

MEDICINE

Plastic False Lung Made

It is shaped to fill a lung cavity in patients who have had a lung removed due to TB or cancer. Purpose is to keep neighboring body parts in place.

➤ A FALSE lung, made of a plastic material shaped into a bag and filled with fiberglass, may become the newest thing in human spare parts to replace those lost because of injury or disease.

The false lung, under experimentation now at the Mayo Clinic in Rochester, Minn., would be used to fill the hollow space left when a lobe or an entire lung is removed surgically in cases of tuberculosis or cancer. It would not, of course, do any breathing.

The need for such a lung and results of experiments to date were reported at a staff meeting of the clinic by Drs. John H. Grindlay, O. Theron Clagett and Arthur H. Bulbulian.

When a lung or a lobe of a lung is removed, the body tries to obliterate the space, Dr. Clagett pointed out. This is done by a raising of the diaphragm, a shift of the partition between the lung sacs, narrowing of the spaces between the ribs and overexpansion of the remaining lung tissue.

Usually this is accomplished without any serious disturbance or disability, particularly in young people. But in cases where the operation has been performed for tuberculosis, overexpansion of the remaining lung tissue is "highly undesirable" because it may light up tuberculous infection in the

remaining lung. And cancer of the lung, chief condition for which an entire lung is removed, occurs most often in older patients who do not have very elastic tissues and consequently can stand least well the overexpansion of the remaining lung.

The first false lung tried by the group was a sheet of polythene made into a lung-shaped bag by fusing the edges together with heat and pressure. This bag, however, had some mechanical defects. In eight dogs on whom it was used, it burst and the non-sterile interior of it caused infection which killed the dogs. Two more out of a series of 21 died because of injury produced by the sharp seam of the bag on neighboring blood vessels. But nine dogs are still alive, eight to 12 months after the operation.

An improved false lung has since been made of another plastic, methyl methacrylate. This is lucite or plexiglass. It is thin-walled, lightweight, has a perfectly smooth surface and has been shaped to fit the lung cavity. It was first tried on another series of dogs four to five months ago. So far, the dogs are all well and X-ray pictures have shown no signs of leaks of their false lungs.

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ENGINEERING

New Mechanical Spring

➤ A UNIQUE mechanical spring that becomes easier to deform as a load is continued to be applied has been developed by W. J. Cook, of the Hunter Spring Company, Lansdale, Pa., and many applications for its use in the mechanical world are promised. It is reported to be unlike all other springs.

Everybody knows that in winding a clock, it becomes harder to wind as the spring is tightened. Mechanics know that with the familiar coil spring, a little pull will start the lengthening of the coil but as it grows in length a stronger pull is required to continue the action at the same rate. The new spring, called the neg'ator, acts contrary to accepted engineering principles, and resists less the more it is deformed from its normal condition.

The secret of the new spring, Mr. Cook states, lies in prestressing each successive increment of length of a flat strip by a predetermined, but not necessarily constant, amount. In its relaxed position the device forms into a tight coil, each turn pressing

on the others. In use, this new type of spring is progressively unwound, or drawn out like a tape rule, over its range of action. Its resisting force is developed as each successive length of the metal strip is drawn off the coil, and is straightened thereby. The force required to do this varies inversely as the radius to which the metal strip has been prestressed at that point.

Obviously, he continued, if the neg'ator is heavily prestressed near the free end and only lightly prestressed farther along the coiled length, the device will pull back more at the beginning of its range of action than at the end of the action.

Among applications in which the device may be found valuable, are in toasters, delicate instruments, hose wrapping, extension or compression spring, automatic coiling device, a friction band, a telescopic tube form, and many others. It has a wide range of action, up to 50 times any original dimension, and can act around corners and through small openings with the same

freedom as non-elastic bands or cables. This new spring gives promise of greatly influencing the future of mechanical design.

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VETERINARY MEDICINE

'Teen-Age Boy Wins Prize For Devotion to His Dog

➤ A BOY'S devotion to his dog received recognition and reward when the 1949 National Humane Act Award of the American Veterinary Medical Association was presented at their meeting to Richard Rose, 17, of Detroit, together with a \$100 U. S. savings bond.

When Richard was an 18-month-old baby he was given a bulldog puppy named Jiggs. Boy and dog grew up together, but the inevitable tragedy occurred, for while Richard was still young Jiggs became, for a dog, very old, and began to go blind.

An operation to save the dog's sight was attempted, but it was unsuccessful. Richard gave up most of the fun a 'teen-ager likes, to take care of his old companion. He built a headgear equipped with bumpers, to save Jiggs from running into things.

Veterinarians think this type of headgear will be useful in making life easier and less risky for other blind dogs.

The Humane Act Award of the AVMA is given each year after a consideration of cases of kindness to animals to which its attention has been called.

At the same meeting, the Association's



DEVOTION BRINGS AWARD—
The 1949 National Humane Act Award of the American Veterinary Medical Association was granted Richard Rose for building a headgear equipped with bumpers, to save his dog from running into things.

highest honors to a member of the veterinary profession were conferred on Dr. Gerard Dikmans, who came to this country as a 19-year-old immigrant from the Nether-

lands in 1905. A graduate in veterinary medicine from Michigan State College, he has made a life-time study of animal parasites and the diseases they cause.

Science News Letter, July 23, 1949

ENGINEERING

Long-Lived Crystals

➤ QUARTZ crystals, essential in radio and television, will have practically unlimited frequency-control life without deteriorating as a result of a heat-treatment process revealed at the laboratories of the U. S. Army Signal Corps, Fort Monmouth, N. J., where it was discovered.

The process involves superheating the crystal to approximately 900 degrees Fahrenheit, followed by slow cooling. Finished blank crystals are placed on a conveyor belt and passed through an electrically heated oven for a period of from two to three hours, then subjected to cooling through a 24-hour period.

The job of the quartz crystal in all types of radio transmission, and in other electronics, is to keep the emitted signals on their assigned radio-wave frequency. But these crystals age in use, permitting the

signal to slide or "drift" away from the desired frequency. They must then be replaced. A crystal which has been subjected to the new Signal Corps process, however, will hold to the desired channel indefinitely, and probably will never have to be replaced.

The discovery, made by Arthur C. Prichard, Maurice A. A. Druesne and Dr. David G. McCaa of the Signal Corps laboratories, is of vast importance not only to the armed forces but to civilian radio, television and communications, in all of which great quantities of quartz crystals are now used. They are imported products, because few satisfactory crystals have ever been found in United States. Had this new method been available during the recent war, many millions of dollars spent for replacements would have been saved.

Science News Letter, July 23, 1949

ENGINEERING

Steel-Making in Russia

➤ SOVIET RUSSIA is reported to be spending two billion dollars, the estimated cost of the American development work on the atomic bomb, on a new method of making steel. This huge expenditure is listed in the ANNALS OF THE AMERICAN ACADEMY OF POLITICAL SCIENCE (May).

Dr. Gerald Oster, physical chemist at the University of London, says that the huge sum is being spent by the Soviet government on steel plants in the Donbas and Soviet Asia. The process, which uses pure oxygen or oxygen-enriched air in the blast used to make steel, is being used more or less widely in this country.

U.S.S.R. development of the use of oxygen in steel making is based on the work of Russia's best known atomic scientist, the English-educated Dr. Peter Kapitza, the report explains. Dr. Kapitza has developed a turbine for producing large quantities of pure oxygen more quickly and cheaply than previous methods.

In the new oxygen process, cost of making steel is said to be reduced 25% to 30%.

Another important industrial use of oxygen in the Soviet, Dr. Oster states, is in work on burning coal underground to produce gas. Proposed by famed Russian chemist, Mendeleev, in 1888, underground gasification of coal was first experimented with by the Soviets in 1931, Dr. Oster says. American scientists also are working on this.

Dr. Oster, who was formerly a research associate at the Massachusetts Institute of Technology and Princeton University and was on the staff of the Rockefeller Institute for Medical Research, praises Soviet planning of scientific research. The way research is organized in the U.S.S.R., he terms "comparable" to the program of American and British work which produced the atomic bomb.

Soviet mathematics is lauded in the same publication by a Princeton University mathematician.

Mathematical developments in the U.S.S.R., comments Dr. Solomon Lefschetz, "parallel those in the United States with equal energy and vigor in research."

Importance of Soviet mathematical work is indicated by the fact that many young American mathematicians are learning scientific Russian just to read of work done by the Soviets. Dr. Lefschetz declares.

Science News Letter, July 23, 1949

NUCLEAR PHYSICS

Plastic Balloons To Carry Instruments Higher

➤ SUPERBALLOONS of thin, tough plastic will soon carry scientific apparatus weighing as much as two men to greater heights above the earth than now achieved,

it was learned at the University of Denver International Cosmic Ray Symposium in Idaho Springs, Colo.

Much information about cosmic rays from outer space has been obtained from recorders and photographic plates hung from balloons that rise 18 to 20 miles upward in the Office of Naval Research "Operation Skyhook." At their highest altitude these bags filled with helium gas are about 75 feet in diameter and scores have been launched from Camp Ripley, north of Minneapolis.

Some of the flying saucers that have been reported were undoubtedly these high-flying balloons shimmering in the sky. The unaided human eye can see these balloons even 20 miles high.

The new balloons are made bigger and better by use of a process of welding the very thin film of polyethylene plastic of which they are composed. Ordinary Scotch tape was used in the beginning to put the balloons together, and while special adhesives are now available, the welded seams will make possible hundred-foot-diameter balloons. Several miles higher will be reached with these new balloons, and this is expected to capture incoming cosmic particles, less impeded because of the even rarer atmosphere at such great heights.

With a lift of about 300 pounds provided by three balloons, larger loads of cosmic ray counters and photographic plates will be sent upward to regions that man cannot visit. Usually only one balloon carrying less weight will be used.

This apparatus is parachuted back to earth when the balloons reach their greatest heights, and the messages they carry help explain the mysteries of how matter is put together.

Science News Letter, July 23, 1949

BIOLOGY

Chart on Mammals Lists Biologic Characteristics

➤ IF YOU know the weight of an elephant's brain, you can get at a glance such data as his water intake and body weight. Or you can spot the weight of a mouse's liver, if you know his heart beat.

These are some of the possibilities with a chart developed by Dr. E. F. Adolph of the University of Rochester. Dr. Adolph's chart, published in the journal, SCIENCE (June 10), listed 34 properties of mammals including man. The relationships between these 34 biological characteristics have been established so that with the chart, a ruler and any one of the measurements, you can immediately read off any of the other 33 for a particular mammal.

Relationships on which the chart is based apply to physiological processes, sizes of organs, numbers of reduplicated structures and biochemical compositions.

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