

or 4,950,000 bricks for the eleven engines. This added to the number of bricks used in the stack makes a total of 8,300,000 bricks for the foundations and stack alone.

#### Flags of Our Warships.

In the Equipment building at the New York navy yard there is a large manufactory where most of the flags of our navy are made. A large vessel carries forty American flags, and a smaller vessel almost as many. This does not include the fleet and international signal flags and the flags of other countries. There are three rooms in the Equipment building which are given up to flag-making. One of these is very large and the others on either end are much smaller. There are sewing machines, scissors, pincushions, and flat-irons scattered around, so that the place does not look unlike a patriotic dressmaker's establishment. The flags are all made by women, though a few men help to cut out the stars and do the finishing. The wind and weather destroy flags so fast, and new vessels are put into commission so rapidly, that it is necessary to employ a number of people even in time of peace. The working hours, during the present war, were extended from eight o'clock in the morning to five o'clock in the evening to eight o'clock in the morning to ten o'clock in the evening. In one week eighteen hundred flags were made at the flag department, and this was when the rush of work was about over. The women cut all the square flags and the devices for them. The men cut the stars and bias pennants and put on the finishing touches and the heading through which the rope runs. They also put in the rope and stencil the flag with the size and nationality. There is a pattern for every flag, and the patterns are put away in paper bags when not in use. There are forty-four flags in a set of general signals used in the navy. These are in three sizes, while the regular flag is made in nine sizes. The largest flag measures 36 feet long, while the smallest is only 30 inches. Pennants are made up to 70 feet long. There are nineteen international signal flags and forty-three foreign flags which are made at the navy yard. There are no specialists in the workroom, and the women make any flag which may be assigned them. Of course it is necessary to have the flag exactly the same on both sides, which makes the work very difficult, especially with foreign flags, where the devices are in much detail. It may be truly said that some of the flags are fancy work on a Gargantuan scale. Here are wonderful landscapes, with round-faced suns with halos coming up from behind gay colored mountains over which run rainbows in four or five lines of outline or chain stitching, making a scene which would surprise an artist. Water must be indicated with some kind of embroidery stitch. Whole menageries of animals have to be represented on some flags. Flags of Costa Rica and San Salvador are considered the most difficult to make, says The New York Times, from which we glean our facts. The German flag is also considered difficult. The largest foreign flag is only 25 feet long. The largest sized American flags are made of 19 inch bunting and the narrow pennants are made of 4½ inch bunting, which comes on purpose for them. Each flag which is made is measured on the floor over the seams and sewed to insure the exact measurement. There are metal pieces let into the floor and each one is marked for the different flags. It is an inspiring sight to see the manufacturing of these flags, and it seems curiously appropriate that women should be selected to make them. Preparing the colors for gallant warriors who go to fight seems to have always been an essentially feminine duty which has obtained from very early days. In the middle ages fair ladies embroidered the banners under which their knights fought, and although flag-making is now put on a business basis, it has been the work of the women in the United States since the first flag of the country was made down to the present day.

#### AN ATTACHMENT FOR SOCKET-WRENCHES.

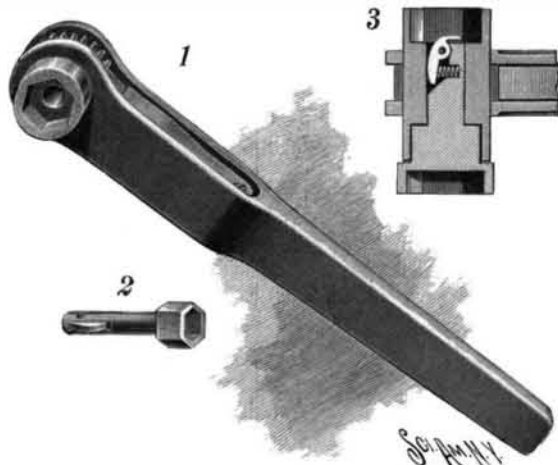
In order to enable a socket-wrench to engage nuts of different diameters, a device has recently been invented which, when applied to a wrench, permits a wider use of that wrench than would otherwise be possible.

Of the annexed illustrations, Fig. 1 represents a ratchet-wrench in perspective; Fig. 2 the removable device or socket piece; and Fig. 3 an enlarged section of the socket-end of the wrench, showing the socket-piece applied.

The ratchet-wrench illustrated is provided at one end with a rotatable barrel having sockets in each end formed to engage nuts of a certain size. These two sockets are connected by a central aperture, circular in cross-section. The auxiliary socket-piece has a stem or shank, which, when the socket-piece is in use, is inserted in the central aperture of the wrench-barrel, as indicated in Fig. 3. On the stem a head is formed which coincides in shape with the socket of the wrench-barrel. The head of the socket-piece is provided with an auxiliary socket, the diameter of which may be smaller or larger than that of the wrench-socket. In Fig. 3 the auxiliary socket is shown pro-

jecting from the wrench-barrel to engage nuts of a diameter larger than that of the wrench-socket.

In order that the socket-piece may not be displaced from its position, a spring-pressed friction-block is pivoted in a slot formed in the end of the stem of the socket-piece. The block being pressed against the barrel of the wrench, holds the socket-piece with a



HAGGERTY'S ATTACHMENT FOR SOCKET-WRENCHES.

force sufficient to prevent its dropping out, in whatever position the wrench may be placed.

The attachment forms the subject of a patent controlled by J. Henry Haggerty, of 50 South Street, New York city.

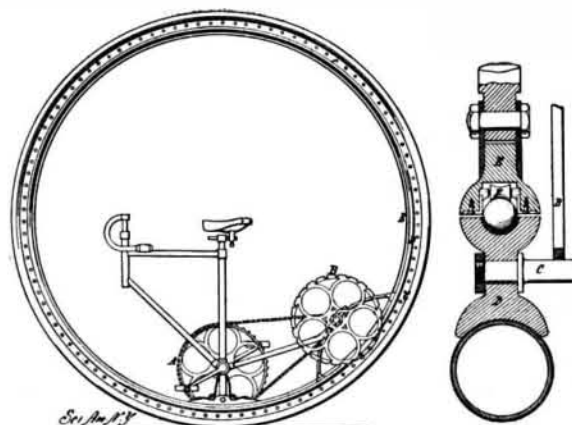
#### A UNICYCLE OF NOVEL FORM.

In the accompanying engraving we have illustrated a unicycle which, by reason of its novel construction, has attracted not a little attention.

The main feature of this unicycle is found in the formation of the spokeless wheel, the rim of which is made in two sections, turning upon each other. The driving gear is secured to the inner section of the rim.

As shown in our side elevation and section, this rim is composed of the two parts, *D* and *E*. The part, *D*, has a concave portion which receives the tire of the wheel and which is connected by a web with another portion semicircular in form, constituting a ball raceway. Between this raceway and the recessed portion of the part, *E*, balls are placed which are engaged by rollers, *F*, adapted to take up the wear. Thus constructed, one portion of the rim will turn upon the other, the friction being reduced by means of the balls and rollers.

Of the two parts of the wheel rim, *E* is the stationary



SIDE ELEVATION AND SECTION.



THE UNICYCLE IN OPERATION.

section and *D* the traveling section. The web of the traveling section, *D*, is provided with pins, *C*, extending horizontally from one side.

By means of the pedals, the rider drives the sprocket-wheel, *A*, the motion thus produced being transmitted by means of a chain and small sprocket-wheel to the drive wheel, *B*, slotted to engage the pins, *C*, of the traveling section, *D*.

The drive wheel, *B*, and the small sprocket-wheel are mounted on a single shaft moving in a slot concentric with the wheel rim. The shaft is connected with the seat mast by links, the forward ends of which receive the ends of the pedal shaft. By throwing his body toward the front, and thus bringing his center of gravity forward, the rider, it is claimed, is relieved of much of the work necessary to drive the wheel. The movement of the saddle naturally produces a corresponding movement of the drive wheel shaft in its slot. The inventor states that the wheel may be steered by inclining the body to the right or to the left.

The unicycle has been patented by Vernon D. Venable, of Farmville, Va., and has been in actual use for two months.

#### The Measurement of Sunshine at Health Resorts.

Jones (Lancet) has been measuring the actinic value of the sunshine, in summer and winter, in London and at Llangammarch Wells, a mountain resort in Wales, where the air is particularly pure and clear. He found that the actinic value of the sunshine in the latter place was in an hour of a summer's day from three to five times that of London under similar conditions of clear or clouded skies. In the winter the difference was not so marked, but the Wales sunlight was about twice as strong as that of London. A comparison with the results of similar tests made in the high Alps shows that the air may be just as pure in a mountainous district or far less lofty elevation. These tests are essentially a test of the purity of the air, as the amount of heat in the sun's rays has no effect upon the result. The method employed is briefly as follows:

A solution of potassium iodide is prepared containing 20 grammes to the liter of water; also, a solution of pure sulphuric acid, 11.6 grammes to the liter of water; and a third solution in which a liter of water contains 0.39 gramme of powdered arsenious acid and 1.5 grammes of potassium bicarbonate. To make a test of the sunlight, 10 cubic centimeters of solution No. 1 and an equal amount of No. 2 are placed together in a glass stoppered bottle on a white porcelain plate, and exposed to the action of the sunlight. At the end of an hour the bottle is removed and enough sodium bicarbonate is added to it to just neutralize the acid. The bottle is then placed under a burette containing the solution of arsenious acid, and the latter is run in until the color of the iodine is completely discharged. The results are expressed in milligrammes of iodine liberated per 1,000 cubic centimeters of solution used. Since in practice 200 cubic centimeters of the mixed solution are used, the results obtained were multiplied by five to bring them up to the accepted standard.

Sunlight has a well known inhibitory effect upon the life of pathogenic organisms. Direct sunlight will kill tubercle bacilli in a few hours or perhaps in a few minutes; whereas they will live for days if exposed to a very strong diffused daylight. The exhilarating effect of a burst of sunshine in the spring is probably not due to mere luminosity, but to an increased actinic action, a chemical action which we cannot very well explain, but which every one feels. In estimating, therefore, the value of a health resort, the amount of this actinic value in the sunshine ought to be taken into account, no less than the number of days upon which the sun shines during the month or the year.

#### The Mitis Patent Sustained.

The United States Circuit Court of Appeals on October 21 affirmed the decision of Judge Acheson in the United States Circuit Court at Pittsburg, sustaining the Mitis patent for the use of aluminum in the manufacture of steel ingots and castings. The litigation has lasted nearly four years, suit having been brought by the United States Mitis Company against the Carnegie Steel Company, to restrain the latter from alleged infringement of patent. The Carnegie Company appealed on decision of the lower court and was enjoined from using the patent, and now that the Court of Appeals has upheld that finding, it is said that the Carnegie Company has taken out a license under the patent and made settlement for the past infringement.

#### Oscillation of the Eiffel Tower.

According to a report to the Academy of Sciences in Paris, by Colonel Bassot, the Eiffel Tower is subject to variations of inclination. He thinks that this is only due to the contraction and expansion of the enormous mass of iron caused by the changes of temperature. From sunrise to night the difference to and from amounts to 20 centimeters, but the stability and strength of the iron structure are not influenced thereby.