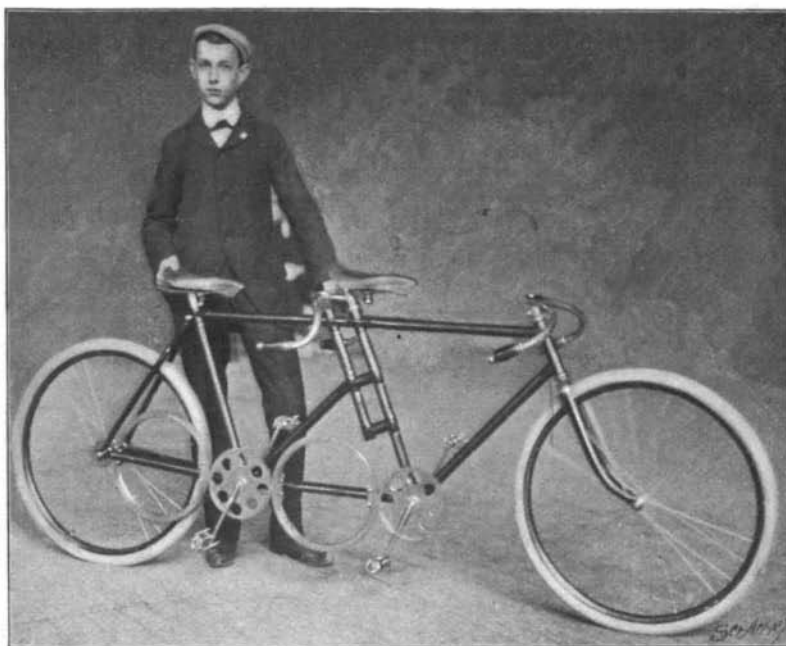


intention of exceeding this speed, it is to be presumed that their determination to withdraw from the record-breaking contest is based upon practical considerations. According to the oft-repeated statement of the company, they consider that there is nothing desirable in the extra two or three knots that may be obtained, beyond the mere prestige which goes with the fastest ship, while, on the other hand, there are positive disadvantages attending this high speed. In the first place, the great increase of weight and the large demand upon space, due to the powerful machinery which must be installed, consumes so much of the ship's capacity as to leave very little room for cargo. Moreover, the consumption of coal is increased by from 30 to 40 per cent, and, of course, the profits of the ship are considerably reduced. Viewed from the standpoint of the passenger, it is claimed that the twelve hours which are saved by putting a ship across the Atlantic at the highest speed frequently only serve to land the passengers in New York Harbor just too late to pass the quarantine, and necessitate their being detained on board until morning. However, in spite of these statements of the company that they intend to run "a regular week boat" instead of a "record-breaker," there are many people in shipping circles who expect the new ship to run very close to, if she does not exceed, the existing records.

With regard to the construction of the ship, particular attention has been paid to the element of strength and stiffness. The frames are heavy channels of steel,



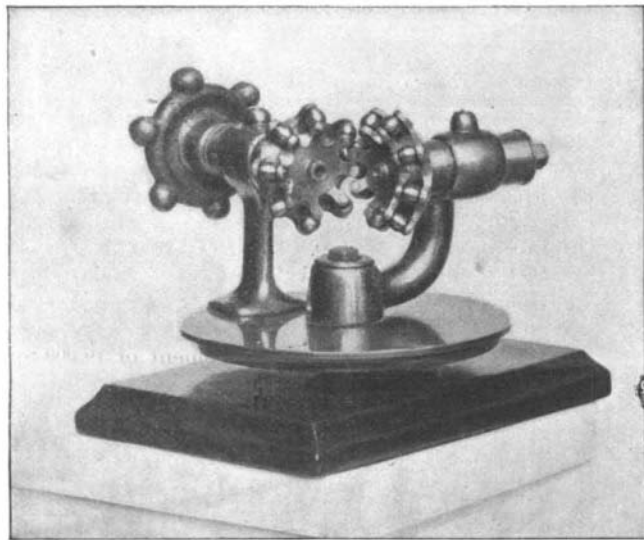
CHAINLESS TANDEM.

distinct decks in all, and above these is the boat deck, which extends for several hundred feet amidship. The captain's bridge is exactly 74 feet 9 inches above the keel, and will be about 40 feet above the water line when the ship is down to her load line. The names of the decks commencing from the bottom are the lower orlop, orlop, lower, middle, upper, promenade deck and boat deck. The engines are of the twin-screw triple-compound, inverted type, working upon four cranks, and the cranks will be set according to the well known Schlick system, which is designed to eliminate vibration and has shown very good results in practice. The high pressure cylinders are 47½ inches, the intermediates 79 inches, and the two low pressure cylinders 93 inches in diameter, the common stroke being 72 inches. The crank shaft is of Whitworth compressed steel and is built up in four lengths. Its diameter is 25 inches; and the diameter of the crank pins is 26 inches. The boilers are of the double-ended return-tube type; they will work under a pressure of 190 pounds to the square inch.

There will be accommodation for 410 first-class passengers, 300 second-class and 1,000 third-class, and as her crew will number 390, the total number of souls on board, when she carries her full complement, will be 2,100.

In conclusion it should be mentioned that this magnificent ship is only one of a large fleet which this great Irish shipbuilding firm has constructed during the last twenty-five years for the White Star Company. In fact,

to 3½ inches being common. Flush joints continue to be popular, although there are many practical men who consider that for a given weight of material better results can be obtained with the old style. On the score of appearance, however, the flush joint is incomparably superior, and, as reliable results have been secured, it is likely that the flush joint will remain the standard type.



BULLIS "BALL BEARING" GEAR.

9 inches in depth, and they are spaced 31½ inches from center to center. The plating varies in thickness from 1 inch to 1½ inches. The plates are generally 4½ feet wide by 28 feet long, and they vary from 2 to 3½ tons in weight. The total number of rivets used throughout the hull was 1,704,000. The double bottom, which is built on the usual cellular system, extends throughout the full length of the ship, and, in general, is 5 feet 1 inch in depth, except beneath the engines, where, in order to comply with navy requirements, the depth is increased to 7 feet, for the purpose of giving the requisite strength.

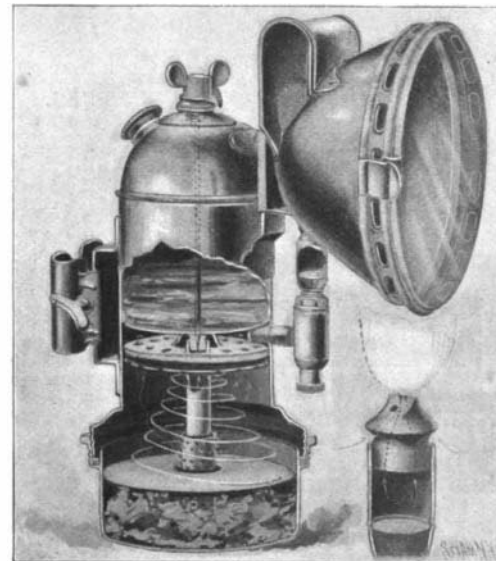
The "Oceanic," it should be said, has been built to meet the Admiralty requirements, and has a sufficient number of gun platforms to carry a powerful rapid-fire battery. As an armed cruiser, she would be of great service, for, with her full supply of coal on board, she could steam around the world at 12 knots speed without recoaling, and, of course, her enormous size would make her an ideal troop ship.

The determination to provide the vessel with great longitudinal strength is shown by the fact that, in addition to the deep inside vertical keel, there are each side of the keel three longitudinal plate girders, worked in between the outer and inner bottoms. Moreover, at the turn of the bilge, the plating is worked in double thickness, and the sheerstrake and the strake next but one below it have been doubled in thickness, while the upper deck stringers have also been doubled for a considerable length amidships.

Great strength is also afforded by the five steel decks, which are completely plated from stem to stern. Including the inside floor of the ship, there are seven

every one of the vessels of the company's fleet has, we believe, been built by Harland & Wolff, and in no single instance have the ships failed to live up to and exceed expectations. The total value of these vessels, including the "Oceanic," amounts to \$37,500,000, and it is a remarkable fact that the ships have been built without any hard and fast contract.

It is probable that the "Oceanic" will make her



ACETYLENE LAMP, WITH FILTER.

The predicted return to 30-inch wheels (they were the standard size many years ago) has not occurred. There were one or two of this diameter in the exhibits, but they failed to attract much attention. Theoretically there is an advantage in the larger diameter, especially on a rough road or on worn macadam, for the larger wheel spans the hollows and surmounts the obstructions with less shock. We have tested this under exactly similar conditions, by replacing the old 28-inch by 30-inch wheels on a favorite machine on which we had ridden 2,000 miles. The lessened vibration is distinctly noticeable when running over rough surfaces, such as poor macadam or Belgian blocks. There is, however, an increase in weight, and, perhaps, a loss in the trim appearance of the wheel, which will probably prevent any return to the larger wheels.

We are also glad to note that there is a return to reasonable weights, and the presence of eighteen and twenty-pound wheels in the exhibits of a few of the best makers testifies to the truth of our recent contention that a thoroughly reliable wheel could be made at these weights. The reduction of weight has been secured by using the very best material and by cutting out every ounce of it that is not essential to the strength of the wheel. The price of such wheels is usually \$75, as against \$50 for the heavy machines. This is to be expected, for it takes the very best of work to produce a reliable eighteen-pound wheel. A lovely little wheel of this weight was shown in the Cleveland exhibit.

In our last issue we gave a comprehensive survey of the exhibition, and we now present several cuts showing a few of the novelties which attracted most attention.

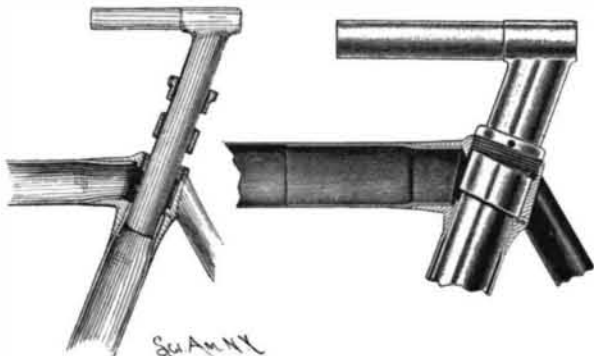
The chainless wheel was, of course, the



WILFORD HALL CRANKLESS BICYCLE.

most important feature of novelty (if we can call it novel) in the building. Six types were shown, the Bevel gear, the Sager, the Spin roller, the Spur gear, the Moomy, and the Bullis gear. Of these, the Sager predominated, and next in the number shown came the Bevel, Spin roller, and Bullis types. In the Sager, the power is transmitted through gear wheels with teeth of an entirely novel but theoretically good form, which mesh with wheels provided with pins and rollers in place of the ordinary teeth. The roller gear is of very strong construction, and it is difficult to see how it could get out of order, provided the material is of proper wearing quality. The curious form of the teeth on the gear wheel is obtained by means of a machine which has a revolving head provided with four revolving cutters of the same size and pitch as the roller teeth of the roller gear. The gear wheel and the cutting machine are set up exactly in the relative position they will hold in the bicycle and rotated together, the cutters cutting out a tooth of the exact shape to conform to the path of the rollers. It was on a machine of this type that "Major" Taylor recently made the world's record for the mile of 1 minute 31½ seconds.

In the Spin roller gear, as distinguished from the Sager, both of the intermeshing wheels are provided



TRIBUNE SEAT-POST ADJUSTMENT.

with roller teeth journaled on pins, each tooth curving inwardly toward its axis. In this type the principle of roller contact is carried one step further than in the Sager, and theoretically the sliding friction at the point of contact is totally eliminated. The contact is "point" contact, as distinguished from the "line" contact of the Bevel and Sager gears.

The Bullis gear substitutes steel balls rotating on pins for fixed teeth in the earlier form of its gear (see cut), and in the later form it uses balls in one of the intermeshing gears and concave rollers on the other gear, thereby securing a wider path to resist the wear. In the later form the pins on which the balls run are tapered, with a view to enabling a rider to adjust the balls and take up the wear. All of the above types are provided with dust-proof casings. In the Moomy chainless the double ball bearings of each set of gears are placed in one rigid bracket, which holds them absolutely in proper relation to each other. By this arrangement the tubes of the frame may be sprung out of line without causing any binding of the gears.

Another type, the possibilities of which have been by no means exhausted, is the Spur gear (shown in



TRIBUNE HANDLE-BAR GRIPPING DEVICE.

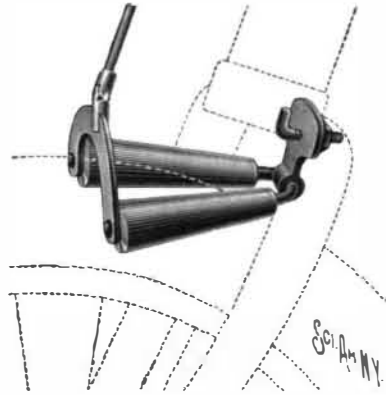
the accompanying cut of a chainless tandem), which has never received the attention it merits from the riding public. In the form of Spur gear shown the chain is replaced by intermediate spokeless gear wheels which travel by means of a circle of balls upon large rings bolted to the right lower fork. The whole gear is incased, runs with great smoothness and has a neat appearance.

The chainless is in our opinion the coming wheel. As soon as it has been proved to the public satisfaction that it runs as freely under all conditions, and is as durable as the chain, it will sweep the older type from the field—so great are the advantages of an inclosed mud and dust-proof gearing.

Of the wheels which embody new driving mechanisms, we select for illustration the Wilford Hall. In

this it will be noticed an attempt is made to get around the supposed mechanical deficiencies of the crank as a means of changing rectilinear into circular motion.

In another, called "the hill climber," the inventor seeks to enable the rider to do more effective work on the down stroke, and to this end he provides two levers, one on each side of the frame, which are pivoted at the bottom of two vertical levers that are themselves pivoted at the upper part of the rear stays of the bicycle. The lower, or propelling, levers have ball-bearing attach-



DUNBAR BRAKE.

ments to the crank-pins at a point a few inches from their (the levers') front ends. The cranks are placed at the forward end of the levers. It is claimed that the crank is practically lengthened to 10 or 12 inches on the down or driving stroke, while the foot only travels in the usual 14-inch circle.

In the Wilford Hall machine the rotary motion is dispensed with by attaching the pedals at the forward ends of two levers which are pivoted at the mid-length of the rear forks. From the levers two lengths of chain pass over loose sprockets, attached to the top of the seat-post tube, and down to jam clutches on the hubs. In the normal position, when not in use, the chains are drawn around the clutches by means of suitable springs, the levers being at the same time in the raised position. When pressure is put upon the



SELF-CLAMPING SEAT-POST.

pedals, the clutches are thrown into engagement and the bicycle is driven forward. The length and the frequency of the stroke can be varied at will, and, as there are no dead centers, it is claimed that this wheel makes an ideal hill climber.

The Dunbar bicycle brake, which is applied to the front wheel tire, consists of two conical rollers which are so placed that their axes diverge (see cut). It is applied to the tire by the usual front brake gear. The object is to reduce risk of puncture, avoid pulling out repair-plugs, and to avoid the throwing of dust and mud. It is attached by a simple hook clip, as shown, which takes hold of the inside of the fork crown.

The ingenious and rapidly adjusted split seat-post herewith illustrated will commend itself to those who wish to guard against the bicycle thief. The wedge action of the two halves of the post causes the post to bind firmly within the tube. A sharp upward blow under the front of the saddle releases the wedge, and enables the rider instantly to disable the machine by carrying off the seat with him.

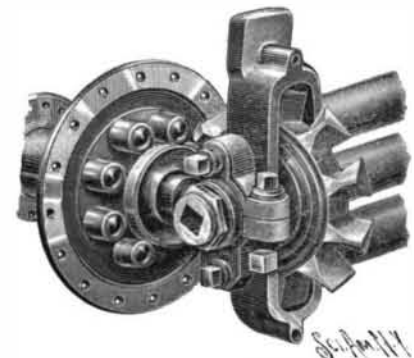
We also show one of the acetylene lamps (their name is legion) exhibited at the show. The carbide, in fragments, is kept at the bottom of the lamp by a coil spring. Water is fed by a needle valve, and the liberated gas passes up through a perforated filter plate before passing to the burner. The latter has two air holes, as shown, formed diagonally on each side of the burner, which causes a current of air to impinge on the base of the flame.

Very neat and effective seat-post and handle-bar clamps are found on the well known Tribune bicycles. The former consists of a beveled ring or collar, which fits closely over the post and catches at its lower edge against a projection within the seat-post

forging. The screwing down of a nut on the upper edge of the beveled ring causes the latter to bind against the post. The handle bar is clamped against the inner walls of the steering tube by means of four independent jaws which open outwardly through slots in the tubing of the stem. They are forced outward by an expander which is drawn up and locked by nuts at the center of the handle bar as shown. In this machine flush joints are used throughout. The metal of the joint forging is reamed out and the tube ends are swaged down, without reducing the thickness of the metal, and brazed into the joint. By this means it is claimed that the handsome appearance of the flush joint is secured without any sacrifice of strength.

The Seat of the Soul.

Understanding by "soul" the highest intellectual faculties, it is worth considerable trouble to find out where these functions are located. Savages believe that it is in the liver or the heart; cynics suggest that it is in the stomach; phrenologists place them in the front part of the brain; but the most advanced physiologists, says D. G. Brinton, of the University of Pennsylvania, in Science, are now inclined to teach that the posterior cerebral lobes have the highest in-

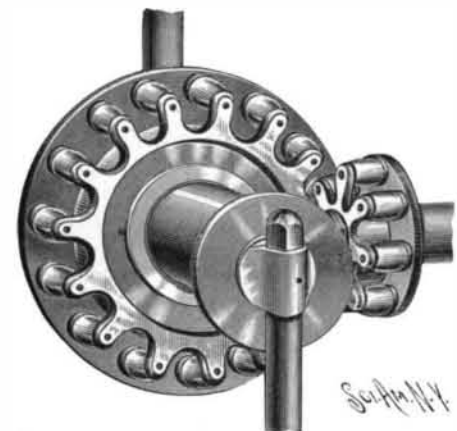


SAGER GEAR.

tellectual value. Dr. C. Clapham's arguments to this effect are quoted with approval in the Centralblatt für Anthropologie (1898, Heft 4). These arguments are that man has the most highly developed posterior lobes, and this is conspicuous in men of marked ability and in the highest races. In idiots the lobes are imperfectly developed, and in chronic dementia these portions of the brain reveal frequent lesions. Numerous authorities are quoted in support of these and allied statements.

Mining Machines Admitted Free.

Russia has decided to permit all machines used in connection with the mining and reduction of gold ores to enter without the payment of duty. According to Stahl und Eisen, the Russian Minister of Finance has prepared a list of machines which, under the new decision, may be imported duty free. The list includes: 1. Machines used in gold-washing, such as pumps, water-pipes, machines for the hydraulic dressing of gold, hydraulic pumps for the treatment of gold-bearing sands. 2. Machinery for the treatment of gold ores, such as apparatus for fusing, for amalgamating, for the extraction of gold by the wet process, all kinds



SPIN ROLLER GEAR.

of furnaces, apparatus for the chlorination of gold, iron casks, and dynamos for the electrolytic separation of gold from cyanide solutions.

Machinery used for mining in general is also admitted free. Among such machinery are included dredgers, drilling machines, transporting apparatus, water pumping machinery, ventilators, and all kinds of mining apparatus.

MRS. ESTHER HERRMANN, who is already well known as a benefactor of scientific institutions, has sent a check for \$10,000 to the Council of Scientific Alliances of New York, which is composed of eight scientific institutions. The council has had for some time plans of a building which will cost half a million dollars, and we have already described the prospective building in our SUPPLEMENT. It is hoped Mrs. Herrmann's gift will be the first of many similar donations.