

IMPROVEMENTS OF INTEREST TO BICYCLE RIDERS.

An improvement designed to enable the rider to propel his machine with increased power, by attaching to it a support affording a resistance above the shoulders, is shown in the accompanying illustration. It has been patented by Mr. Estanislao Caballero de los Olivos, of No. 34 West Fifteenth Street, New York City. To the rear of the saddle frame a curved rod is secured by a clip, the vertical outer portion of the rod having a collar on which rests a transverse bar to which are attached the straps of a shoulder brace. In the transverse bar is a spring-pressed slide, adapted to engage a notch in the vertical support, but by pressing upon a button on the outer end of a rod extending from the slide to one end of the bar the latter is disengaged from its support, freeing the brace from attachment to the machine and relieving the rider from its tension. As the straps afford a resistance or fulcrum above the shoulders of the rider, he is enabled, by means of the brace, to exert a considerably greater downward pressure with his feet. The straps preferably have pads, and yokes or other forms of support may be substituted for them, as may best accommodate the rider. Another improvement of the same inventor is also represented in the illustration, consisting of a light and simple form of stand by which the bicycle may be supported in upright position when not in use. It is a telescoping leg or rod whose upper end is attached to the top bar of the frame, the lower end of the bottom section, when extended, reaching the ground and forming a rest when the machine is tipped slightly to one side. When the sections are closed up, the lower end of the extensible leg is secured to the lower bar of the frame. On the lower bar is also a short spring arm, carrying a shoe, adapted to be sprung into engagement with and form a lock upon the tire of the front wheel when the machine is at rest, preventing the turning of the wheels.

JAPANESE CLOCKS.

The Japanese are the only ones outside of western Europe who have constructed clocks having a peculiar character, and the manufacture of them dates from the end of the sixteenth or the beginning of the seventeenth century. Their first attempts were made after they had seen the European types that were brought to them, but they soon devised systems of dials and movements more in keeping with their method of counting the hours.

Among the various systems that are peculiar to them, let us describe that which we illustrate in Fig. 1. This piece, which dates from the beginning of this century, consists of a well-made wooden case, containing the clock, which is of gilded copper. The movement shows perfect workmanship and the back pillar plate is carefully decorated with fine engravings. The skill of the Japanese in matters of clockwork is indisputable, and the decoration of their clocks is often most charming. We shall explain the peculiarities of the dial of this clock and the manner in which the hours, days, days of the month and moons are counted.

In Japan, the civil day consists of twelve hours only, instead of twenty-four. There are six of the day and six of night. The six diurnal hours are counted from the rising to the setting of the sun, and the six nocturnal ones from its setting to its rising. So, the days and nights have equal hours twice a year only, that is to say, at the equinoxes, while at the solstices the disproportion is considerable. The division of the two periods, diurnal and nocturnal, usually of unequal length, requires that the six divisions that compose them shall themselves be unequal;

hence hours of greater or less length. On the long days, for example, the six hours of the night are shorter than those of the day. Sometimes, therefore, it is the hours of the day that lengthen to the detriment of the night, and sometimes the contrary is the case, according to the time of the year.

This manner of dividing the year is not exclusively Japanese, for it was universally employed in antiquity. It is what is called the natural day, while our day, which is divided into equal parts, without regard to the rising or setting of the sun, is called the

perfect number nine. The intermediate numbers are developed thus: Twice 9 is 18; suppress the decimal figure and eight remains; that is why the hour that follows noon or midnight, that is to say, the second hour, is 8 o'clock of the day or night. Three times 9 is 27; suppress the decimal as before, and there remains 7, which makes the third hour, and so on.

In order to mark these hours and obtain the equation of the days, the Japanese have employed various systems; sometimes that of the balance shown in the clock in Fig. 2, and sometimes that of the dial, as in Fig. 1.

In the first of these systems, the balance consists of a vertical rod upon which is horizontally mounted a strip of metal whose upper edge is notched and from which are suspended two small metallic weights that may be moved at will from or toward the axis in order to quicken or slacken the movement of it. In the long days, for example, the two weights are placed at the hour of sunrise at the extremity of the balance, and the hours are marked slowly. When the hour of sunset arrives, they are placed near the center of the axis and the hours of the night pass much more rapidly. There are thus obtained, by a proper regulation, the long hours for the long days and the short ones for night.

In the system of regulation by the circular dial, the latter consists of twelve sliding cards, upon which the hours are painted, and which are so mounted in the disk that they can be easily moved away from or toward each other. In the long days, for example, the six cards

that serve to mark the diurnal hours are widely spaced, and the six that serve to mark the night hours are proportionally moved closer together.

The equation of the days is therefore operated by the proportionate spacing of the cards by hand. It is necessary to add that in this system the complete dial is revolved by the movement, and the hours present themselves successively before the hand, which is stationary. The six hours of the day and the six of the night constituting the complete day have a name as well as a figure. But the complete day, instead of being composed of two periods of six, comprises twelve names corresponding to the signs of their Zodiac. These are: The Rat for midnight or 9 o'clock. The Ox for 8 o'clock. The Tiger for 7 o'clock. The Rabbit for 6 o'clock. The Dragon for 5 o'clock. The Serpent for 4 o'clock. The Horse for noon or 9 o'clock. The Goat for 8 o'clock. The Monkey for 7 o'clock. The Cock for 6 o'clock. The Dog for 5 o'clock. The Boar for 4 o'clock.

We give a facsimile, Fig. 3, of these twelve subjects; but upon the clock dials that represent them they are figured only by characters answering to their names. The dial that we reproduce belongs to a system of clock other than the one of which we speak.

Each of the twelve hours is divided into ten parts.

The use of the twelve branches to designate the hours is borrowed from the Chinese, but the other combination for counting the six hours is, as has been said, peculiar to the Japanese.

Having spoken of the hours, we shall explain how the days of the month and moons are indicated. In two small apertures situated beneath the dial (Fig. 4) appear Japanese characters. In one, that to the left, are the signs of the Zodiac. They represent the days to the number of twelve, which are the same as those of the hours, and so in Japan one may be at the same time at the hour of the Cock, the day of the Cock, the month of the Cock and even the year of the Cock.

To the right is the month represented by one of the ten elements. In order to obtain the day of the moon (for the year is lunar, and not solar, as with us), the twelve signs



CABALLERO'S BICYCLE SHOULDER BRACE AND BICYCLE STAND.

artificial day. But in Japan, the thing is strangely complicated when it is necessary to count the hours. It would seem that nothing was more simple than to count the twelve parts of the day from 1 to 12. Such simplicity has been disdained in Japan, and the process adopted is as follows: As nine is regarded as the perfect number, midnight and noon are called 9 o'clock. Thus noon will be 9 o'clock of the day and midnight 9 o'clock of the night, while the rising and setting of the sun are either 6 o'clock of the day or 6 o'clock of the night. If it be asked how nine can be found twice in twelve, we answer that the seeming arithmetical impossibility will be overcome if we begin to count by four, which will allow us to finish by



Fig. 1.—PORTABLE JAPANESE CLOCK.



Fig. 2.—JAPANESE CLOCK WITH WEIGHTED BALANCE.

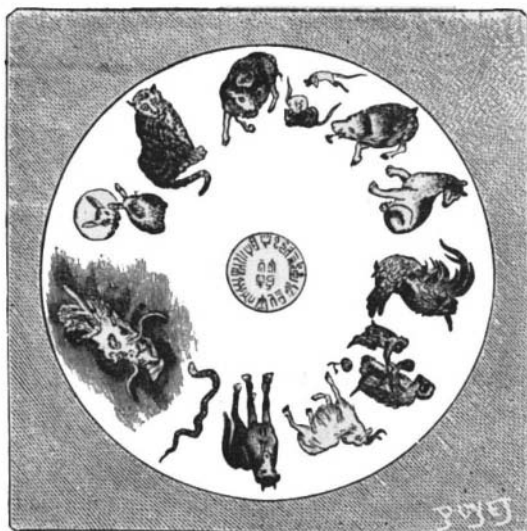


Fig. 3.—JAPANESE CLOCK DIAL OF PORCELAIN.

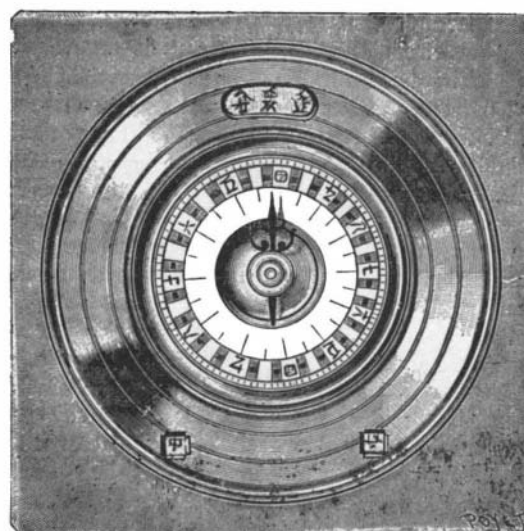


Fig. 4.—JAPANESE CLOCK DIAL OF COPPER.