



**ACETYLENE CUTTING MACHINE**—Sergeant Everett R. Van Cleave turns on the power to put his newly invented machine into action in this official Army Air Forces photograph. It follows any pre-determined pattern, and the edge of the material is perfectly smooth after it has been cut.

## PHYSICS

## Fabric Measured by Sound

Elasticity of fabric thread is determined by causing it to vibrate like a string of a violin. Method is not new, but developments have made it commercially usable.

► CAUSING fabric thread to vibrate like a string of the violin with sound waves passing through it, is the basis of a method for determining its elasticity, a property important particularly to manufacturers of girdles, garters and garments that must possess stretchability. The method is not entirely new, but recent developments make it now commercially usable. They result from the work of two scientists of E. I. du Pont de Nemours and Company, Dr. J. W. Ballou and Dr. Shirleigh Silverman.

The elasticity of the thread or yarn must be taken into consideration in adjusting the loom or knitting machine before fabrication is started. The older stretching-by-weight method often produces permanent deformation. The new method does not, because in it a small force is applied rapidly and stretches the material so little and so quickly that it does not have time to get out of shape.

It is the sound waves passing rapidly through the material that cause the rapid stretching and recovery as the thread or yarn vibrates.

In the new method the test fiber is fastened to one end of a steel bar about eight inches long. The other end is strung over a pulley and held taut with a weight. A radio tube audio oscillator is turned on and sets up vibrations in the steel bar at the ten-kilocycle frequency (10,000 cycles per second), causing the bar to give out a very high note. The sound energy passes along the test fiber and causes it to vibrate. The wavelength of these vibrations is accurately measured with a sliding crystal. From the wavelength and the frequency, which is already known, the velocity of the sound is calculated. By what physicists call Young's modulus of elasticity, the elasticity then becomes known.

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## MEDICINE

## Army Uses Benzedrine Only When Necessary

► YOU NEED not worry that your man in the service who may be given a "benzedrine alert" to ward off a "sleep crisis" is in danger of nervous breakdown from overdosage. As explained by Maj. Gen. David N. W. Grant, the Air Surgeon, in a recent report to *Air Force*, official service journal of the U. S. Army Air Forces, distribution of benzedrine is in the hands of the medical officers.

These officers issue only the amount of benzedrine required in a particular situation, issue it only when absolutely necessary, and see to it that the men get a long enough sleep after a "benzedrine alert" to relieve completely the accumulated fatigue.

These medical officers know that benzedrine is no substitute for sleep and rest. The fact should be remembered by the lay person, young or old, who may be tempted to take the drug so he can stay awake to cram for an examination or to crowd into an already full day a few more hours of social or business activities.

"In time of war," General Grant states, "combat conditions frequently require men to remain on active duty long after the desire for sleep tends to overpower the demand for wakefulness.

"The importance of the 'sleep crisis' may be appreciated if one remembers that military success depends not only upon the arrival of enough men and equipment at the right place at the right time, but also upon their continuation in action the right length of time. To win a battle, in other words, striking power must be supported by staying power."

Ideally, staying power is obtained by replacement of tired men with rested reserves. This is not always possible and at such times it is better to give the men a "benzedrine alert" than to risk losing not only the battle but the men themselves.

"One pill may be worth a B-17 and crew of 10 when the man who is flying it can no longer stay awake," General Grant points out.

Benzedrine, it should be understood, will not produce supermen and its practical value will be defeated if the men are denied proper rest after its use.

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