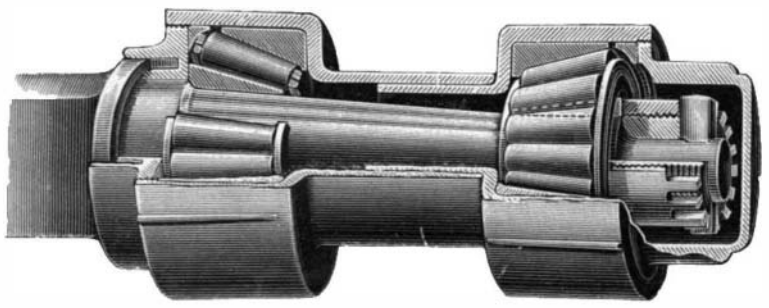
THE GRANT ROLLER-BEARING.

In tbe accompanying illustration we present a novel roller-bearing made by the Grant Axle and Wheel Company, of Springfield, Ohio, which has been used with noteworthy success upon wagons, carriages, automobiles, and vehicles in general.

The tapered rollers of the bearing turn between a cone held upon the axle spindle and an exterior coned ring. The inner cones are not keyed to the spindle, but are loose; so that they turn independently of the rollers. Should the rollers bind, the wheels would not be locked; for the cones could still rotate on the spindle. The method of assembling the various parts of the bearing is so apparent from the illustration that no extended description is necessary. Perhaps the most striking feature of the construction is the simple method provided for taking up the wear.

The adjusting nut is held on the outer end of the axle spindle by a pin or cotter passing through the nut and through the reduced end of the axle. The nut is made in two concentric members having threaded connection, whereby the outer portion or shell of the nut may be adjusted inwardly to take up the wear of the cones. Once set, the nut cannot be jarred or loosened from its position. It is evident that the spindle may be removed from the hub or wheel without in any way disturbing the adjustment of the parts.



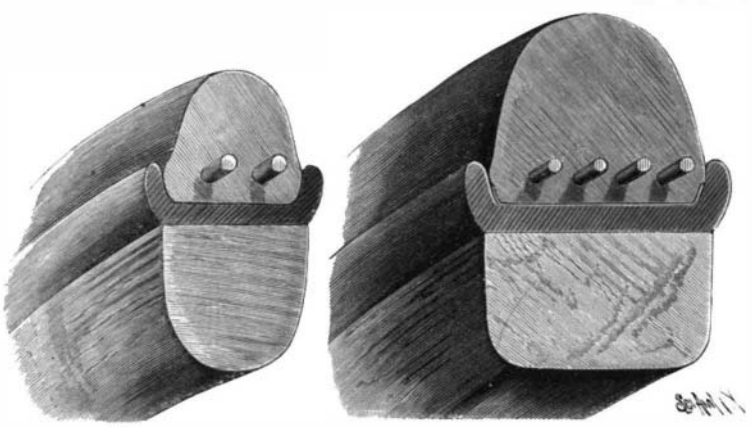
THE GRANT ROLLER-BEARING.

AN IMPROVED VEHICLE-TIRE.

An ingenious form of tire is being placed upon the market by the Consolidated Rubber Tire Company, of 40 Wall Street, New York city, which is particularly adapted to the requirements of wagon, buggy and carriage wheels.

To the wooden wheel upon which the tire is to be secured a metallic rim is fastened having angularly projecting flanges forming a groove with tapered sides, within which the inner portion of the tire is held. The outer portion of the tire is formed at an angle to the inner portion, the angle or corner between the portions being placed within the outer periphery of the flanges. Openings extend through the entire unexposed portions of the tire, and through these openings independent retaining wires pass, the ends of which are united after the rubber has been endwise compressed. The bottom portion of the tire is reinforced with a canvas strip.

By having the sides of the unexposed portion of the tire inclined and formed at an angle to each other, the compression of the tire in use is such that all portions of the rubber are retained within the groove and no portion is forced over the side of the flange. Thus the cutting of the tire at the corner or angle is prevented, and likewise its breaking inwardly to the openings through which the retaining wires are passed. The reinforcement of the bottom with canvas has a tendency to prevent the breaking of the rubber below that portion of the tire between the retaining wires and the rim. By reason of this construction, it is claimed that the tire is capable of standing more use and of remaining in position longer than most similar contrivances.



AN IMPROVED VEHICLE-TIRE.

PLANS are being made for the construction of a tunnel under the Hooghly River at Calcutta. The river at this point is about 36 feet deep, and according to one of the plans the tunnel will pass 12 feet beneath the bed of the river. The length of the tunnel proper will be 6,875 feet.

New Coast and Geodetic Survey Vessel.

The new steamer of the United States Coast and Geodetic Survey, the "Pathfinder," after receiving her scientific outfit at Washington, recently started on a voyage to San Francisco via Cape Horn, her destination being Alaska and subsequently the Hawaiian Islands, says The National Geographic Magazine. An examination made by Superintendent Pritchett last year developed the necessity of continuing the geodetic and hydrographic surveys of those islands by the United States government. The land operations, however, have been successfully organized and carried on for the last 25 years by the Hawaiian Government Survey. The steamer carries the necessary instruments for observations of terrestrial magnetism, densities of sea water, current velocities, and sea bottoms, as well as for the regular hydrographic and topographic survey of the coast. A record will also be kept of the phenomena observed while en route along the coast of South America. During the summer seasons the "Pathfinder" will reinforce the ships and parties of the Survey operating in Alaskan waters, retreating during the winter months to the milder Hawaiian shores. The "Pathfinder" is under the command of Frank Walley Perkins, of the Survey staff, with J. C. Dow, a well-known Transatlantic master, as executive officer. She is the largest of the Survey's vessels, and is peculiarly well fitted for the long distance work of the character she undertakes, her coal endurance being about 6,000 miles. She carries a complement of about 75 officers and men. Including the "Pathfinder," the Survey will now have four steam vessels on the Pacific station and three along the Atlantic and Gulf coasts, besides a number of schooners and smaller craft at various points.

Wireless Telegraphy During the Naval Maneuvers.

We have already referred briefly to the trials of Mr. Marconi's wireless telegraph apparatus at the naval maneuvers, says The Electrician, and we have now received a letter from Mr. Marconi himself giving us some interesting additional information and directing our attention to the significance of the experiments from a theoretical point of view. The maximum distance to which service messages were sent was 60 sea miles, and this was obtained with apparatus similar to that which has been in use for some time past at South Foreland, the vertical wires being 150 feet and 128 feet long. Mr. Marconi points out that it would geometrically be necessary to have poles 700 feet high at each end in order that a line between their summits should clear the curved surface of the earth. The greatest height employed above the level of the sea, however, did not exceed 170 feet, so that the Hertz waves, if it was really Hertz waves that passed, had either to go over a dome of water 530 feet higher than the top of the mast or to pass through it. This thickness of water, Mr. Marconi considers, would probably be much more opaque than Dover cliff. Non-official messages were obtained up to 74 sea miles in one stretch, which Mr. Marconi considers to be an undoubted record for electric waves.

The following detailed particulars of the trials are given in an article by Commander E. P. Statham, R.N., in The Navy and Army Illustrated: When the reserve fleet first assembled at Torbay, the "Juno" was sent out day by day to communicate at various distances with the flagship, and the range was speedily increased to over 30 miles, ultimately reaching something like 50 miles. At Milford Haven the "Europa" was fitted out, the first step being the securing to the main topmast head of a hastily prepared spar, carrying a small gaff or sprit, to which was attached the receiver, the wire from it being brought down to the starboard side of the quarter deck through an insulator and into a roomy deckhouse on the lower afterbridge which contained the various instruments.

When hostilities commenced, the "Europa" was the leading ship of a squadron of seven cruisers dispatched to look for the convoy at the rendezvous. The "Juno" was detached to act as a link when necessary and to scout for the enemy, and the flagship, of course, remained with the slower battle squadron. The "Europa" was in direct communication with the flagship long after leaving Milford Haven, the gap between reaching 30 or 40 miles before she lost touch, steaming ahead at a fast speed.

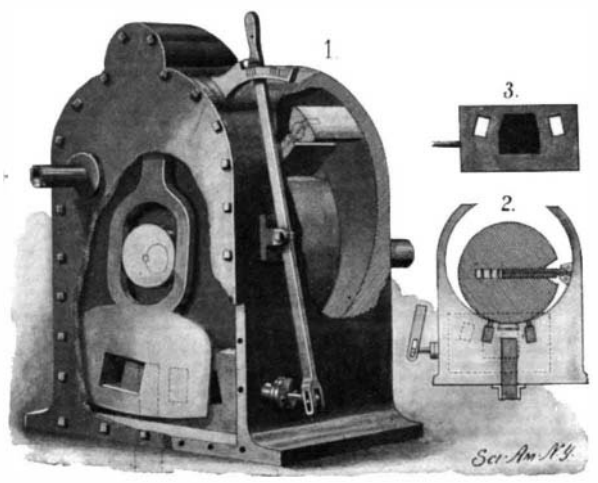
Reaching the convoy at four o'clock one afternoon, and leaving it and the other cruisers in charge of the senior captain, the "Europa" hastened back toward another rendezvous, where the admiral had intended remaining until he should hear whether the enemy had found and captured the convoy. But scarcely had she got well ahead of the slow ships when the "Juno" called her up and announced the admiral coming on to meet the convoy. The "Juno" was at this time fully 60 miles distant from the "Europa."

"Now imagine," says Commander Statham, "a chain of vessels 60 miles apart; only five would be necessary to communicate some vital piece of intelligence from a distance of 300 miles, receive in return their instructions, and act immediately, all in the course of half an hour or less. This is possible already. Doubtless a vast deal more will be done in a year or two or less; and meanwhile the authorities should be making all necessary arrangements for the universal application of wireless telegraphy in the navy. The outfit is not expensive; £120 would probably fit up any ship, and it is sure to become cheaper in time."

A RECENTLY INVENTED ROTARY ENGINE.

A small, compact rotary engine which is arranged to utilize steam expansively has been patented by Richard Toennes, of Boonville, Mo., and is noteworthy chiefly for the construction of the piston and for the method employed in admitting and controlling the steam. Fig. 1 is a perspective view of the engine with parts broken away to show the cut-off mechanism; Fig. 2 is a partial sectional front elevation; and Fig. 3 is a view of the reversing valve. The piston of the engine is eccentrically mounted and is provided with a spring-pressed piston-head which consists of a shank made in parts breaking joints and which is formed at its outer end with a pivot on which an auxiliary head is mounted to rock, this auxiliary head being likewise made in sections breaking joints. The engine has two main ports, one of which can be used as a supply port and the other as an exhaust port. These ports are reversed in function when the engine is reversed.

To change the direction of the piston motion, a reversing-valve (Fig. 3) is used having two through ports and an exhaust recess or port on one side designed, as the valve is shifted by the long lever shown in the engraving, to connect either main port with the exhaust port. The cut-off mechanism comprises a valve superposed on the reversing-valve and having a swinging arm extending across the engine-shaft. The arm is provided with a yoke which is acted upon by an eccentric on the shaft to cut off the steam and allow it to work expansively. The steam can be cut off at ¼, ½, or ¾ of the piston-stroke. In lubricating the cylinder, piston, and bearings, oil is fed at only three places. With the exception of the shaft, no moving parts are to be seen on the outside of the engine-casing.



PERSPECTIVE AND DETAIL VIEWS OF ROTARY ENGINE.

Educational Assistance for Young Men.

A very large number of young men are handicapped in business and social life by deficient education. For these there are excellent opportunities presented in the evening classes of the Young Men's Christian Association. Here they may get an education at the same time they are earning a living.

At the West Side Branch, 318 West Fifty-seventh Street, New York, there are elementary and advanced commercial courses, and language and scientific subjects so arranged that a young man can take one or more studies at a time and devote to study as many or as few evenings as he desires.

The courses of study begin on October 2 next. Those participating have the advantage besides of the Reading and Current Topic Clubs, Literary Society, and a library of over 42 000 volumes, which is a decided gain for any young man inclined to better his condition.

A CORRESPONDENT from New Orleans writes us concerning the water hyacinth, about which we recently published an article. He states that the country around New Orleans has also been very much troubled with the water hyacinth, and attempts to mitigate the evil have been made. Experiments have been made on the Melpomene Canal with a chemical spray, and the result has been highly satisfactory.