Some Foreign Guns Described.

According to the *Army and Navy Journal*, the Albini rifle has a caliber of 11 millimeters, and its projectile weighs 25 grammes, and has an initial velocity of 417 meters. The improved Mauser has a caliber of 7·65 millimeters, the weight of the bullet is 14 grammes, its length 30 millimeters, and the outer covering is of maillechort metal; its initial velocity is to be determined with the adoption of another kind of powder. The Chassepot and the Gras have each a caliber of 11 millimeters, and are charged with smokeless powder; the Lebel (these three are of French invention) has a caliber of 8 millimeters, a bullet weighing 15 grammes, and 28 millimeters in length; it is incased in maillechort metal (an alloy of copper, nickel, and zinc), and its initial velocity is of 570 meters. This latter gun was improved in 1891 by the Berthier rifle, whose caliber is 0·301 inch, the bullet weighs 205 grains, and is projected by 33 grains of smokeless powder, instead of 46 grains in the Lebel. The magazine contains four charged cartridges, and the Lebel eight; the gun itself also is lighter, 8 pounds 5 ounces. The Martini-Henry rifle bullet is made of 1 part of tin and 12 parts lead; it is cylindro-conoidal, solid, compressed, length 1·27 inch, and has a slight cavity at the base, which is 0·450 inch in diameter; its present weight is 410 grains (formerly 480), and its charge of powder 80 grains. There is a paper cap over the bullet, lightly smeared with beeswax. Its rapidity of fire without aim is 25 shots in a minute.

The Schmidt rifle, model 1889, is the one adopted in the army of Switzerland, and resembles the Wetterli, until very recently used by the Italian troops. Its caliber is 0·295 inch, it weighs 10 pounds 4 ounces, the magazine contains twelve cartridges, the bullet has an outer covering of steel, its muzzle velocity is 1,920 feet in a second, its range 2,100 yards, and the weight of 150 charged cartridges 8 pounds 4 ounces. The Russian army is provided with the Mouzin and the Berdan rifles, both of the same caliber, 0·300 inch, weight 9 pounds 5 ounces, with five charged cartridges in the magazine. Its steel-covered bullet has an initial velocity of 2,000 feet, sighted to 2,100 yards, and the weight of 150 charged cartridges is 7 pounds 7 ounces. These two guns have lately been improved upon by Dandeteau, by reducing the caliber to 6·5 millimeters. The cartridge is charged with 2 grammes of smokeless powder, the bullet having an envelope of maillechort metal. The whole, ready to fire, weighs 21 grammes. At a distance of 25 meters from the mouth of this new weapon the velocity of the projectile is 715 meters per second. The present rifle of the Italian soldier is the Carcano, 1892, which has a caliber of 0·256 inch (the smallest), and weighs 8 pounds 5 ounces. It is a steel-covered bullet, weight 170 grains, projected by 34 grains of powder, having an initial velocity of 2,320 feet per second (the greatest) and a range of 2,100 yards. The magazine contains five cartridges, and the weight of 150 of them, ready for use, is 7 pounds 1 ounce (the lightest).

The Spanish army is now being provided with a modified Mauser rifle, whose caliber is 0·295 inch, cut-off type, central magazine, having five ready cartridges in it. Portugal adopted the Kropatschek rifle, which has a tubular magazine, caliber of 0·315 inch. The gun weighs 10 pounds 2 ounces. The bullet weighs 245 grains, and is projected by 70 grains of black powder. It has an initial velocity of 1,760 feet per second, and the magazine carries eight ready cartridges.

The Lee-Metford rifle has superseded the Martini-Henry as the fighting gun of the British troops. Its caliber is 0·303 inch; it weighs 9 pounds 4 ounces, the bullet has a cupro-nickel envelope, weighs 214 grains, and is discharged by 66 grains of black powder, has a muzzle velocity of 1,830 feet per second, its range 2,100 yards. The magazine contains ten ready cartridges (the largest number but one of all the modern small caliber rifles), and the weight of 150 charged cartridges is exactly equal to the weight of the gun itself.

THE tax of 10 francs a year on cycles, which was imposed in France last April, yielded in the first half year, it is said, over 780,000 franc

THE IRRIGATION OF LAWNS.

Among the surroundings of a country dwelling, perhaps nothing adds so much to its rural charms as a green and flourishing lawn. The eye ever rests upon it with delight; and if there are extended prospects, the lawn lends beauty to the scene.

In order to preserve a lawn in freshness during the parching days of summer the grass must be repeatedly watered; and if the lawn is of much extent, this work of irrigation is no easy job. A common method is to have a hollow standard provided at its top with a rotary perforated head. This, when connected with the supply

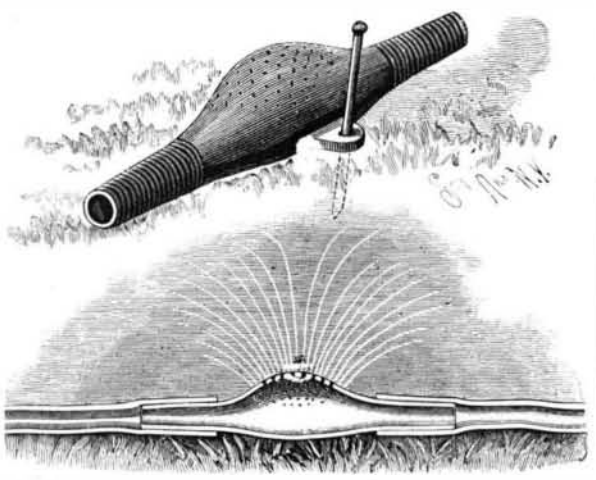

Fig. 2.—FOUNTAIN PIPE SECTION.

hose, throws a gentle rain over a considerable space; after which the standard is moved into a new position and another part of the lawn is watered, and so on. The time and attention of one or more men, according to the size of the lawn, is required for this duty.

The object of the present invention is to effect the instantaneous irrigation of every part of the lawn, at any time desired, without the interposition of a special attendant, such irrigation being effected by simply turning the water faucet, which any member of a household may do.

For this purpose the usual lawn hose is employed, which is divided into various sections, the ends of which are connected to a series of short fountain pipes, as shown in our engraving, Fig. 1. In Fig. 2 is seen an enlarged view of one of these fountain pipes. They may be made of copper for durability, but a cheaper material is tin, and it answers very well. One side of the pipe is provided with an ear, through which passes a long pin, by which the fountain pipe is fastened to the ground. The central part of the fountain pipe is

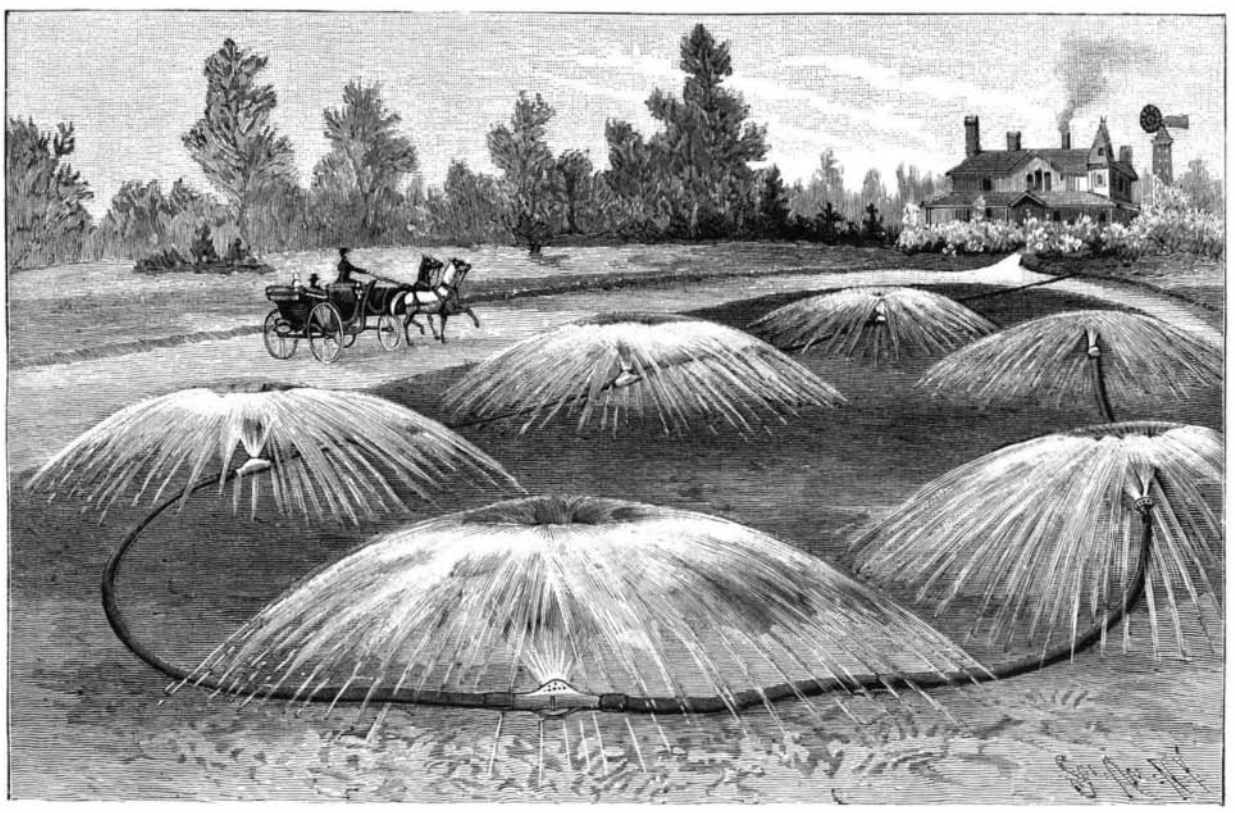

Fig. 1.—FOUNTAIN PIPES FOR LAWN IRRIGATION.

enlarged, as shown, and is perforated with fine holes, so that the escaping water from the several fountain pipes will issue in the form of fine showers, as shown in Fig. 1.

In practical use the hose, furnished with the fountain pipes, is laid throughout the lawn, and the pipe pins are driven down to hold the fountain pipes in proper position. The water valve is then opened, when the entire lawn will be thoroughly and quickly showered. The hose and fountain pipes may be left in position upon the lawn throughout the season, and the lawn may be irrigated whenever desired simply by turning the supply faucet.

Planet Notes for July and August.

H. C. WILSON.

Mercury, having been visible in the evening during the last days in June, will in July pass between us and the sun, being hidden by the rays of the latter during the greater part of the month. He will be at inferior conjunction July 20 at 4 h. 28 m. P. M. central time.

Venus is slowly receding from us and moving around behind the sun. Her disk will be 0·76 illuminated July 1 and 0·92 August 30. Venus will pass by Jupiter on the morning of July 20, the nearest approach of the two planets to each other occurring at about 2 h. 30 m. A. M. On the morning of July 28 at 6 h. 13 m. Venus will pass very close to the third magnitude star *u* Geminorum, the difference of declination of the two bodies at the time of conjunction being only 3′. August 8 at 7 h. 45 m. A. M. Venus will pass 9′ to the south of another third magnitude star, δ Geminorum. Venus will be in conjunction with the moon July 30 at 1 h. 34 m. A. M. and August 28 at 7 h. 23 m. P. M.

Mars will come into good position for observations after midnight by the 1st of August, and it is to be hoped that observers will begin early to study the markings on the surface of the planet. It is not necessary to have a great telescope in order to see them to good advantage. In fact, there are some good observers who believe that planetary details can be seen better with small than with large telescopes. We do not subscribe to this belief, but do say that the difference in favor of the large telescope is not so great as to entirely discourage the possessor of a good small one from attempting to add to our knowledge of the planetary markings.

Jupiter and *Neptune* are coming round as morning planets, but will not be in good position for observation during the summer. As already noted, Jupiter will be in conjunction with Venus, 51′ north of the latter, on the morning of July 20. Neptune will be still closer to Venus, only 9′ north, July 11, 11 h. 54 m. P. M.

Saturn will be visible in the early evening, but will be pretty low in the west by the time twilight is over. Saturn and the moon will be in conjunction July 9 at 9 h. 11 m. P. M. and August 6, 7 h. 30 m. A. M.

Uranus is making the turn of the loop in his apparent course among the stars and will be almost stationary during July. In August he will move eastward toward the star *a* Libræ. Uranus will be in conjunction with the moon July 11 and August 7.—*Astronomy and Astro-Physics.*

Another Inventor of the Telephone.

Those of our readers who have all along believed that Prof. Bell was the original inventor of the speaking telephone, or, perhaps, Dr. Gray, and that Blake or Berliner or Reis were the pioneers in the microphone field, will be somewhat surprised, says the *Electrical Engineer*, to learn that the honor of having made the first microphone is now claimed by Dr. R. D'Unger, of the D'Unger Long Distance Telephone Company, at Chicago.

The doctor states that as early as January 29, 1869, he filed a caveat for his "Electro-Medical Music Box," and that in 1879 a pair of small musical boxes were insulated according to the claims in the caveat and perfect speech was had from them.

The gist of the doctor's invention consists, as he explains, in the fact that by taking two ordinary Swiss musical boxes and insulating the harp plate and frame from the cylinder carrying the note pins and connecting the two instruments by means of a wire carrying an electric current, not only the musical impulses of one of the boxes will be transmitted to the other, but that articulate speech can also be sent over the wire.

Although the doctor makes the above claims and insists that he had a talking machine several years before Prof. Bell and also before Elisha Gray's harmonic telegraphs were known, he makes no claim that he is the discoverer of the art of telephony, but accords that honor to Charles Bourseul, of Paris, France, who in 1854 told in plain words how a telephone could be made and what it could and would do.