES CAN BE EITHER OPERATED HYDRAULICALLY AS SHOWN OR SET AT A FIXED ANGLE (SEE PHOTO 45). USING A ONE PIECE FLAT TABLE IS A SIMPLER ARRANGEMENT

Another star knife arrangement is illustrated in Sketch #8. In this arrangement the desired star knife size can be mounted on a frame and either installed permanently over the top of a bin or hopper, or set on casters for mobility. A cut-off slide valve under the knife can be built into the arrangement so that the Sling Bin can be used as a small supply bin.

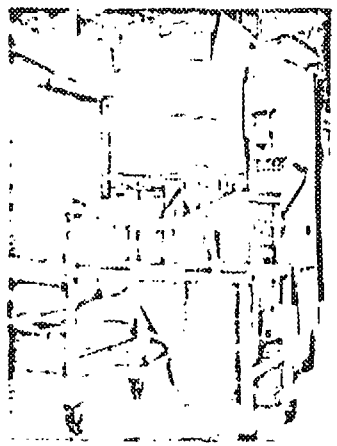
The table mounted star knife need not be as elaborate as that shown in Sketch #8 which has hydraulically operated side panels for better emptying. A flat table or a table with fixed angle side panels are simpler arrangements. A star knife mounted on a table with fixed angle side panels and a cut-off slide valve is shown in Photos 44 and 45. Regardless of the arrangement of side panels, some product will remain along the four edges in the bottom of the bin. The last of material can only be discharged by manually pushing the sides of the bin toward the center opening.

As mentioned earlier, Sling Bins are available with an EZMT (Easy Empty) feature which consists of a 6" diameter hole in the bottom of the bin and a fiberboard slide valve. This method of emptying works well with many products and is frequently used when it is necessary to keep contamination at a minimum, or to control the flow of products, or when Sling Bin rate is desired.

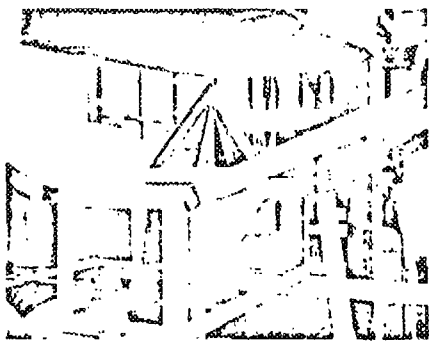
The EZMT feature will not work with products that compact or that are sticky and do not flow. It will not work with products that remain alive, such as round marbles and balls, because products of this type exert constant pressure on the bottom of the bin thereby locking the slide valve.

Photos 46 and 47 show the optional EZMT feature being used to control the flow of polyethylene pellets from a 28 cu. ft. Sling Bin containing 1000 lbs. of this product.

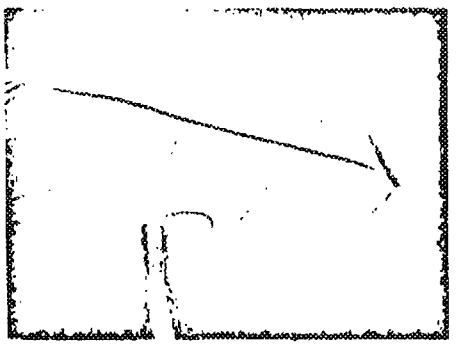
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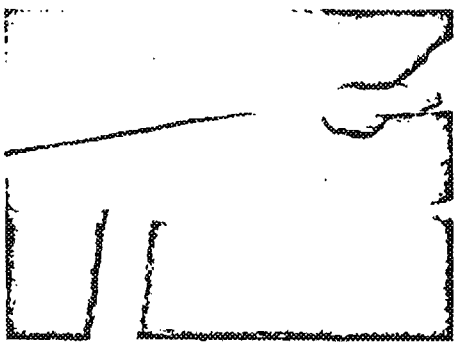
44 Star knife bottom opening stand



45 Star knife arrangement with cut off slide valve permits use of Sling Bin as a small storage bin.



46 EZMT Slide Valve (optional).



47 Controlling product flow with EZMT arrangement. EZMT Features makes Sling Bin reuse possible.

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CALIDRIA STANDARD GRADE PRODUCTS
TYPICAL PROPERTIES

	SG-100	SG-130	SG-200	SG-210
Magnetite, %	1.7	1.7	1.7	1.7
Reflectance, G.E.B.	-	66	-	68
Loose Dry Bulk, #/ft.^{3}	44	7	44	5
Pkgd. Dry Bulk, #/ft.^{3}	44	18	44	16
DOP Oil Absorption, #/100#	-	100	-	110
Wet Bulk, 10 gm/ 250ml/ 1 hr.	-	200	-	240
Wet Screen, Cum. % Ret., 100M	-	5	-	trace
200M	-	17	-	3
325M	-	30	-	12
Bag Weight, lbs.	50	40	50	35
Pallet Weight, lbs.	2000	1600	2000	1400

C1563

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TYPICAL PRODUCT CHARACTERISTICS FOR STANDARD GRADE-210 (SG-210)

PROPERTY	TYPICAL VALUE
G. E. Brightness, %	68
Magnetite, %	1.7
Moisture, %	2
Alkalinity, % Na_2O	.05
pH	9.5
Surface Area (BET), $m^2/gm.$	55
Oil Absorption, lbs. DOP/100 lbs.	110
Water Absorption, %	100-120
Wet Screen, % +80 Mesh	0.3
, % +325 Mesh	12

Single Bag Weight	35	lbs.
Single Pallet Weight, 40 bags	1,400	lbs.
27' Truckload, 7 Pallets	23,800	lbs.
50' Railcar Load, 52 Pallets	72,800	lbs.

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