

Engineering applied to packaging

By DUNCAN CASSIDY

NO INDUSTRY has done more to stimulate and test the ingenuity of the package engineer than that devoted to the production of electrical appliances. Though this industry consumes the second largest number of corrugated fibre packages it consumes by far the largest number of specialized packages. This demand is not explained solely by the large volume of output, or by the great variety of shapes encountered among electrical appliances. It is accounted for chiefly by the fact that the electrical industry, having been developed recently by inventive and original minds, is not governed by habit and tradition to the extent of most industries. Minds which could pioneer in new regions of science were also responsive to methods which, in the distribution of products, promised to eliminate waste.

Just as the mechanical engineer would be helpless without steel, so the box engineer could not produce his varied designs without corrugated fibre board. This

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THE design of proper packing so that a radio set shall reach its destination in good working condition, is no less important than the proper design of its operating circuits—for both are essential to the customer's satisfaction.

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material is composed of tough, waterproofed fibre sheeting, trussed with cross braces of minute corrugations,—a type of mechanical construction which combines a maximum of both strength and lightness. When such material is under pressure or is struck a blow it will compress but its rigidity is not affected.

The "raw product"

Corrugated fibre board is used, in the several stages of its manufacture, for wrapping and padding goods. "Unlined" board is a single corrugated sheet, usually shipped in 500-ft. rolls. Single-faced board has one flat facing cemented to the corrugated sheet to prevent flattening of the corrugations, while double-faced board has plain facings cemented to both sides of the corrugations. The double-faced board, used for making containers, is faced on both sides with tough, resilient sheets whose thickness and consequent tensile strength are graduated to meet the requirements of the article to be packed and the transportation service to be used.

The puncture resistance of board is tested in a Mullen testing machine. Non-test board, which may test under 175 lbs. puncture resistance, is used chiefly for the smaller mailing boxes adapted to light articles. Boards which resist puncture at a pressure of 175 lbs. and 200 lbs. respectively, per square in., are used for express and freight boxes. A board of extra strength, which resists puncture at 300 lbs., is also manufactured. This material is used for out-size boxes or those intended to carry extra weight.

The unit package—its economies

Working with these materials the packaging expert has made himself most useful to the electrical industry. The unit package is probably his most important contribution as such a large percentage of electrical appliances now reach the consumer in single units and quite frequently in the original factory container. The unit package achieves great economy of time and effort. The middleman is relieved of the work of unpacking a shipment to verify the invoice. He knows that each package contains one unit, or a specified number of units. He counts the packages, unpacks one or two for display purposes and stores the remainder of the articles in their dust-proof containers. This eliminates shop wear and breakage in storage. In a shipment of desk lamps, for example, each box contains shade, base and cord, firmly held in place by stays and braces.

Three fundamental principles are observed in designing a unit package for any article. First, the contents must be so anchored in the box that they cannot wedge or shift in handling; second, no two separate articles are allowed to touch each other; and, third, no highly polished, fragile or protruding parts are permitted to come in contact with the walls of the container.

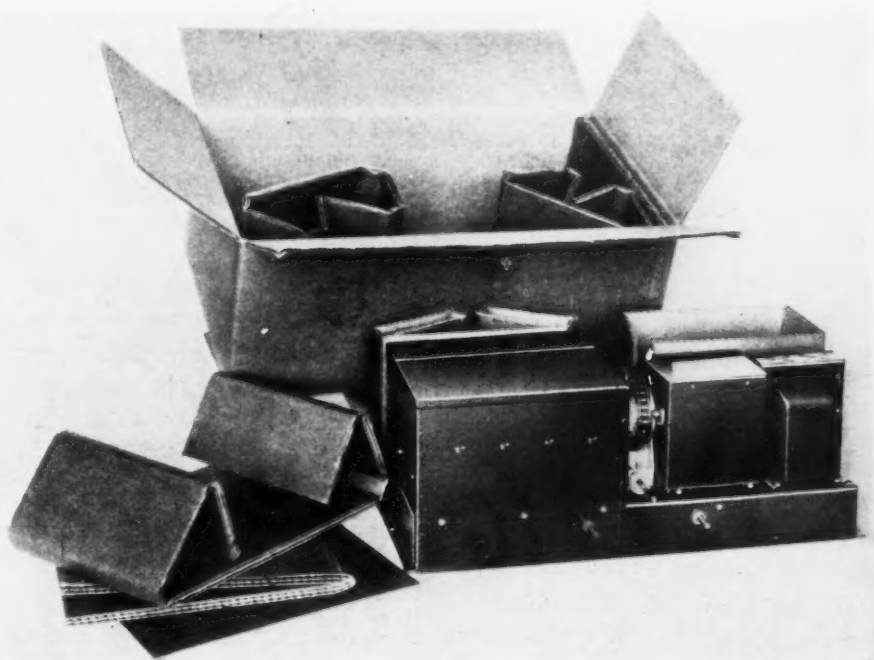
The box engineer displays his ingenuity in designing the interior packing. Safety is the first requirement and obviously there is always the best way for insuring safety. The box specialist's job is to discover the best way and at the same time to give attention to ease and speed of packing and economy of spacing and weight. When the expert announces solution of a problem every cut and scored piece of board has its own proper place into which it fits perfectly; every delicate part of the article to be shipped is securely anchored at a safe distance from all sides of the container. Through severe and careful tests it is ascertained whether the contents

will remain suspended in place, unharmed by treatment far rougher than it is likely to receive during shipment. As a consequence, breakage in transit, which once imposed a heavy burden on the shipper, need no longer be taken into account.

Containers for radio receivers

Millions of these specially designed containers are used each year by the electrical industry. But of all problems presented to the packaging expert by the electrical industry, involving odd shape and fragility, that of the radio set is most complex. The many shapes and sizes of delicate parts which compose the sets cause the difficulty.

Nevertheless, all packaging problems involving radios have been mastered by the packaging experts. The Simplex Radio Company of Sandusky, Ohio, reports that damage in transit is too negligible to be considered. The company has specially designed containers for three models, prepared by the Hinde and Dauch engineers.

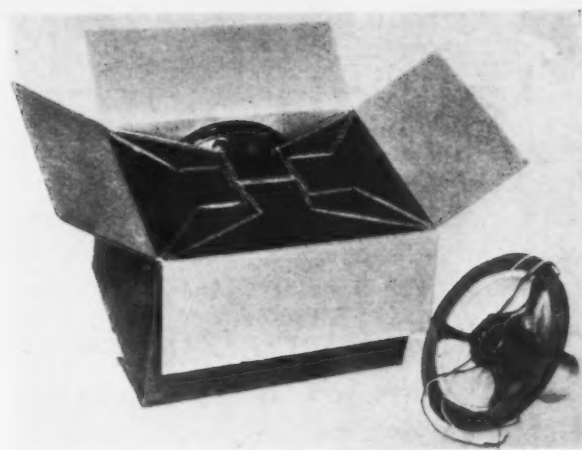


A chassis is protected by buffer cushions, top, bottom, and sides

The Gothic or midget model, is protected by "rat trap" cushions at the bottom and four sides. These cushions are of double-faced board and are folded to give three thicknesses of the material. A facer cushion fixes the set firmly in place, while a cushion of double-faced board at the top completes the interior packing. This model is 12½ in. wide, 18 in. high and 7 in. deep, and weighs 23 lbs. When packed it weighs 31 lbs.

The Moderne is a modernistic design with steps at the sides, and requires, in addition to the "rat trap" cushions two stays of double-double board exactly fitting the steps. The container and interior packing for this set also weigh eight lbs.

The Beverly is 20 in. wide, 36 in. high and 10½ in. deep. The cabinet is supported by four legs. The container is of double-double material. The leg anchorage is composed of a cushion which exactly fits the container except at the corners where there are notches in which the legs rest. Double-faced flaps or pads hold the cabinet in place a half inch from all sides. The cabinet is topped

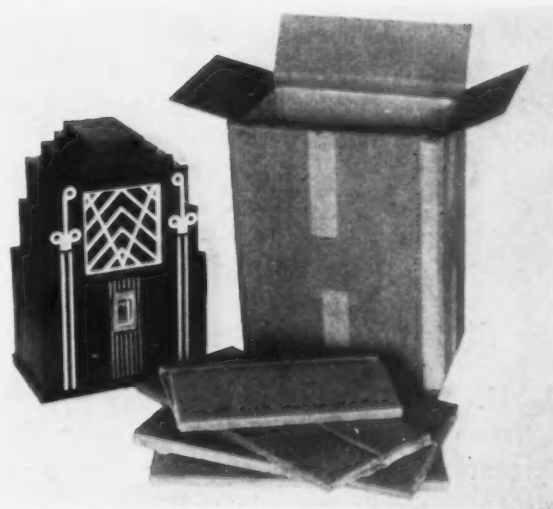


Loud speakers, four to a package, are shipped in this manner

by a single sheet and a cap composed of three thicknesses of double-faced board. The Beverly weighs 42 lbs. and 60 lbs. when packed.

Packing of the sets goes forward swiftly and noiselessly. New workers quickly learn how to adjust the interior packing. The sweep of a brush seals the package. Containers come folded, occupying in this form one-tenth the space they will contain when set up. A fiber container weighing three pounds will contain 2½ cubic ft. One of the old-style containers of the same cubic contents would weigh from 6 to 15 lbs.

A visit to the modern box factory is a revelation to the uninitiated. In a brief time one begins to appreciate the importance to industry—and especially the electrical industry—of the scientifically designed container. It is evident from the variety and complexity of designs produced that the packaging expert has fairly earned the title of engineer.



A modern radio receiver and its packing carton