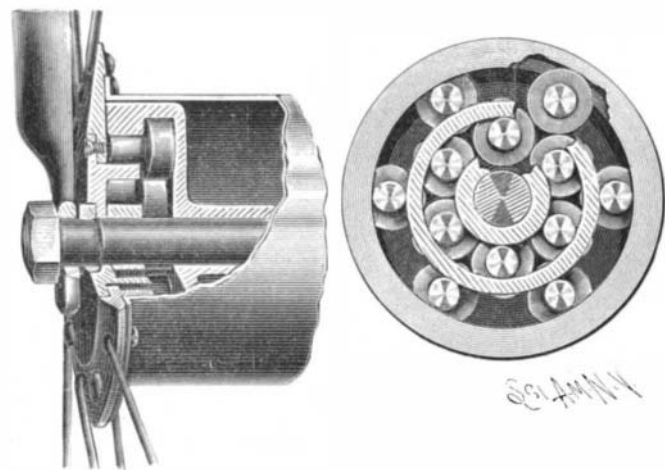


world, including China, Japan, Mexico, Central and South America, South Africa, England and the continent of Europe. The samples have been collected with special reference to the requirements of the various markets; they are intended to show the general lines most in favor. It will be found on examination that in most cases a better article of the same sort can be supplied from the United States at a fair price. The lines represented in the collection will repay expert examination, and such an opportunity to compare goods has never before been offered. Forty-one countries will send delegates to the commercial congress and 126 chambers of commerce will participate.

**A ROLLER-BEARING FOR BICYCLES.**

A roller-bearing especially adapted for bicycles and machinery has been invented by Philip M. St. Louis, of Carmel, Wis., which, it is claimed, besides being cheap in construction, cannot bind or become disarranged.

Referring to our illustrations, in which the bearing is shown applied to a bicycle and in sectional side elevation, it will be seen that concentric tracks are employed, secured to the axle of the bicycle-wheel, between which tracks is a bearing-ring formed or fastened on a cap attached to the hub of the wheel. Two sets of flanged rollers are employed, lying between the bearing-ring and the concentric tracks. The flanges of one set of rollers roll upon the flanges of the other set, the concentric tracks being grooved alongside their bearing-surfaces to receive the flanges, but without contacting with their peripheries. When the axle of



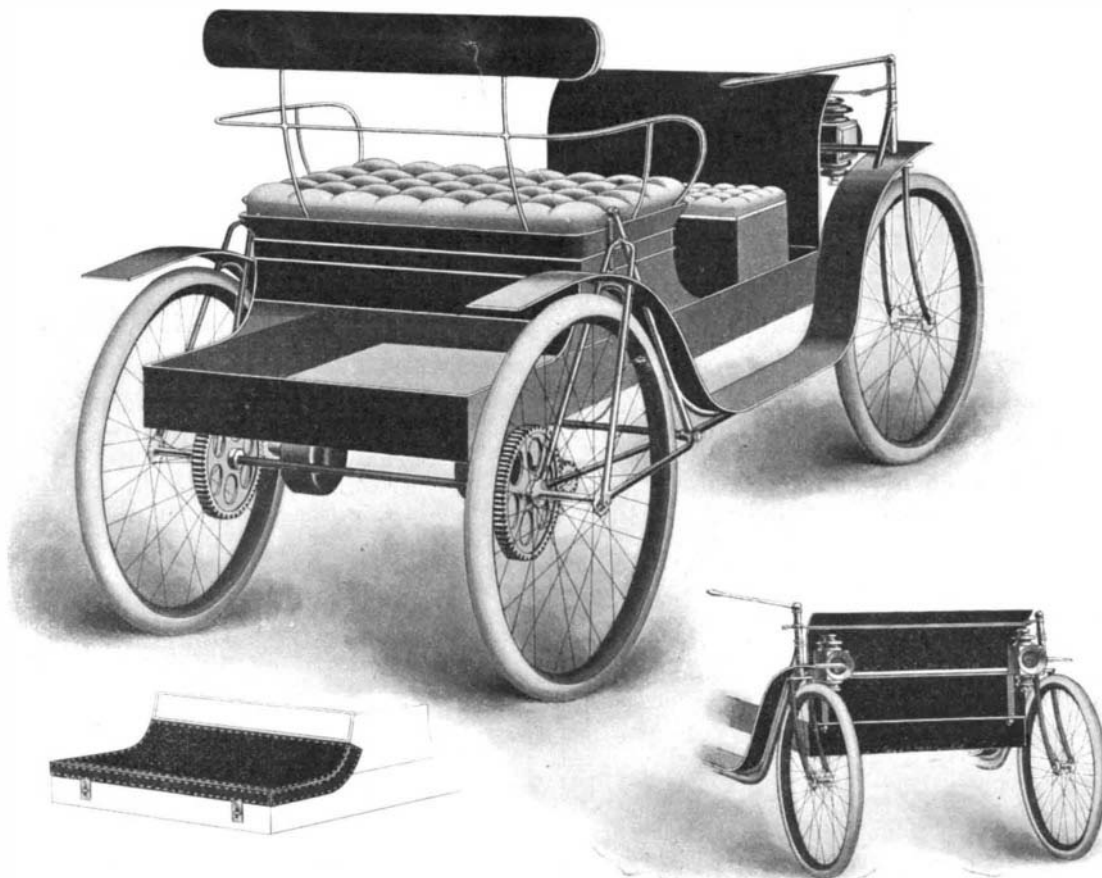
**ST. LOUIS' ROLLER-BEARING FOR BICYCLES.**

the wheel is turned, the sets of rollers, being in contact with the inner and outer surfaces of the rotating bearing-ring, are made to turn in opposite directions and roll upon the fixed, concentric tracks. The flanges, besides separating the rollers, cause them to turn in unison.

By arranging the parts in this manner, the bearing-ring is placed between two sets of bearing-rollers, thereby forming double bearing-surfaces sustaining the weight equally. The load is directed against the outer set of rollers at the bottom and bears against the inner set at the top, thus reducing the friction to a minimum so far as the vertical stress is concerned.

**THE CHAPMAN ELECTRO-MOBILE.**

The chief objection to electric automobiles is their great weight and their limited radius of action. The advantages of electrically operated vehicles is their ease of operation, safety and freedom from vibration. This makes them great favorites for the city, but their weight interferes with their general use for every-day purposes in the country. Our engraving shows a very light carriage built on the bicycle principle which does away with many of these objections. It was designed by Mr. W. H. Chapman, of Portland, Maine. Its weight is only 380 pounds. The bicycle frames were made by a well known firm of makers of wheels, and the motors were made by the Belknap Motor Company. The wheels are 32 inches in diameter and are equipped with 4-inch pneumatic tires. The light skeleton body is hung between them. Although only intended for light work, the first carriage of this type has



**THE CHAPMAN BICYCLE FRAME ELECTROMOBILE.**

been used for a two weeks' tour in the country, always, of course, keeping in reach of an electric light plant.

There are two motors of one-half horse power. Each is geared to a rear wheel by means of a 10-inch gear wheel and a pinion giving a reduction of 10 to 1. Each is run independently. The storage battery is in front and may be used as a child's seat. Owing to their light weight, they can be easily removed for recharging, which operation consumes about two hours. In design the vehicle resembles a light cart, and there is room at the rear for a second battery, so that the distance traveled can be doubled. Ordinarily, the carriage can be run 20 to 25 miles without recharging and the speed is from 15 to 20 miles per hour. The steering lever is in front at the right and the manipulating lever is in front of the seat. Owing to its lightness, it can be turned, stopped and started with ease.

**The Museum of the Royal College of Surgeons.**

On the south side of Lincoln's Inn Fields lies the Royal College of Surgeons with its great museum behind, containing the Hunterian collection. The building houses one of the most remarkable collections of everything which bears upon the medical sciences. The museum was endowed by John Hunter, who a century ago came to London to learn surgery. He became possessed with the idea of starting a medical and surgical museum in which every form of health and disease should be presented. He

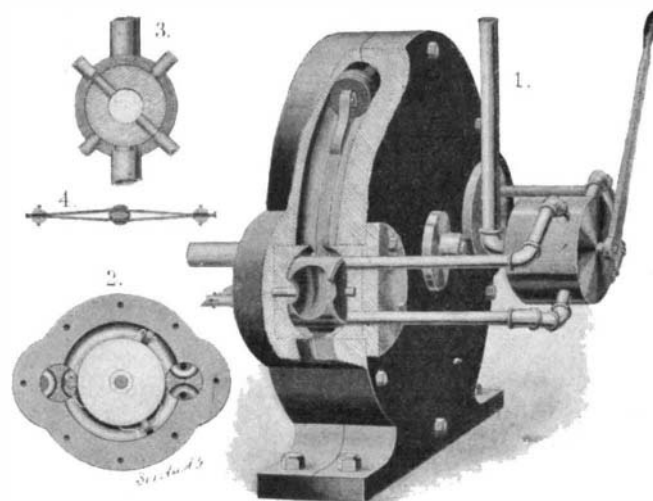
spent \$350,000 in his own lifetime on his pet project, every cent of which he obtained by medical practice. He died in 1793, and it took six years to induce the government to spend \$75,000, which was all that was required for the purchase of the collection. It was bought by the nation and turned over to the custody of the Royal College of Surgeons, and the same amount was given to house it. The college itself has spent over \$2,000,000 in amplifying and completing Hunter's design, and the Curators of the collection have included William Clift, Richard Owen, Sir William Flower and lastly Dr. Charles Stewart. The museum besides containing skeletons and all kinds of human and pathological specimens, also has many curiosities, such as the clothes of a man struck by lightning, and there are many specimens illustrating miraculous recoveries from injuries usually considered fatal. In one gallery there are the surgical appliances of all kinds, and here may be seen samples of instruments of the Roman surgeons, 300 years B. C., and also samples of the products of a Roman artificial limb manufactory.

**Russian Weights and Measures.**

By a recent ukase a standard of Russian weights and measures has been fixed. The unit of weight is the Russian pound, equal to 409,512 grammes, a vedro or pail must hold 30 pounds of distilled water at 16½ degrees Celsius, while the garbuetz must equal 8 pounds of water. The unit of length is the arshin, equal to 71.12 centimeters. The metric system may be used by the side of this.

**A ROTARY ENGINE WITH IMPROVED ABUTMENTS.**

The rotary engine which we illustrate herewith is an improvement made by its inventor, James J. Callihan, of 2020 Melpomene Street, New Orleans, La., upon a similar engine which he has patented. Of our illustrations, Fig. 1 is a perspective view of the engine with parts broken away; Fig. 2 is a sectional side elevation; Fig. 3 is a section through the reversing-valve; and



**DETAIL AND PERSPECTIVE VIEWS OF ROTARY ENGINE.**

Fig. 4 is a detail showing the means employed for holding the abutment-valves in their normal positions. The novel features of the invention are found in the use of these abutment-valves and in their mode of operation.

The engine-cylinder is formed of two disks bolted together and provided with recesses in which the piston and its three heads rotate. Tangent to the inner sides of the circumference of the piston-disk and extending through the cylinder are two apertures which receive blocks which are concaved at their inner faces to form chambers for the abutment-valves and which are provided with steam-ports controlled by the abutment-valves. Caps cover the outer ends of the apertures and can be adjusted by means of screws to force the blocks snugly upon the abutment-valves. The abutment-valves are journaled in the block-chambers and are provided with peripheral cavities receiving and passing the piston-heads. One of the abutment-valve journals projects from the engine and has a flattened end (Fig. 4), which is embraced by flat plate springs whose function it is to hold the valves normally in position.

Steam enters the cylinder through the ports upon opposite sides of the chamber which receives the abutment-valves. When the abutment-valves are in position shown at the right of Fig. 2, the ports are open. Steam can then pass through one port into the cylinder; while through the other port the exhaust escapes from that portion of the cylinder on the opposite side of the abutment-valve. As piston-head passes the abutment-valve, the inlet ports are closed as shown to the left of Fig. 2.

By means of the reversing-valve illustrated in Fig. 3, steam can be made to enter at either side of the cylinder, so as to cause the piston to rotate in the desired direction.

**Blue Rays of Sunlight Over Mont Blanc.**

Lord Kelvin, writing to Nature from Aix-les-Bains, says that at five o'clock on August 27, from the balcony of the hotel, 1,545 meters above sea level and 68 kilometers from Mont Blanc, he had an opportunity for observing what he had been anxious to see for five or six years, which was the earliest instantaneous light through very clear air and find whether it was perceptibly blue or not. He was amply rewarded for his pains. He saw a blue light against the sky on the southern profile of Mont Blanc, which, in less than one-twentieth of a second, became dazzlingly white, like a brilliant electric arc light.

A FEW days ago three waterspouts passed Atlantic City, N. J., and narrowly escaped coming in contact with several yachts. The waterspouts passed at an estimated distance of three miles from the coast.

### The Island of Sulphur.

About thirty miles from the shore in the Bay of Plenty, North Island, New Zealand, is an immense rock or rather series of rocks three miles in circumference which rise precipitously from the sea to a height of 860 feet. "White Island" is the name given to the spot, and the name is particularly appropriate because it is constantly enveloped in thick impenetrable clouds of white vapor which rise to over 10,000 feet in height, making White Island a conspicuous object for many miles around. It is perhaps the most extraordinary island in the world, and it is the subject of an interesting article by James R. Falconer in the September number of *The Windsor Magazine*, and from this article we obtain our facts.

The island is practically one mass of sulphur, while the clouds of vapor constantly rushing from the craters are highly charged with acid fumes, which can be noticed sixty miles away. The appearance from the sea is most imposing, the rocks rising abruptly from the waters. At first sight it seems impossible to effect a landing, but as the steamer sweeps around the south side of the island into Crater Bay, a beach comes into view, which though small is sufficient to admit of disembarkation provided the sea is calm. This is the only level stretch on the island, the rest being great irregular rocks.

In the center of the island is an immense lake 50 acres in extent and 12 feet deep and it is 15 feet above the level of the sea. The water contains vast quantities of acid and the temperature is about 110° Fah. It is dark green, and dense clouds of dark sulphurous fumes are constantly rolling off from this boiling caldron. At one side of the lake are blowholes, and the roar of steam as it pours forth into the air is deafening, and huge boulders and stones are often hurled to a height of several hundred feet.

A boat brought from the ship can be launched on the lake, and the very edges of the blowholes may be safely explored, but the trip is by no means an enjoyable one, and only those who have inhaled fumes of acid can form any idea of their very overpowering nature when given off in large quantities from such an expanse.

Should the boat upset, death would be almost instantaneous. When the boat was taken to the sea, it became so corroded that it dropped to pieces after all the passengers had been landed. The mouths of the blowholes are weird in extreme. Steam belches forth from every fissure and crevice in the rocks and ground, while the noise drowns all other sounds. The whole island is in a ceaseless state of agitation.

Except in the immediate neighborhood of the craters no sulphur is apparent on the surface, but by digging a little into the earth large beds of this mineral will be laid bare, for the island is practically one mass of sulphur mixed with a quantity of gypsum and one or two other substances. The White Island sulphur is much esteemed on account of its purity, and it can be employed for any purpose without any preliminary preparation. The older deposits contain about 90 per cent pure sulphur, and that around the blowholes 98 per cent. It is surprising that these immense deposits have not been more systematically worked. Some years ago a company was formed for working the deposits, but for lack of capital the scheme was abandoned and the amount of sulphur and gypsum exported at present is very small. In the event of a serious war, doubtless the island would immediately rise to prominence.

### Did Man Once Possess a Third Eye?

This query heads the following statement in a recent number of *The Evening Telegram*:

Deep researches as to the structure of the human body have recently furnished some startling facts regarding changes which man is at present undergoing physically.

It is believed that man was formerly endowed with more teeth than he possesses now. Abundant evidence exists that, ages and ages ago, human teeth were used as weapons of defense. Unintentionally, traces of such use are often revealed by a sneer. The teeth are sometimes bared, doglike, ready, as it were, for action.

The practice of eating our food cooked and the disuse of teeth as weapons are said to be responsible for the degeneration that is going on. The wisdom teeth, in fact, are disappearing. Human jaws, found in reputed Palæolithic deposits, have wisdom teeth with crowns as large as, if not larger than, the remaining molars.

In ancient times a short-sighted soldier or hunter was almost an impossibility; to-day a whole nation is afflicted with defective vision. It is almost certain that man once possessed a third eye, by means of which he was enabled to see above his head. The human eyes formerly regarded the world from the two sides of the head. They are even now gradually shifting to a more forward position.

In the dim past the ear flap was of great service in ascertaining the direction of sounds, and operated largely in the play of the features. But the muscles

of the ear have fallen into disuse, for the fear of surprise by enemies no longer exists.

Again, our sense of smell is markedly inferior to that of savages. That it is still decreasing is evidenced by observations of the olfactory organ. But the nose still indicates a tendency to become more prominent.

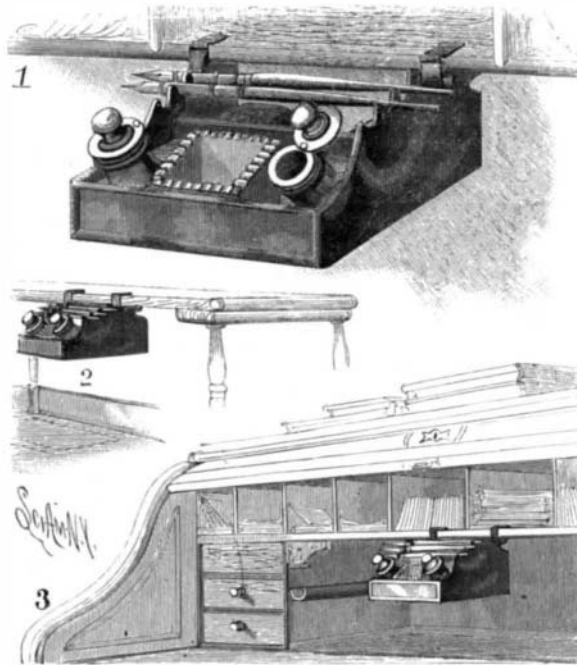
### THE HAYNE SUSPENDED INK-WELL.

The inkstand in general use up to the present time monopolizes the most valuable space on a desk, and is often a menace to books and papers because of its liability to be overturned, and usually necessitates an inconvenient reach every time the pen is filled.

The advantages of removing the ink from the surface of the desk are so obvious that it seems strange the suspension arrangement—practically applied in the Hayne Suspended Ink-Well illustrated herewith—has not been sooner employed.

The Hayne ink-well is manufactured by the Universal Specialty Company, of 151 Chambers Street, New York, and consists of a metal frame, the sides of which are provided with lugs, whereby it can be readily suspended from the bottom shelf of one of the pigeon holes of a roll-top desk by means of strong spring clips, or from the rack above a bookkeeper's desk. Within the frame are two flint glass ink bottles and a sponge cup. A third ink bottle can be substituted for the sponge cup when desired. The ink bottles are fitted with hard rubber tubes in such a manner as to render them air-tight and dustproof, preventing all evaporation and congealing of the ink.

The construction of the bottle is such that the pen can be submerged only to a certain depth, thus the ink bottles which may hold two kinds of ink can be easily



SUSPENDED INK-WELL.

filled or cleaned by removing the front plate of the frame.

The entire table surface of the desk is left free and clear, and the device can be put on or taken from the desk in a moment.

### When You Weep—and Why.

Tears are the common legacy of every human being, and if you should be asked whence they come and where they go, you would probably display a surprising amount of ignorance about a very simple subject. A writer in *The Evening Telegram* enlightens its readers as follows:

Our eyes are always wet with tears, not only when we weep, but always. Our eyeballs are subjected to a constant flow of the lachrymal fluid, even when we are asleep, and were the stream to cease only for an hour, miserable indeed would be the lot of the human creature.

At the outer corner of every eye is what is called the lachrymal gland, which nestles under the overhanging bone of the forehead. This organ secretes the fluid which flows over the eyeball to the inner corner, and there it disappears through a little orifice, whence it is in turn conducted to the nostril. That is why you require so many extra handkerchiefs when you have a cold.

Now comes the question, How do the tears find their way to the nose? Examine your eye in the mirror, and you will find a small elevation upon the lower eyelid, near the nose. Place your finger upon the lower eyelid just below this small elevation, so as to turn it outward. There you will see a small hole, like a pin prick, and there you have found the little passage which conducts the tears into the nostrils.

This little orifice, for various causes, frequently becomes obstructed, in which case you are bound to weep incessantly until relief is afforded you by the removal of the obstruction.

The overflow of tears which follows some great grief

is created by the lachrymal gland under pressure of mental emotion.

Why are tears salt? Literally, our tears are distilled from the very springs of our inmost vitality, for they are separated by marvelous machinery and chemistry from the arterial blood freshly circulated from the heart; and as this contains about six or seven parts in one thousand of saline constituents, so tears contain one-third per cent of chloride of sodium, besides a very small proportion of other salts, ninety-eight per cent being water. The office of this alkaline fluid is to clear, clean and moisten the cornea, which, having no blood vessels, would, of course, wither and dry up without this moisture, and we should become blind.

### Thermodynamics of the Human Machine.

In a paper published recently in the *Comptes Rendus*, M. A. Chauveau gives particulars of a series of experiments made to determine the thermodynamic economy of the human machine. The apparatus consisted of a pair of treadmills, each three meters in diameter, mounted on the same shaft. One of these treadmills was surrounded by a small chamber which was calibrated as a radiation calorimeter. A brake could be applied to either wheel at will and served to both regulate the speed of rotation and to measure the energy exerted. The speed chosen was 80 revolutions per minute, which, with necessary corrections, corresponded to an effective work of 68 calories per hour. The calibration of the calorimeter was effected by means of an electric current passing through heating coils in the chamber. It was thus easy to determine the output of heat required to maintain this chamber at any given temperature above that of the room in which it was placed. According to *The Engineering and Mining Journal*, the first series of experiments gave very uniform results. When the subject was doing useful work at the rate of 64 calories (units) per hour, he also radiated from his body extra heat amounting to 199 calories per hour. The efficiency of the human mechanism was therefore about 24.3 per cent.

### Automobile News.

The Motor Age has just appeared in Chicago and is published by the Cycle Age Publishing Company. It is filled with a number of interesting articles and will undoubtedly prove interesting to its readers. The form, however, is rather small for a paper devoted to motor carriages.

The Automobile is published at 150 Nassau Street, New York city. There are now two papers issued under this name, and *The Automobile Magazine* will be a third. The specific Automobile to which we refer consists of sixteen pages and contains a number of articles and notes on the automobile industry. It is quite well illustrated.

There is one place in New York where electric carriages are received and stabled and batteries charged at any time during the day. The batteries are charged in position or put on a small truck and taken to the charging-room. In a short time there will probably be facilities for charging storage batteries in every large stable in our cities.

### American Enterprise in Siam.

A former citizen of New Haven, Conn., Mr. Wallace J. Palmer, in traveling about the world, especially in the Far East, was particularly pleased with Siam. Having had some experience in operating Florida hotels, he opened one on a small scale in Siam. The American patronage made him prosper, and among the visitors was the King of Siam, who after a few visitations liked the place so well that he made Mr. Palmer his chief caterer.

The relations between the two grew quite cordial until the king at last generously gave Mr. Palmer a large plot of land in the center of the city of Bangkok, on which he is to erect a \$200,000 hotel structure. Land in Bangkok is said to be quite expensive. This practical recognition by the king of American enterprise is another example of how American ideas are being advanced in foreign countries.

### Microbes in Telephones.

According to *The Medical Record*, Dr. W. H. Hill, of the bacteriological laboratory of the Boston Health Department, recently made an examination of thirteen public telephones in that city. In several of the transmitters harmless microbes were found, but an inoculation of guinea pigs failed to reveal the presence of any pathogenic micro-organisms. The report states, however, that this examination has demonstrated the possibility of infectious diseases, particularly diphtheria and tuberculosis, being conveyed from one user of the telephone to a subsequent user. He suggests that the receiver as well as the transmitter be also cleaned and disinfected. Precautions of this nature are more necessary in public than in private telephones, as in many cases public telephones are used by persons who are unfamiliar with the instrument and insist upon placing their lips in close contact with the transmitter.