SPEAKING OF POWER

We are constantly plagued by the odd bits that come our editorial way and find no convenient resting place in a magazine dedicated, in the main, to serving a solid diet of useful technical information. These may vary from nuggets, picked up at engineers' bull sessions and in chats with men on the job, to glimpses of future developments gained in visits to the manufacturing plants and research labs of industry. They may result from our own editorial journeyings, from the wanderings of our correspondents in far corners of the world, or from the incessant stream of periodicals and publicity releases that flows across an editor's desk. They may range from fact to fancy, from items of significance to items that amuse. Regardless of source and nature, they disturb editors' tidy souls because they defy classification as articles, news, what have you.

Because our job is one of communication, we itch to pass them along, and with them some of the sidelights of publishing a magazine which, like running a power plant, has its interesting, embarrassing and often humorous moments. So we herewith revive two war-suspended franchises, roll up the former "Speaking of Power" and "Exhaust Lines" columns into one, and bring you a page in which we "speak of power"—power, the engineering field, and POWER, the magazine. May it add the spice of zest and humanity to the meat and potatoes of practical information.

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Best of the continuing crop of atomic-bomb stories is the one quoted by Bennett Cerf in *The Saturday Review*. High on a bluff near Los Alamos, New Mexico, an Indian was sending a smoke message when the experimental bomb went off. Crawling out of the ditch, he pulled himself together in time to see a tower of smoke billow into the sky. He watched in awe-stricken silence, clucked his tongue, and murmured, "I wish I had said that!"

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Some twenty years ago the French physicists, Georges Claude (inventor of the neon lamp) and Paul Boucherot, proposed generating power by using the temperature difference between the *warm surface of the tropical ocean and* the cold waters of the deeps (POWER, March 1, 1927, p 329). Such a plant was built on a 10,000-ton cargo vessel and tested (POWER, Oct 28, 1930, p 702 and Jan. 6, 1931, p. 35) but failed to produce enough output to drive the pumps.

The controversy that raged over this experiment is likely to be revived if plans revealed recently by the French Embassy in New York materialize. These envision a 2-million-ton ship with a 65-ft-thick hull of a special concrete including sawdust and glass fiber. Proponents of the scheme claim that this colossal floating power plant, if anchored off the coast of Dakar, would supply energy enough to operate the Trans-Sahara Railway and irrigate parts of the desert.

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Handling subscription records for magazines of large circulation is, of necessity, carried out on an essentially *mechanical and impersonal basis. Such* systems work with truly astonishing efficiency, but when the machine slips the results range from the merely annoying to the ridiculous. Thus when the Purdue chapter of Pi Tau Sigma, mechanical-engineering honorary fraternity, recently entered a subscription to POWER, the letter of acknowledgment was addressed to "Dear Mr Sigma." Purdue alumni By Sawyer and Bill Paisley, of the POWER business staff, spotted a kidding reference to the incident in the Purdue *Exponent*, were properly redfaced, took small comfort from the fact that dignity was maintained and "Mr Sigma" was not greeted with a familiar "Hi, Pi."

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At the end of 1947, Allis-Chalmers Mfg Co, of Milwaukee, completed 100 years of engineering and manufacturing achievement. It was back in 1861 that Edward P Allis acquired the 14-year-old French burr millstone firm of Decker and Seville and initiated the still-held policy of diverse manufacture that was to lead to the world's largest line of major industrial products.

Old timers in the power field will remember Edwin Reynolds, whose engineering genius was responsible for such pioneering developments as the improved Reynolds-Corliss engine, the first direct-*acting metallic-valve blowing engine,* the first triple-expansion pumping engine of the inverted type, and the pump, forerunner of the propeller hydraulic turbine developed in more re-cent years.

The present Allis-Chalmers formed in 1901 after merger of the Edward P Allis Co with Fraser & Chalmers Co, the Gates Iron Works and the Dickson Mfg Co. In the years after the turn of the century, Allis-Chalmers built *many notable engine-generator sets*, including the 3000-kw Reynolds-Corliss unit that powered the spectacular lighting of the St. Louis Fair of 1904. In March 1906, the first A-C steam turbine went into operation at the Kent Avenue Station of the Brooklyn Transit Development Co. Following years saw extension of electrical-manufacturing lines, continuous development of hydroelectric equipment and pioneering activity in the gas-turbine field.

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In an effort to reduce Italy's foreign fuel requirements, the government minister for industry and commerce has asked the Fiat Co, at Turin, to investigate the possibility of replacing steam and diesel machinery in the power plants with gas turbines burning natural gas.

THIS MONTH'S COVER

Power readers, as evidenced by continuing correspondence, well remember W A Doran's chronicles of the OLD CHIEF, his shrewd and lovable mentor in stationary engineering. No small part of this pleasant memory is the series of warmly human sketches made by Theodore Van Gorp, artist in the McGraw-Hill Illustration Dept. Others illustrated the early stories but it remained for "Van" to breathe life into the OLD CHIEF and sundry other plant characters — convivial Red Hogan, Old Bob, the blacksmith, Creeping Jimmy, Greenhouse Gertie, and that "honest" grafter, Boss Hookem.

Like all good craftsmen, Van is versatile. The brush that made the old plant and its denizens come to life can, with equal skill, dramatize the mechanisms of power engineering. For the February cover, we wanted a single, graphic symbol of the clutch, essential power-transmission element described in the special section beginning on p 79. Van found it in the simple and familiar jaw clutch, as his cover painting testifies.

Industrial-Power CLUTCHES

By
F A ANNETT
Associate Editor

Clutches for industrial-power drives are probably more popular than ever before. Accordingly, every power and industrial engineer should understand their use in the solution of power-application problems in group and individual drives. To assist him, this special section, POWER'S 66th, describes applications, constructions, operations, and characteristics of manually and automatically applied power takeoffs, lineshaft clutches and clutch couplings, including magnetic and hydraulic drives

Applications

Application of an electric motor to a machine or group of machines includes selecting a suitable motor, a speed controller or starter, and a connection to the load. The latter may require one or more couplings, shafting, hangers and bearings, belts, chains, gears, variable-speed transmissions, clutches, or combinations of these equipments. For many drives, either *individual or group, clutches improve* machine performance and simplify power applications. This is also true of internal-combustion engines.

Clutch Designs. Clutches and clutch couplings are built in many forms. Some are not true clutches, but are included to give an *over-all* picture. A clutch may be considered as a coupling that readily connects two working parts—usually a power source to its load—or releases them if desired. When these devices are in proper working condition, input and output shafts have the same speed, but they generally slip when severely overloaded. Other equipment applied as clutches permits 2 to 4% speed slip between power unit and driven machine. These are often used as variable-speed drives.

Friction Clutches. These form by far the largest group and have the widest use of any equipment classed as clutches. They are normally engaged and disengaged at full speed under load and, when properly adjusted, drive their loads without slip unless *heavily overloaded. They may* be applied either manually or automatically and are built in many designs. But all transmit torque by friction between two or more surfaces, held in contact under pressure. Other friction-clutch designs are marketed under different names derived from the means of engaging and disengaging them, such as those actuated by compressed air or pressure liquids, p 86.

Friction clutches are built to apply as cutoff couplings or as lineshaft clutches. In the former applications, they serve to connect a power source to its load or as a disconnect coupling between the halves of a lineshaft, Fig. 1, p 80. In this design the shaft end of left-hand half of the coupling is supported on a ball bearing, *B*, in the right-hand half, to maintain good alignment between the two.

Lineshaft Clutches. For drives like Fig. 2, the clutch is located on a line-shaft where power is taken off to drive a machine, or on a countershaft driving a group of machines, or for similar applications. One half of the clutch has a long sleeve that extends along the shaft. In Fig. 2 the sleeve supported on two ball bearings, *B*, permits the shaft to turn freely in this half of the clutch when it is disengaged. A pulley, sheave, chain *sprocket* or gear mounted on the sleeve drives the load while the other half of the clutch, keyed to the shaft, engages the pulley half.

Power Takeoffs. Clutches, built in as part of gasoline engines to permit them to start before applying load, are known as power takeoffs, Fig. 5. But a clutch, to connect an electric motor to the end of a lineshaft or to the driven shaft of a machine, becomes a cutoff coupling.

Friction-Clutch Applications. Among their many applications, friction clutches in group drives either connect or disconnect single machines or groups. These machines are driven by a motor of less horsepower than