CHEMISTRY

Anti-Freeze in Tires

Tubeless tractor tires filled with anti-freeze solution promise better wear, less slip; may be post-war answer for better farm tractor tires.

➤ TUBELESS TIRES completely filled with an anti-freeze solution of calcium chloride may be the post-war answer to the need for better farm tractor tires, E. F. Brunner of the Goodyear Tire and Rubber Company reported to the meeting of the Society of Automotive Engineers in Milwaukee.

Main handicap of tubeless tires so far has been that air diffuses deep into the tire, building up internal pressure that eventually causes it to fail. Development of an inner liner that will prevent this diffusion has been a long term research problem.

"So far, the rubber industry has not been able to find a diffusionless material," Mr. Brunner reported. "Certain synthetic rubbers are better from a diffusion standpoint than others, and maybe synthetics will show us the way to a tubeless tire."

Recent experiments have tried using a tire completely filled with a solution of calcium chloride. This gives no diffusion difficulties, as there is no air present. But another problem is posed due to a tendency of the solution to lubricate the bead and cause working and chafing which eventually permits the solution to enter the tire casing through the bead, resulting in tire failure.

The 100% liquid-filled tire is a further development of a tire filled to valve level with liquid and the remaining space filled with air, a method already in use for several years.

For the past two-and-a-half years, 35 tractors with completely liquid-filled tires have been checked for pressure changes during regular farm use, Mr. Brunner announced. The minimum pressure recorded in extremely cold weather was nine pounds, and the maximum on hot days was 15 pounds. Tires were originally filled at 12 pounds pressure at about 60 degrees Fahrenheit.

"This we consider a practical range," Mr. Brunner said, "much the same as is likely to be had with air tires due to inaccurate gauges, etc."

Furthermore, the pressure is maintained since air loss through diffusion is eliminated. Most failures of air-filled tractor tires develop from diagonal breaks on the interior of the sidewall, and are due entirely to low pressure.

Another money-saving advantage of liquid-filled tires is reduced slipping when the tractor is under a heavy pull. Comparative tests in both loose and hard dry clay soil showed that 100% liquid-filled tires had from 41% to 230% less slip, depending on the load, than similar air-filled tires.

"Since tire tread wear is almost directly proportional to per cent slip," Mr. Brunner pointed out, "you can readily see how the farmer can easily increase the life of his tires from 50% to 75%."

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MILITARY SCIENCE

English Grenade-Thrower

Northover projector, small-caliber breach-loading mortar, designed as an anti-tank weapon for the man on foot.

➤ THE SAME NEED for a weapon enabling the man on foot to fight back against tanks that brought forth the American "bazooka" was responsible for the development of a totally different kind of British weapon, known as the Northover projector. Hitherto but little publicized, it is described by a veteran British officer, Maj. Gen. H. Rowan-Robinson, in the technical journal, *Army Ordnance* (Sept.-Oct.)

The Northover projector is a grenade-thrower, but it is not a tube discharging rocket-grenades, like the "bazooka." It is essentially a small-caliber breech-loading mortar, capable of being fired at a low angle and light enough to be carried rapidly from one position to another by a few men. It throws grenades of various types, but the one favored in British anti-tank practice is a self-igniting phosphorus bomb enclosed in a glass bottle—a kind of sophisticated version of the fiery Molotov cocktail.

The range of the Northover projector is short, and it is designed primarily as a weapon for the defense of villages or important road crossings. It is sighted up to 200 yards, though its extreme range is half again that much.

Ordinarily this projector is fired from a four-legged stand that looks a good deal like a machine-gun tripod except for the extra leg. It can, however, be set on a higher stand that permits it to be used against low-flying airplanes.

Since the range is short and the weapon's position usually vulnerable, it is important that the enemy tank be disabled or blinded by the first shot. Some of the projectors are equipped with double barrels, permitting another shot to be fired right after the first.

The Northover projector was first produced to meet a dire necessity, when an invasion of Britain seemed imminent, and an effective tank-stopper was needed.

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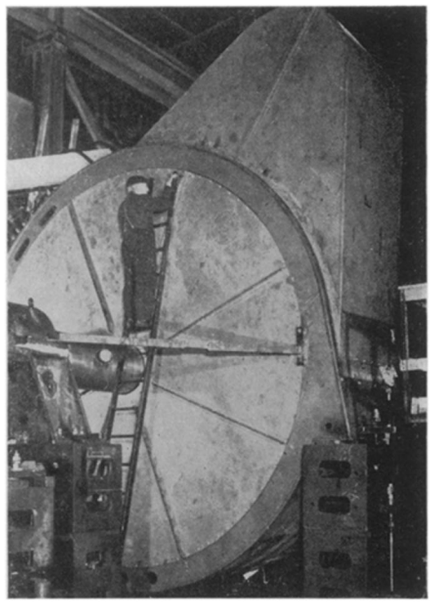

GIANT tanker motors such as this are being built for U. S. Maritime Commission tankers. The sheet-iron covering keeps dirt out of the enclosed, ventilated motor. Each General Electric motor being built at Schenectady is equipped with an air re-circulation system.

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