

**THE NATIONAL EXPORT EXPOSITION,  
PHILADELPHIA.**

The grounds of the National Export Exposition, which was formally opened September 14, 1899, are admirably situated on the west bank of the Schuylkill River, within ten minutes' ride of Philadelphia's great city hall. There are not less than sixty-two acres in the inclosure, fifty-six being deeded to the Philadelphia Museum by the city and another tract of six acres being secured for the use of the Exposition.

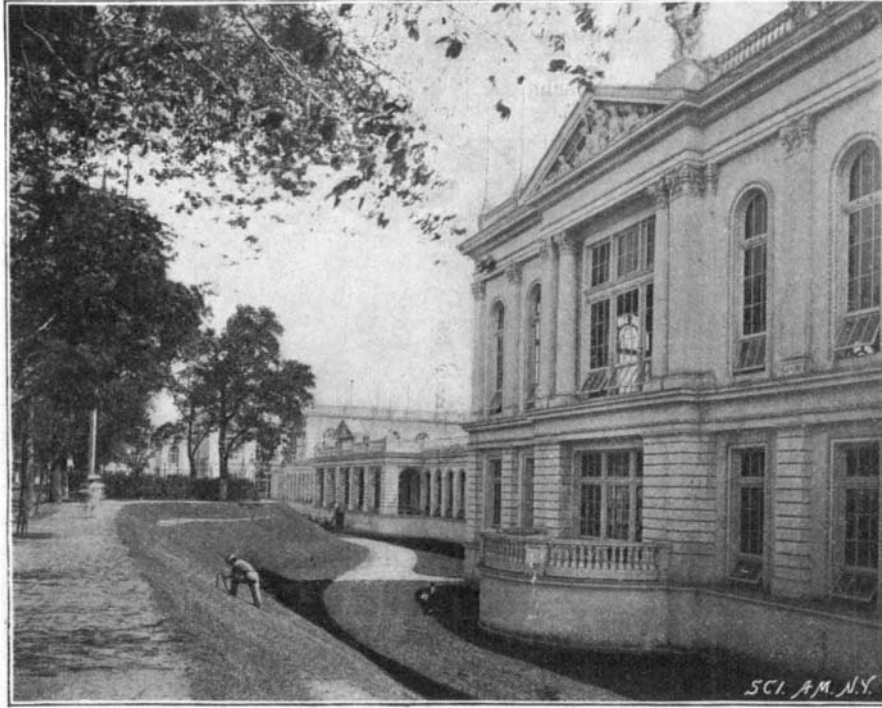
The main group of buildings is so arranged as to form one imposing structure 1,000 feet long and 400 feet wide, and covers an area of more than nine acres. Five separate buildings really enter into this large edifice. Three of these structures are to be permanent; these are the north, center, and south pavilions, which are each 380 feet long and 90 feet wide. The spaces between them are covered by temporary buildings connected with the permanent pavilions, the whole forming a single harmonious edifice. The permanent buildings will eventually become the home of the Philadelphia Museum. The temporary building between the north and center buildings is 300 by 297 feet; it comprises an auditorium and music hall 200 feet long and 140 feet wide seating 6,000 persons, with arcades for exhibit on each side 300 feet long by 78 feet wide. Between the central and southern wings there is an immense exhibition hall 383 by 297 feet. The exhibition spaces on the first floor of the wings open into the main hall with side arcades, so that the

with a peculiar composition, the basis of which is plaster and papier mache, which is more durable than the staff which was used at Chicago. The pavilions naturally received the greatest attention and they are admirable from an architectural point of view, as will be seen by our engravings. Above the main entrance a large pediment contains

the numerous flagstuffs float the flags of all the nations which were represented in the International Commercial Congress. The main building was designed by Wilson Brothers & Company, assisted for the permanent part by G. W. & W. D. Hewitt, Philadelphia, architects.

The main building is reached from the main entrance by an esplanade, where the visitors will find numerous attractions which it is deemed necessary to have in all expositions. It is very suggestive of the "Midway" at the Chicago Exposition. To the south of the main building is an Implement, Vehicle, and Furniture Building measuring 450 by 160 feet, and next to this is an open shed termed the Transportation Building. It is 450 feet long and 75 feet wide, and is provided with two tracks, so that it is available for the exhibit of rolling stock. The building offers every advantage for the handling and disposition of these heavy products, and representative displays are made by the Baldwin Locomotive Works, Pullman Company, and other manufacturers.

Unfortunately at the present time the space of many exhibitors still remains vacant, but exhibits are being rapidly installed, and in the course of a week or so the Exposition will be complete. The exhibits are numerous and include most of the best known manufactures in America. The booths are fitted up so as to present an attractive appearance. The Pencoyd Works, builders of the Atbara bridge, easily carry off the honors by a splendid exhibit of their work. There is a great lack of novelties, but after all it



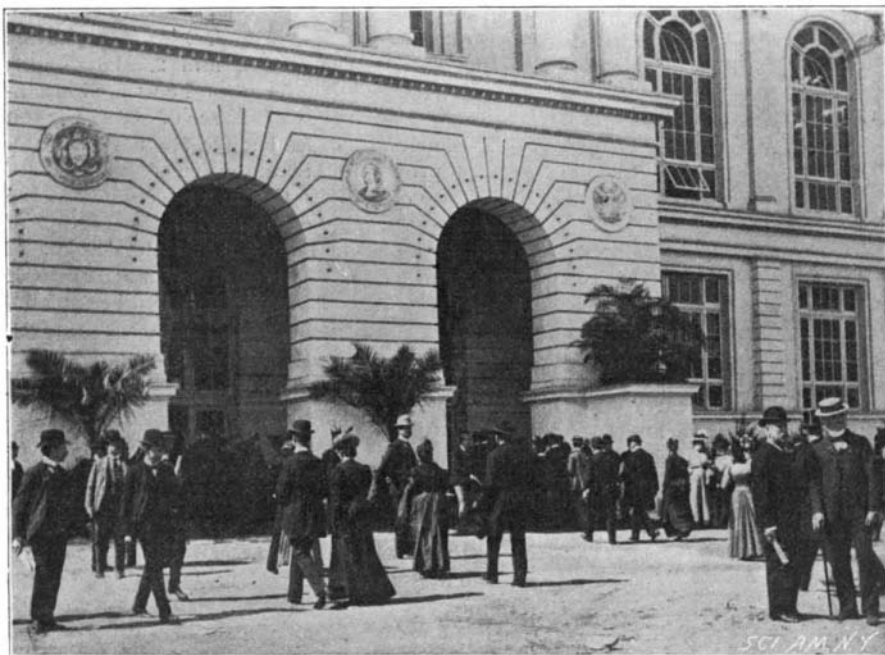
THE NATIONAL EXPORT EXPOSITION AT PHILADELPHIA.



GROUPS OVER MAIN ENTRANCE.



PEDIMENT OF PAVILION.



MAIN ENTRANCE.



VIEW OF THE ESPLANADE.

entire area of 167,200 square feet is practically a single open space. While the Exposition is of an eminently practical nature, the artistic side has not been lost sight of; on the contrary, the ornamentation and decoration of the structure, though of a temporary character which must of necessity be used in all exposition buildings, will delight the eye and will recall the "White City" of 1893. The buildings are covered

a group of thirteen figures representing "Commerce;" other pediments typify the four continents. Numerous groups of graceful figures symbolical of "Transportation," "Navigation," "Labor," "Electricity," etc., rest on pedestals. Beside the pediments and over the main entrance there is a large quadriga drawn by four horses carrying a figure of "Progress." Around the roof runs an iron balustrade of rich design, and from

must be remembered that this is in no sense an international exposition, and it fulfills admirably the purpose for which it is established.

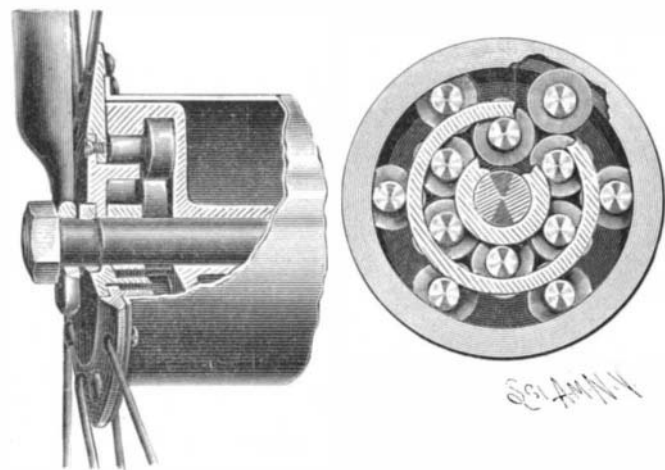
Of special importance is the exhibition of foreign trade samples collected by special commissioners of the Philadelphia Commercial Museum. These are displayed on the second floor of the center pavilion. These agents visited all the important markets of the

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



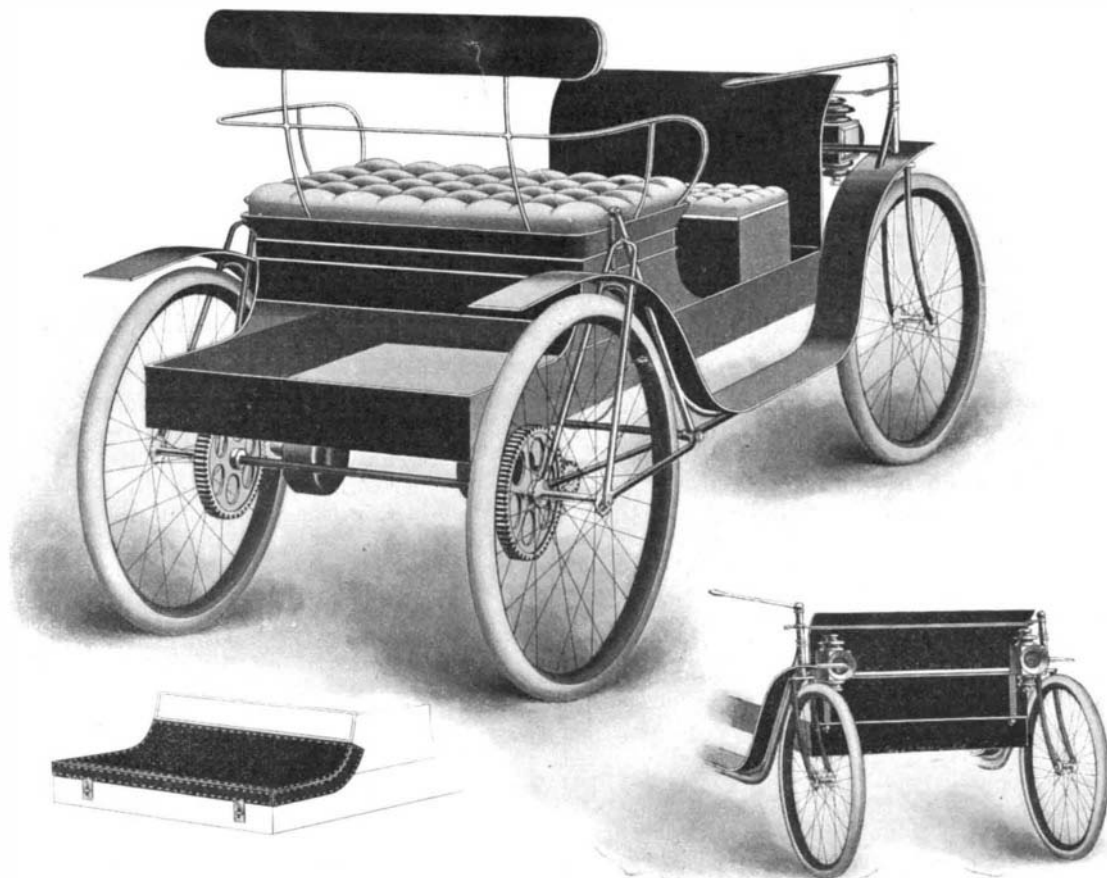
**ST. LOUIS' ROLLER-BEARING FOR BICYCLES.**

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

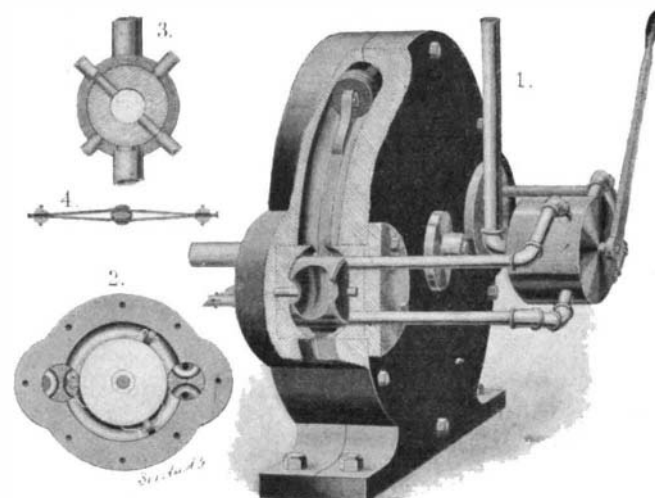
spent \$350,000 in his own lifetime on his pet project, every cent of which he obtained by medical practice. He died in 1793, and it took six years to induce the government to spend \$75,000, which was all that was required for the purchase of the collection. It was bought by the nation and turned over 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 16 2/3 degrees Celsius, while the garbuz 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 concealed 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.