INVENTION

New Revolver Moves Cylinder to Rear

➤ A REVOLVER incorporating the first really radical change in design since the weapon was first invented by Samuel Colt more than a century ago has just been patented by Louis H. Palma of Nashville, Tenn.

In Colt's original revolver the rearmost part was the grip or butt, with the frame containing the cylinder in the middle and the barrel at the forward end. This pattern is preserved in today's revolvers.

In Mr. Palma's new revolver, for which he received patent 2,465,815 the cylinder has been moved to the rear, with the grip and trigger-guard underneath and in the center position, while the barrel extends over the top from cylinder to muzzle. The trigger activates a cam, which simultaneously revolves the cylinder and serves as a sear to cock and then trip the hammer, concealed in a cap behind the cylinder, by means of the rod or pin on which the cylinder turns.

Several advantages are claimed for the new arrangement. The considerably increased length of the barrel makes for greater accuracy of fire, as well as for higher velocity on a given type of ammunition. Reloading and cleaning are easier because the whole rear of the cylinder is left clear by swinging away the rear cap. Finally, the weight of the weapon is centered directly over the grip, making for greater steadiness in aiming and firing.

There remains the possibility of scorching the user's hand through side-flash in the clearance between cylinder and barrel. This, however, is neatly obviated by means of a guard that extends under the cylinder rearwardly from the grip.

Science News Letter, April 9, 1949

CHEMISTRY

More Gas Promised From New Process

➤ HERE's good news for you from chemists:

A new, low-cost process can help make high-grade gasoline from poor grades of crude oil.

Two new death-to-insects chemicals are five times as potent as DDT.

Not for cocktails, but with promising uses in industry is trimethylhexanol, the newest alcohol.

Getting high-grade gasoline from low-grade crude oil can now be done in a single step, two scientists from the Esso Standard Oil Company Laboratories, Baton Rouge, La., told the American Chemical Society in San Francisco.

Dr. Alexis Voorhies, Jr., and W. M. Smith explained that the process removes sulfur from the oil with hydrogen gas at relatively low pressures. Previous, more costly methods used hydrogen at high pressures, the chemists explained.

Just how much trouble sulfur can cause in the gas you use in your car has been measured by a team of DuPont chemists. H. K. Livingstone, J. L. Hyde and M. H. Campbell reported that only one-tenth of one percent of sulfur of the kind found in most gasoline will ruin the effect of half of the tetraethyl lead, added to prevent knock in your motor.

BNB and BNP are not new federal bureaus. They are new insect-killers which can control insects that survive DDT.

Dr. Henry B. Hass, of General Aniline and Film Corp., and formerly of Purdue University, synthesized the chemicals in collaboration with two Purdue graduate students, Drs. M. B. Neher and R. T. Blickenstaff. Dr. Walter O'Kane of the University of New Hampshire conducted tests of the new insecticides.

Dr. Hass said that the studies showed that BNB and BNP were only one-third as poisonous to mice as DDT. These newest weapons in the anti-insect arsenal are only two of hundreds of nitro paraffin chemicals which are being investigated.

Dr. W. M. Bruner of DuPont said that the new alcohol made from coal, petroleum, air and water, yields many chemical compounds. Some of these may be used in industry as synthetic lubricants, wetting agents and other applications, he indicated.

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PHYSICS-CHEMISTRY

Chemicals Analyzed by X-Ray Absorption

➤ A NEW branch of science known as X-ray absorptometry, which means measuring the amount of an X-ray beam absorbed in passing through a substance, promises to become increasingly important as a method of chemical analysis and of chemical control, the New York Academy of Sciences was told by Dr. Herman A. Liebhafsky of General Electric, Schenectady.

Measurements of X-ray absorption will not noticeably alter the sample under study, and a single measurement can often be made in a matter of seconds once the sample is in the beam, he said.

X-ray absorption is essentially an atomic property, he explained. An oxygen atom, for example, will show virtually the same X-ray absorption in the element as in any oxygen compound. Under tthe simplest conditions the absorption is independent of the physical state. This means that the amount of energy taken from an X-ray beam passing through a given mass of material is always the same, be the material hot or cold, or in a gaseous, liquid or solid form. The absorption per gram is the same in steam, in water, and in ice.

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IN SCIEN

CHEMISTRY

Blistering of Plaster Prevented by New Process

➤ NO LONGER need housewives worry over the mess made by the blistering and bursting of the white finish coat of plaster on the walls of their homes. Also, building owners may save millions a year in repair bills, thanks to a new process of treatment of the lime used in the plaster, developed by the National Bureau of Standards.

The blisters are caused by the expansion of unhydrated magnesia in the lime, the Bureau determined after a thorough investigation. This magnesia makes a slow combination with water, causing volume expansion and resulting in bulging, blistering and buckling. Such water adsorption takes place slowly, the most failures occur several years after the white coat is applied.

The Bureau's treatment to prevent this type of failure involves the use of a kind of a pressure cooker that scientists call an autoclave. In it, heat and moisture are used to effect a chemical bonding of water with the components of the lime, giving a stable product.

As a result of the Bureau's work, several manufacturers are now producing a dolomitic lime, one containing magnesia, so well hydrated that harmful expansion does not take place, and no blisters form. Dr. L. S. Wells, of the Bureau staff, is responsible for the study and the development of the treatment cure.

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PHARMACOLOGY

Heart Disease Studies Use Radioactive Foxglove

➤ FOR better treatment of heart disease, plants are now being grown in a radioactive atmosphere. This application of atomic science to medicine was reported by David E. Lilienthal, chairman of the U. S. Atomic Energy Commission, at the meeting of the American College of Physicians in New York.

The plants are foxglove from which comes digitalis, long used in treatment of heart disease. To get more knowledge of the drug's action, with a view to better use of it, it is now being produced in radioactive form. This is done by growing the plants in air-tight glass jars in an atmosphere of radioactive carbon dioxide.

The small quantities of radioactive digitalis thus far produced are now being studied in animals in AEC laboratories.

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CE FIELDS

ENTOMOLOGY

German Chemical Is Deadly to Insects

➤ A CHEMICAL so poisonous to insects that it will kill them if they bite a plant that has taken it up through its roots was described before the meeting of the American Chemical Society in San Francisco by Dr. S. A. Hall of the U. S. Department of Agriculture. It is one of more than 300 organic phosphorus compounds originally produced by a German chemist, Dr. G. Schrader, the more promising ones of which are now being put through tests by the Bureau of Entomology and Plant Quarantine.

The compound, which has been so little known that it has no short common name or set of initials as yet, is octamethyl pyrophosphoramide. If it proves a practical means for enabling plants to poison their own attackers, it will probably be useful only on plants not intended for food, since most of the compounds in this group are toxic to human beings and domestic animals as well as to insects. However, it could still have large usefulness in the protection of fiber plants such as cotton and flax, as well as seedling trees, flowers and other ornamentals.

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CHEMISTRY

New Laboratory Tools Evaluate Oil Products

➤ YOU have got to know a lot of big words, such as tetramethyldiaminodiphenylmethane, and be skilled in laboratory procedures, such as a capillary-pycnometer technique, if you want to understand what oil chemists talked about at the meeting of the American Petroleum Institute's division of refining in Houston, Texas. Rapid means of analysis was the theme.

Much credit is due to them, however, for various processes developed for the rapid evaluation of petroleum products. Many of the methods employed utilize physical apparatus rather than older chemical analysis techniques. They use microscopes, distillation equipment, viscosity testers, colorimeters, infrared and ultraviolet apparatus, emission spectroscopes and other scientific devices of latter-day scientists and modern laboratory technicians. The result is that the contents of petroleum and its products are now revealable with accuracy and speed.

Methods found valuable for evaluating petroleum products when very small samples only were available were described by J. V. Sommer and G. E. C. Wear of the Standard Oil Development Company, Elizabeth, N. J. They explained apparatus and procedures, carried out on a microscale, which involve density or specific gravity, viscosity, and what is called Engler distillation.

A simple colorimetric method, usable by semi-skilled operators, by which the furfural content of lubricating oils can be determined in five minutes was described by A. R. Javes, Anglo-Iranian Oil Co., Ltd., Sunbury-on-Thames, England. It has been successfully employed for concentrations between .0001 and 1.0 percent, he stated.

A computing recorder for infrared spectra was explained by Robert W. Foreman and Warren Jackson, Jr., of Standard Oil Company, Cleveland, Ohio. It is a simple electric instrument that automatically computes the ratio of sample-cell transmission to blank-cell transmission and permits plotting percentage transmission of a sample directly.

A rapid colorimetric method for the determination of tetramethyldiaminodiphenylmethane in oils and greases using nitrous acid was presented by S. Walter Denton, R. M. Oliver and John T. Wiley of the Texas Company, Port Arthur, Texas. This chemical with the long name is commonly known as a methane base and is widely used in the dye and rubber industry.

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ENGINEERING

Process Aids Production Of Useful Light Gases

➤ LIGHT gases, which are building blocks for such products as anti-freezes, fertilizers and margarine may become cheaper and more plentiful as a result of a new method of petroleum gas separation.

The new process, known as hypersorption, was described by Clyde Berg of the Union Oil Company of California at the American Chemical Society meeting in San Francisco.

The hypersorption unit is a tall, round column with a cooler at the top and a steam section at the bottom. Between these two are very fine particles of charcoal which has been treated so that it will absorb the heavy gases in larger quantities than the light gases.

The method was first used to produce ethylene, from which glycol anti-freezes and ethyl alcohol are made.

Mr. Berg stated that this process could also be applied to recover hydrogen from catalytically cracked gases. Hydrogen is used in the production of margarine, of ammonia fertilizers and of many plastics.

Propane, which is burned in many homes as bottled gas, can be produced more cheaply and efficiently from natural gas by this new process, Mr. Berg said.

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MATHEMATICS-PSYCHOLOGY

Brain and Machine Conduct Are Predicted

➤ BROAD systematic theories which can describe and predict the behavior of both human brains and computing machines were discussed at a two-day conference on mathematical models in the social sciences at Harvard University.

Profs. John Von Neumann, of the Institute for Advanced Study, Princeton, N. J., N. Rashevsky of the University of Chicago and Norbert Wiener of Massachusetts Institute of Technology said that the basis of mathematical social sciences is being developed and is producing results today. Modern digital computing machines like the ENIAC, are the closest man-made approach to the nervous systems of living organisms, Prof. Von Neumann said. They resemble the network of nerve cells in the human brain, although they are very much simpler. Each individual unit of a computing machine can be isolated and its function described in relation to the whole machine. But individual nerve cells can be described mathematically only when they are performing extremely simple functions as small groups of cells. When large groups of cells such as perform the higher functions of human and animal brains are studied, only statistical behavior can be described.

Prof. Rashevsky told of differential equations which predict the behavior of neural systems in the large groups of cells. Even the simpler esthetic likes and dislikes can be handled. Differential equations have been set up to predict which ones of a set of geometrical figures people will like, and they give extremely close correlations with the preferences of groups of people.

It is still not easy to bridge the gap between the "complex dynamics of simple systems and the simple dynamics of complexed systems." For this reason Prof. Von Neumann would like to see the most complicated digital computing machines investigated with techniques similar to the techniques which biologists must use to investigate living organisms. The large scale statistical measurements would be correlated with the functions of the individual units, and some insight to analogous relations in living brains could be gained.

However, it was emphasized that the human brain is not the whole man or even the whole intelligence. Some important information is transmitted in the blood stream by chemicals, rather than through the nerve cells. This is particularly associated with the emotions. The memory also is probably not stored in the nerve cells, for while there are 10,000,000,000 nerve cells in the human brain, the number of individual pieces of information stored in the memory during a lifetime is probably a hundred thousand times as great.

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