



OILWAYS

JUNE 1961



*Nupak of New Orleans, Inc.
makes it and plumbers
everywhere use it*

The Rope That Stops Water

IN 1937 a young Los Angeles plumber, Duane H. Tollstrup, became dissatisfied with the oakum he was using to caulk joints in soil pipes, those ubiquitous waste carriers of modern civilization. His dissatisfaction led him to invent a new kind of packing, now trademarked Nupak and supporting two manufacturing plants, one in Louisiana and the other in California.

Oakum, to the plumber, conventionally means a loosely twisted rope of jute which has been impregnated with creosote or a petroleum derivative. When packed into the hub-and-spigot joint of a cast-iron soil pipe and caulked with lead, it is supposed to prevent the joint from leaking despite prevailing internal pressures of up to 40 psi.

Like many other plumbers, Tollstrup knew that this kind of oakum had one notable failing: joints caulked with it often leaked, necessitating call backs to repair them. The call backs were annoying and wasted time and money.

Then Tollstrup got his idea. He had become familiar with the properties of bentonite, a clay similar to fuller's earth which is formed under seas through decomposition of volcanic glass. The principal constituent of bentonite is montmorillonite, a hydrated silicate of magnesium. Being extremely hygroscopic, it expands to about ten times its original volume when it comes into contact with water. The idea was to mix the bentonite into the oakum and

On the building site of the Lincoln Square apartments in New York City, a plumber of Jarcho Bros. Inc. packs a pipe joint with Nupak.



Above, jute is fed onto belt which carries it into picker. Inside, the jute is cleaned of dust, dirt and other debris. Below, jute cords come from a cording machine. Observing are Charles J. Wolford, left, Esso representative, and Jay E. Tollstrup, right, Nupak production manager.



take advantage of the bentonite's hygroscopic property. Then if a leak began to form, the water would wet the bentonite and cause the oakum to swell, automatically providing increased leak resistance. This action would be in addition to the natural but moderate hygroscopic action of the jute fibers.

Tollstrup made his trial batches in a neighbor's garage, using a washing machine to mix the ingredients, a wringer to remove excess liquid, and a meat cleaver to cut the oakum into lengths.

When he tried his new packing on the job, he found that it virtually eliminated call backs due to leaks. He quit the plumbing business and entered the business of making Nupak oakum. In 1940 a plant was built at El Monte, California to handle its production. In 1953 the demand for Nupak had grown to the extent that another plant was opened in Kenner, Louisiana, near New Orleans; it operates as Nupak of New Orleans, Inc.

Nupak oakum was the first to be supplied already cut into short lengths (30 inches), making it more convenient for the plumber since it saves him the effort of cutting it on the job. Also, no creosote is used in Nupak oakum; instead it is impregnated with a combination of ingredients that includes mineral oil. Oakum of the creosote variety tends to spit when hot lead is applied to it, making its use uncomfortable for the plumber. Nupak oakum, however, does not spit under these conditions because the oil used in it, an especially formulated Esso process oil, has a high flash point.

The jute used by Nupak of New Orleans comes from Pakistan in 400-pound pukka bales. The jute plant, a member of the *Corchorus* genus, is grown extensively in Pakistan and India, where the hot, rainy climate is ideal for its growth.

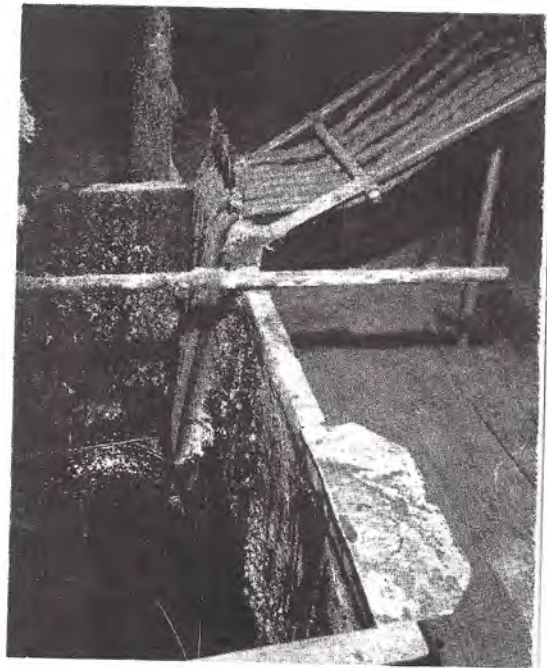
The jute fibers lie between the wood on the inside and the cortex on the outside. They are freed by retting, a process in which the jute stalks are steeped in water for a number of days, and bacterial action ferments the stalk.

Virgin jute consists of long staple fibers. It is strong, but too long and stringy to be used alone in oakum. For this reason, some reclaimed jute is added to Nupak oakum to give it better packing qualities.

In the plant of Nupak of New Orleans, the jute's first processing is accomplished by a picker. By means of



Jute cords are fed from individual barrels to the twisting machine. As the steel spool visible in rear revolves, cords are twisted into four-ply rope. The spool can hold about 100 pounds of rope.



Jute ropes are impregnated by being fed into bath containing oil and other ingredients.

cutting knives and an air cyclone, the picker breaks up the fibers and cleans them of dirt, dust and other foreign material. As the jute is fed into the picker, it is sprayed with an Esso Pale Oil to keep down the dust which otherwise would be a fire hazard.

By forced air, the jute is transported to a feed bin where it accumulates. From there it feeds onto an apron consisting of a moving belt which serves to measure the fibers out evenly.

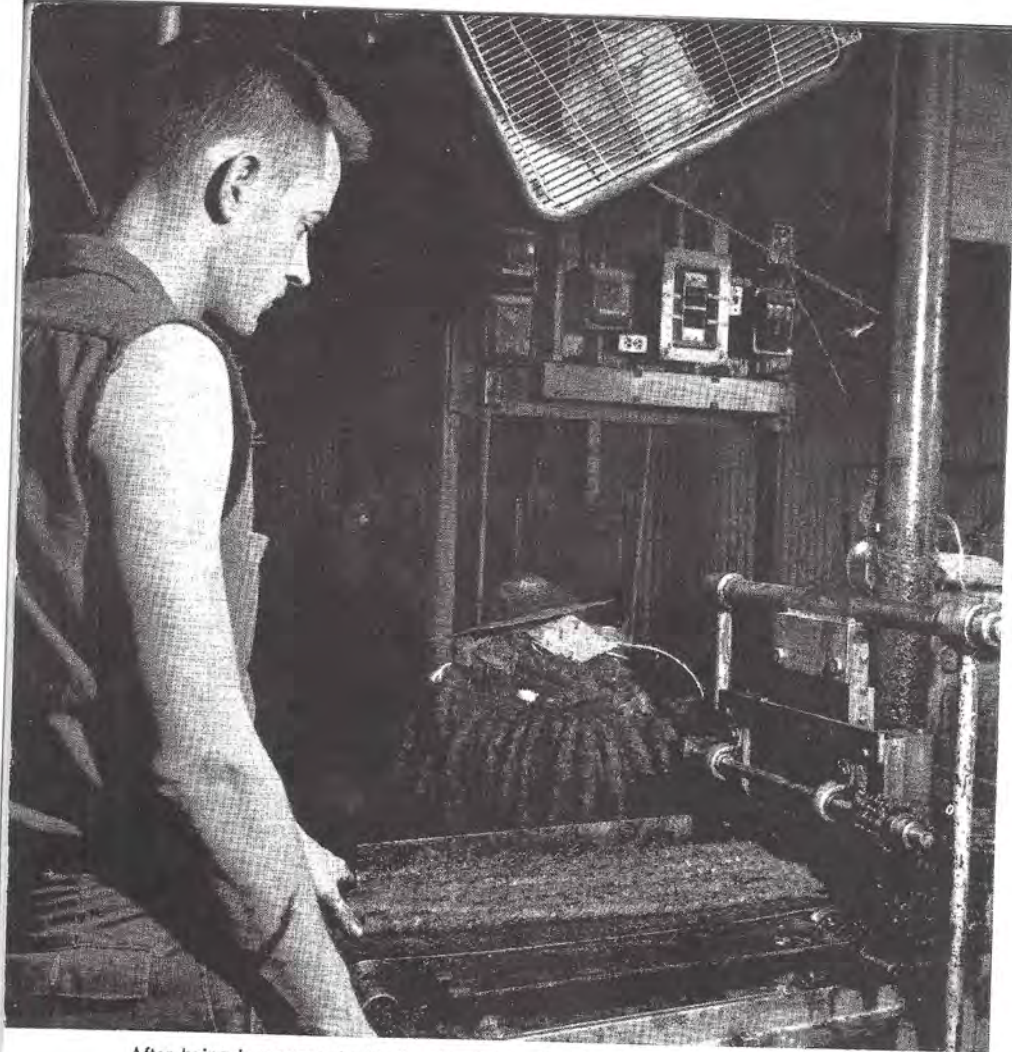
A cording machine receives the fibers next. Like the preceding operation, it is continuous and automatic. The fibers pass under a drum which has a multiplicity of hooked metal fingers on its surface. These serve to comb the fibers, orienting them all longitudinally. At the delivery end, the fibers are channeled into flat cords about three inches wide.

The loose cords pass down through funnels and between revolving drums in order to impart a circular cross section to them. They drop into steel barrels which are constantly rotating, and fill the barrels in a loose, spiral manner.

The filled barrels are periodically removed and their contents are fed into a twisting machine. If a final rope of four-ply is desired, four barrels of corded jute are placed at the end of the twisting machine, and a cord from each is inserted through a guide hole and



In East Pakistan, jute is washed in the final step of the retting process. The worker swings a handful of jute into the water to remove impurities.



threaded to a common steel spool. As the spool is rotated, the four cords are twisted and wound onto it. Each spool holds about 100 pounds of rope when full. The equipment at Nupak of New Orleans makes rope of up to seven-ply.

With the rope completed, it is ready to be impregnated with the liquid ingredients. The oil for this purpose comes from an underground storage tank of 7,500-gallon capacity which is filled by bulk delivery from a truck transport. From there it is pumped to a 1,000-gallon holding tank over the processing area. The tank is thermostatically controlled. A quantity of oil is measured into a pit sunken below floor level. To this, other Esso ingredients are added, along with bentonite.

The jute rope is fed continuously into the oil bath, where it stays for a few seconds and then is pulled out. Excess oil is squeezed from the rope by passing it between rotating drums.

If the Nupak oakum is to be cut, it passes on to an automatic cutting table. If it is intended for coils, it goes directly to a coiling machine. Smaller packages of Nupak oakum are packed by hand. The large 50-pound pack is formed by a hydraulic press.

After being impregnated with the oil mixture, the Nupak oakum is squeezed of excess liquid and then automatically cut to 30-inch lengths, above. Below, lengths are weighed prior to packaging.

