This paper describes a new type of bin for storing shredded solid waste, either municipal or industrial. The bin can also be placed in a system following an air classifier to store the light fraction of shredded waste. The bin described has two vari-speed driven conveyors at the bottom for two or four metered material outlets.

The bin can be built for a capacity of up to 100 tons of municipal waste. This municipal waste normally weighs 8 lbs. per cu. ft. or 128.5 grams per liter.

The bin described has been designed to store non-freeflowing materials and meter such materials from two or four outlets.

Material such as plastic film, 2 mils thick, cut through 25 millimeter screens, cut nylon thread, shredded industrial or municipal waste, can readily be discharged from this bin.

The user has never put anything in this bin that he could not discharge from the bin. To better understand this live center bin, let us look at a diagram of a live bottom bin and compare to this live center bin. As per Fig. No. 1, the screw conveyors in the live bottom bin completely cover the bottom of the bin. The screws are horizontal. The bin walls are vertical and designed with a negative slope for some materials (see Fig. No. 2). In this type of bin 100 percent of the weight of the contents of the bin is supported by the horizontal screw conveyors. The bins of this type have been designed so that the conveyors can safely withstand 100 percent of the vertical load. The bottom conveyors serve the dual function of conveying and metering. The distance is across the entire width of the bin, and to minimize headroom a gathering conveyor can be provided at the discharge end. This type of bin will not discharge if any one of the horizontal conveyors is not functioning.

Figs. Nos. 3 and 4 show the live center bin. The shape of this bin is more or less conventional in that two sides are sloped to a central hopper and two sides are straight. In the bottom hopper there are only two horizontal screws and these horizontal screws are only exposed to about 50 percent of the vertical projected load over their area.

These two screws can have the same hand of conveyor with two outlets or the two screws can be designed with both right-hand and left-hand flights, giving the bin four outlets.

There is a bank of vertical screws the full height and width of the bin and these vertical screws are between the two horizontal screws. The vertical screws are driven at a constant speed. These screws are subjected to only a fraction of the vertical load and this fraction of load is maximum at the very bottom of the conveyors and is reduced to zero at the top. These vertical screws are functioning as a continuous bridge-breaker and make, in effect, two bins with one set of screws.

The thrust and power required to drive the vertical screw is determined by the slope of the bin bottom. The steeper the slope of the bottom hopper, the more per cent of thrust there is against the vertical screws. The speed of the ver-
Live Center Bin Specifications

All figures based on 8lb/ft³ municipal waste light fraction at a total nominal discharge rate of 10 ton/hr.

<table>
<thead>
<tr>
<th>Model</th>
<th>Total Capacity — ft³ (water level)</th>
<th>†Working Cap. — ft³ (based on 45° angle of repose)</th>
<th>No. Vertical Screws</th>
<th>Total HP</th>
<th>Bin Weight (lbs) *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tr>
<tr>
<td>LC-50</td>
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<td>24</td>
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<td>34</td>
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<tr>
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<td>7,100</td>
<td>10</td>
<td>45</td>
<td>61,700</td>
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<tr>
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<td>8,600</td>
<td>12</td>
<td>56</td>
<td>73,400</td>
</tr>
</tbody>
</table>

†Working capacity dependent on method of bin loading. *Wt. less motor and drives.

The vertical screws has to be relative to the speed and discharge rate of the horizontal screws, but this speed may be constant.

The vertical bank of screws has a pronounced elevating action and some mixing of the material in the bin is in evidence.

The bin can be loaded on both sides of the vertical screws or on one side only. The screws even out the load height, and if the bin is loaded on one side, the rotation of the screws will transfer the material from the loaded to the unloaded side very readily.

The vertical screws are driven at constant speed and will have to rotate whenever the bin is being charged or discharged.

The horizontal metering screws have been designed within an enlarged section, leveling out the surges from the conveyor flights.

The discharge rate will vary somewhat in relation to the density of the material over the screws. This density will, in turn, vary in some proportion to the height of material in the bin. For municipal waste at 8 lbs. per cu. ft. (125.8 grams per liter), the density will be approximately three times as
great with waste in the bin at a height of 25 ft. (7.62 meters).

To obtain uniform rate of discharge from a partially empty to a full bin, a variable speed drive will have to be used for the horizontal conveyors.

This variable speed drive can be mechanical AC or DC with remote control, if so desired.

Typical bin sizes are shown in Fig. No. 5.

No foundation is required for the bin other that support piers for the vertical columns. The bin is entirely self-contained.

**PARTIAL LIST OF LIVE CENTER BIN INSTALLATIONS**

- **E. I. du Pont** – 1961 – Carneys Point, New Jersey
  - Cotton Fibers, 1.1 lbs. per cu. ft.
  - Aluminum bin, carbon conveyors

- **FMC Corporation, Downingtown, Pennsylvania** – 1965
  - Chopped film
  - Stainless steel

- **Du Pont, Washington, West Virginia**
  - Nylon fibers, 3 – 5 lbs. per cu. ft.
  - Aluminum bin, stainless steel conveyors

- **Weyerhaeuser Company, Barrington, New Jersey** – 1967
  - Ground waste cardboard, 1.5 lbs. per cu. ft.

- **Du Pont, Mechelen, Belgium** – 1969
  - Nylon fibers
  - Stainless steel – 14.7 P. S. I.

- **Fiber Industries, Inc., Fiberton, North Carolina** – 1972
  - Chopped polyester fibers, 4 lbs. per cu. ft.
  - Carbon, epoxy-coated

- **Packard Industries, G. M. C. Division, Warren, Ohio** – 1972
  - Nylon 6 fibers, 3 – 9 lbs. per cu. ft.

- **Brown Company** – 1972 – 3 bins
  - Wood celluose flock, 5.5 lbs. per cu. ft.
  - Carbon steel

- **E. I. du Pont** – 1972
  - Cut nylon yarn, 3 – 10 lbs. per cu. ft.
  - Stainless steel – 2 P. S. I.

- **Eastman, Kodak, Rochester, New York** – 1975
  - Industrial waste, 2 lbs. per cu. ft.

**KEYWORDS**

- Municipal Waste
- Live Center Bin
- Live Bottom Bin
- Negative Slope
- Conveying and Metering
- Vertical Projected Load
- Vertical Bank of Screws
- Continuous Bridge Breaker
- Horizontal Metering Screws
- Self-Contained Bin

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