is its virtually all-wood construction. The only metal parts are forward of the fin walls in the eight engine nacelles. Solid wood could not be used. Trees do not grow large enough, and natural wood has too many inherent defects. Therefore plywood is used throughout for the frame of the hull, wings, tail surfaces, ribs, and for the covering of all major assemblies. Fabrication of these giant components is achieved by laminating and cross-plying selected wood veneers, using synthetic resin adhesives. The adhesive must be stronger and more durable than the wood itself, and must be completely water resistant. The curved sections are produced by the now familiar bag molding process. This involves the use of a mold, over which layers of adhesive-coated veneers are laid cross-grained. The assembly is enclosed in a rubber bag, from which air is exhausted by vacuum, and then placed in an autoclave where steam furnishes both heat and pressure to fuse the veneers into a single solid structure.

The thickness of the veneers varies from 1/48 to 1/2 inch, and the synthetic resin adhesive must possess characteristics which will permit it to cure properly under the various required temperatures. Each of the millions of glued joints in wood construction must possess the necessary strength and show no deterioration.

Science News Letter, January 5, 1946

CHEMISTRY

Synthetic Fibers Research

➤ A SERIOUS WARTIME shortage of natural fibers in Germany, for clothing, canvas and rope, forced concentrated research, it is now revealed, directed toward the production of synthetic fibers with wool-like properties, and replacements for jute, sisal and hemp to make baling materials, rope and twine.

Germany obtained considerable wool from conquered countries, but the amount was insufficient for military uniforms. Its supply of cotton and rope-making fibers was very limited. Even before the war the plan of the Reich government was to make Germany independent, as far as possible, of the importation of raw materials for fibers, and also of natural fibers.

In the case of cotton, this was accomplished to a marked degree by the expansion of the rayon staple and tire yarn industries, but it was recognized that rayon staple fibers would not be entirely satisfactory for outside wearing apparel and for many technical and industrial uses.

German activities in the development of synthetic fibers have been studied on the ground since the close of the war by J. B. Quig of E. I. du Pont de Nemours and Company under a program of investigating German industrial and chemical methods sponsored by the United States government. His report is now released by the Office of the Publication Board, U. S. Department of Commerce.

The shortage of iron, steel and other metals, the report says, greatly stimulated the rapid development of hydrocarbon polymers and copolymers for the plastics industry. Some of these polymers were capable of being made into fibers, and determined efforts were made to find polymeric fibers which would augment the natural fiber economy.

In the development of wool-like fibers, three lines of approach were followed. These were the modification, physically or chemically, of viscose and acetate rayon fibers; the preparation of a synthetic protein fiber; and the application of water repellents to the fiber or fabric.

By the first line of approach, a crimped cellulose fiber of viscose, cuprammonium or acetate solutions was obtained that duplicates fairly successfully the superficial characteristics and processing characteristics of wool, but obtained only a limited success in imparting water repellency, permanence of crimp, and resiliency of handle.

Many other synthetic fibers are reviewed by the investigator. His conclusion, relative to the status of wholly synthetic fibers in Germany, however, is that progress in the United States compares favorably with it.

Science News Letter, January 5, 1946

ENGINEERING

Cable Controls Operation On Bulldozer Tractors

➤ BULLDOZER operators, whether levelling Army airfields or building civilian roads, will welcome a new single-drum front-mounted cable control to raise or lower the heavy earth-cutting blade which is pushed forward by a caterpillar tractor. The new cable control, simple and easy to operate, is mounted where readily accessible on the front of the tractor.

This cable control is of compact design, permitting close mounting to the tractor. Cast-steel structural members and cast-steel case provide structural strength. Anti-friction bearings used throughout contribute to the ease of handling. The control embodies the smooth-performing multiple-disk type clutch that has proved satisfactory in the past.

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