AUTOMATIC APPARATUS FOR SELLING POSTAGE STAMPS, POST CARDS, AND NEWSPAPERS.

BY ROBERT GRIMSHAW.

Many will wonder just how the various apparatus which have been contrived to distribute tickets, chocolate packages, cigars, etc., are constructed, and how they operate. Of course, the construction and operation must vary with the nature of the article to be sold, but one principle extends through all—the opening of a certain orifice by the passage of a coin of definite size and weight and by means of no other. The one illustrated in Fig. 1, and which is not patented, is one of a number of suggestions made to the German Imperial Post Office Department for the distribution of postage stamps. With reference to the sketch, *M* shows a strip of stamps that is pushed along a path, *B*, by means of a comb-like device, *K*, which grips in the cross row of perforations. This comb, *K*, is automatically shifted in the direction of the length of the strip of stamps, and to an amount corresponding exactly with the length of one stamp if they lie lengthwise of each other, or to the amount of the width of one stamp if the strip is as wide as the stamp is. Then while the piece *D* presses the strip of stamps against the path, the cutter *S* comes up and slices off one stamp at the perforation line. The knife, the pressure piece *D*, and the comb, *K*, are then brought back to their original positions, and are all three automatically locked against any further movement until freed by the passage of a coin of proper diameter, thickness, and weight. Fig. 2 shows a device proposed for the automatic sale of postal cards. These are mostly sold in pairs or in fives at a time. The trouble with these articles is that by reason of their rough edges they are apt to stick together. In the arrangement here proposed, the cards are arranged beforehand in twos or in fives or as desired; the sets of two, five, or what not being piled up crosswise of each other in a cylindrical holder, *B*. The upper layer or set, K^1, is held by two springs, F^1 and F^2.

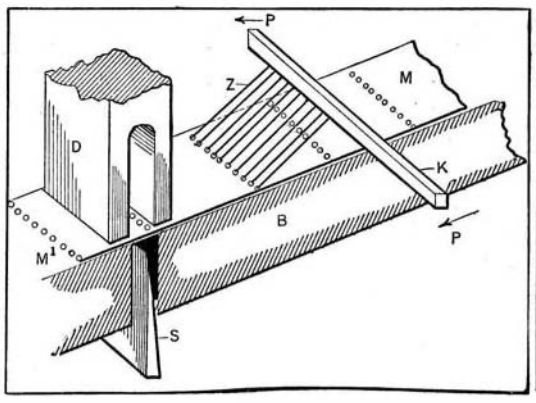


Fig. 1.

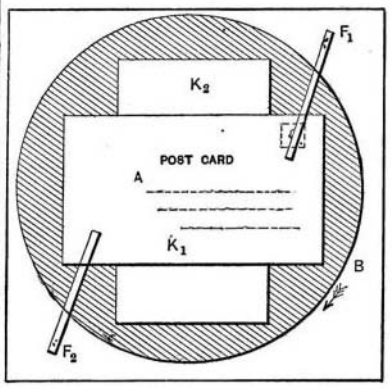
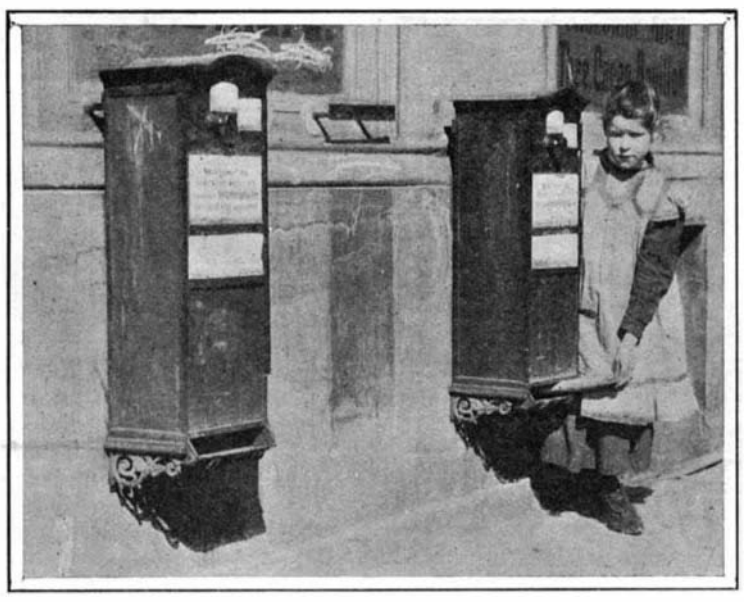


Fig. 2.

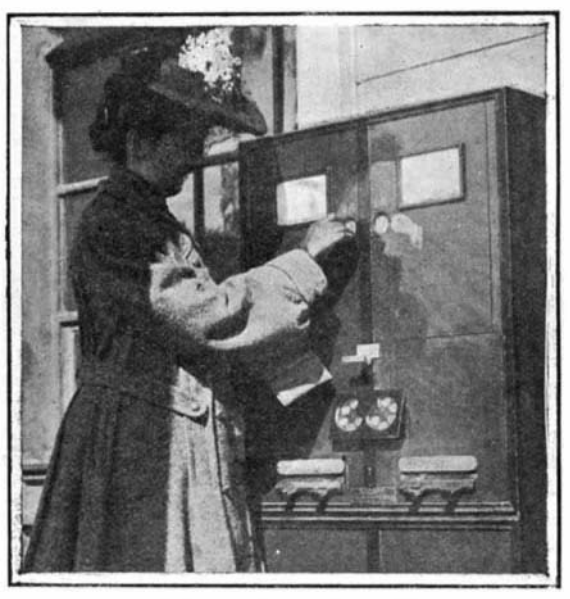
The Principle of an Automatic Postage Stamp and Post Card Selling Machine.

When a coin of the proper size and weight is dropped in the slot, the drum *B* can be turned so far on its axis that the upper layer or set of cards, K^1, is freed from the pressure of and from contact with the springs, and can fall out; while the second set, K^2, comes under the springs.

Germany intends to buy or make forty thousand "automatics" for selling postage stamps; so inventors might find it desirable to keep their eyes on this field.



A Machine for Selling Newspapers.



Stamp Selling Machine.

Dr. Cook Ascends Mount McKinley.

Dr. Frederick Cook's ambition to ascend Mount McKinley was born of his desire to try polar equipment in high mountain climbing, his fifteen years' experience in polar expeditions fitting him well for the venture. He had served as surgeon twice under Commander Peary, once in 1891 and again in 1901, and with Capt. Amundsen in the Belgian Antarctic expedition of 1897-99. Dr. Cook was accompanied on this trip by Prof. H. C. Parker, who teaches physics in Columbia University, New York; Russel W. Porter, topographer; Belmore H. Brown, naturalist; Walter Miller, photographer, and J. H. Beecher. The explorers left New York on May 1, and arrived at Seattle May 10, where they were joined by Fred Paine and Edward Barrelle, who acted as packers; John Dokkin, a miner, and several others, increasing the number to ten in all. The most interesting feature of the high-mountain-climbing outfit was a large tent made of Shantung silk, which weighed three pounds and was large enough to hold three persons. Heretofore the tents used in mountain-climbing equipments weighed thirty and forty pounds. The sleeping bags were made of eider-down covered with silk, and so fashioned that they could be used as coats. The Swiss axes which formed part of the outfit were covered with tubes, so that they could be used as tent poles. The food was much the same as that carried in polar expeditions—pemmican, dry beef, beef tallow in equal parts, and sugar, which was used instead of salt, as it would be difficult to get a sufficient supply of water to satisfy the thirst caused by using salt with the food. Each man's outfit, weighing about fifty pounds, was strapped to his back.

A special launch, forty feet long, of shallow draft and a 25-horse-power engine for navigating swiftly-moving streams, was constructed in Seattle. On May 16 a start was made for Cook Inlet on the Alaskan coast, which point was reached May 28. In the boat, stocked with provisions for six months, the expedition went up the Susitna and Yentna rivers to the head of navigation, where pack horses were waiting to join them. The passes which the party found at the head of the Yentna River could not be traveled, so it was decided to try to reach the southeast of Mount McKinley. After a tramp of 65 miles through marshy country, the explorers were confronted with perpendicular cliffs rising to a height of 1,500 feet. As it was now early in August, it was decided to abandon the idea of reaching the summit for the time being, and to devote the time intervening to scientific work of a different nature.

Mr. Porter and two assistants went to the south of Mount McKinley, to make a map of the triangle between the Susitna and Yentna rivers. Mr. Brown and Beecher started for the mouth of the Matanuska River to collect zoological specimens, and Mr. Prince and Mr. Miller arranged to go to the mouth of the Keechatna River, also for the purpose of obtaining zoological specimens.

Dr. Cook, Barrelle, and Dokkin, while navigating the Susitna, Chulitna, and Tokositna rivers in the launch, discovered a glacier which sweeps the upper eastern slope of the mountain, and which proved to be a good route to the summit of Mount McKinley. After exploring this glacier for three days, the northeastern ridge of Mount McKinley was reached. Although snow fell all day, this proved the most agreeable part of the journey. On the top of the ridge, which was reached the fourth day after leaving the boat, was a granite cliff which rose 4,000 feet in the air. Here a house was dug in the snow, as it was impossible to pitch a tent. By cutting steps in the ice, a climb of 2,000 feet was accomplished on the fifth day. As the explorers could not get back to the camping place where they had left Dokkin, beds were cut out of the ice. Wrapped in sleeping bags, the party rested for the night. A climb of 2,000 feet was made on the sixth day, which proved to be the last comfortable day the explorers spent on their way to the summit. They were attacked with nose bleeding, snow blindness, difficult breathing, and depressed heart action. On the seventh day a climb of 2,000 feet brought the expedition nearly to the top. On the eighth day the march for the summit was made very early in the morning. On the way up two peaks were encountered, of which the southwestern one was chosen. The summit was reached at 10 o'clock. So great were the sufferings of the explorers, that they remained but twenty minutes at the top. The American flag was planted about 200 or 300 feet below the peak, and a record of the trip with the names of the men, the line of march, the date, and the temperature was left. The descent was made in four days.

From observations made with his instruments, Dr. Cook believes that the mountain is 20,300 feet above sea level. It will take several months before

A German Machine Which Sells Postage Stamps.

he will have completed his mathematical calculations in order to give the exact height. Barometric pressures and triangular measurements from twelve different points were taken. In scaling the mountain Dr. Cook realized a life ambition, and besides obtained geographical information about a country of which very little is known.

TOTAL ECLIPSE OF THE SUN IN JANUARY, 1907.

BY MARY PROCTOR.

"Eclipses are predicted, and science bows them in."

The next total eclipse of the sun takes place on January 13, 1907, and will be visible in central Asia. The track of the eclipse is wholly on land, and gives the last favorable opportunity for observing an eclipse until that of April 17, 1912, which may be witnessed for one minute in South America, and for a brief interval in Spain.

The best region for observing the 1907 eclipse is available by means of railways recently constructed in Russian territory. On this railway, and about two-thirds of the way from Tashkend to Samarkand, lies Jizak, only a few miles from the exact line of central eclipse. Fortunately, the railroad from Orenburg to Tashkend, practically a branch of the Trans-Siberian Railway, which has been in course of construction, is now completed. Other easily accessible places near Jizak, and well within the belt of totality, are Zaamin, Nau, and Ura-Tiube. The last is practically central.

From the United States, the best way to reach Jizak is by means of Naples, Constantinople, the Black Sea, Tifiis, the Caspian Sea, Bokhara, and Samarkand. From Krasnowovsk on the Caspian Sea to Tashkend trains run regularly, there being two trains which leave Krasnowovsk daily at 5 A. M. and 7:15 P. M. respectively.

If we go farther east, the track of the eclipse leads into a region more and more difficult of access, although the totality lasts a few seconds longer, and the eclipsed sun is a few degrees higher. Only one station in Mongolia, Tsair-osu, seems likely to be considered. In The American Journal of Science, for March, 1906, Prof. David P. Todd, of Amherst Observatory, has given the position of ten possible observing stations, exact local times of the four phases, durations of totality, and other interesting facts.

As shown by the map (taken from the Nautical Almanac for the year 1907) the middle of the eclipse occurs at sunrise in a region north of the Black Sea, the track crossing the Caspian Sea, where the eclipse begins at sunrise. It reaches Jizak in Turkestan about a quarter to nine, totality beginning at 9 h. 59 m. 58.4 sec., and ending at 10 h. 1 m. 55.2 sec., the duration being about two minutes. Jizak is thirteen miles south of the central line, while Ura-Tiube is only two miles south, and practically central. There the eclipse begins at 8 h. 50 m. 52 sec., totality being at 10 h. 6 m. 37.1 sec., and ending at 10 h. 8 m. 40.9 sec., a duration of two minutes and seventeen seconds.

At Tsair-osu in Mongolia, which is two miles north of the central line, the eclipse begins at 12 h. 29 m. 58 sec., with totality at 1 h. 49 m. 41.6 sec., and ends at 1 h. 51 m. 36.7 sec., a duration of about one minute and fiifty-five seconds.

It appears that no expedition from any of the well-known American astronomical institutions will observe the eclipse, and in all probability no eclipse expeditions from Europe will attend, on account of such unfavorable weather conditions liable to prevail, and uncertain communication with the difficult region (Russian Turkestan).

The following eclipse will be that of January 3, 1908, and will be wholly confined to the Pacific Ocean, with the possibility of observing stations on two islands. A brief account of these islands will show how little they are adapted for such work. One named Flint Island, one of the Line group, is situated west of the Marquesas Islands, in long. 151 deg. 48 min. W., and lat. 11 deg. 26 min. S. It belongs to the British, and was discovered in 1801. It is covered with brushwood and trees, and is visible from the masthead of a ship from a distance of sixteen miles.

This little island is about 2½ miles long N.N.W. and ½ mile broad S.S.E., and is fringed by a steep coral reef which dries at low water, and extends seaward quite a distance. In the interior of the island are two small lagoons of brackish water. Not a very promising prospect for the most enterprising observer, despite the fact that the duration of totality will be four minutes, and the sun's altitude will be 74 deg.

In 1880 the island was uninhabited, and the buoys formerly in use were gone. There is no rise and fall of tide, and the landing is said to be very bad, even for surfboats. These interesting facts are to be found in the Monthly Notices of the Royal Astronomical Society for March, 1906, and were contributed by Dr. A. M. W. Downing, F.R.S. He gives a still less favorable report of Hull Island. This island is situated halfway between the Marquesas Islands and Solomon Islands, in long. 172 deg. 13 min. W. and lat. 4 deg. 30 min. S.

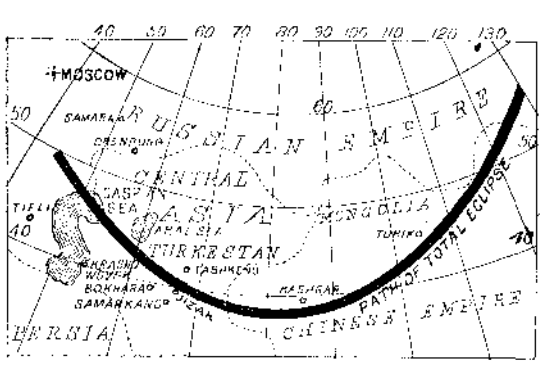
Hull Island, one of the Phoenix group, belongs to the British, and was discovered and so named by Wilkes in 1840. It has a lagoon and a little fresh water, and there are some cocoanut trees on it, about 50 feet high. A coral reef fringes the island, and landing is difficult except by entering the lagoon by means of the boat passages on the northwest side. There is no anchorage. In 1899 the island was uninhabited.

The winds are almost constantly from the eastward, but squalls accompanied by light rain occur in the neighborhood all the year round. The wind is variable from January to May, during which period bad weather is most common. Small chance there is there of observing the eclipse with any success, since it occurs on January 3, and totality only lasts 2 m. 51 sec. The sun's altitude will be 43 deg.

Both these islands have been leased to Lever's Pacific Plantation Company, and intending observers are requested to communicate with the officers of this company, situated at Port Sunlight, Cheshire. Such is the irony of fate, permitting one of the grandest sights the eye of mortal can ever behold to waste its glory on these almost inaccessible islands! On December 23, 1908, another eclipse track will cross the South Atlantic Ocean, and on June 17, 1909, an eclipse will occur in the neighborhood of Greenland.

The South Antarctic regions will be crossed by an eclipse track May 9, 1910, and another will visit Australia, May 28, 1911. On all these occasions, since the eclipse tracks lie almost wholly across oceans, or in inaccessible parts of our globe, no observations of value can be made. This is due to the fact that no device for securing accurate astronomical observations from the deck of a ship has yet been perfected, while to reach the inaccessible regions tedious and expensive expeditions are necessary.

At a meeting of the British Astronomical Association which met at Sion College, Victoria Embankment, on June 20 last, Mr. W. T. Lynn, one of the members, read a paper on the total eclipse of January 13, 1907.



PATH OF THE ECLIPSE OF THE SUN, JANUARY, 1907.

In it he referred to the fact that "the Russian government has recently established an observatory at Tashkend, nearly due north of Samarkand, and no doubt the astronomers there will observe the total eclipse at the latter place." He also referred to the fact that the second catalogue of stars ever made was formed at Samarkand by Ulugh Beg. In 1437 Ulugh Beg, the grandson of Tamerlane, built at Samarkand the greatest astronomical observatory in the world, one hundred and forty years before Tycho Brahe erected Uraniborg in Denmark.

After Mr. Lynn read his interesting paper, Mr. A. C. D. Crommelin, the president of the Association, remarked that "unfortunately the next eclipse is one that only those should venture to go to see who are prepared to brave an Arctic degree of cold. As a general rule, they regarded an eclipse as a favorable one when its track is mostly over land, and as an unfavorable one when its track is mostly over water. The track of the eclipse of next January is entirely over land except for a few of the lakes of central Asia; and yet it is a very inaccessible eclipse, for it is over Tibet and Siberia in the depths of winter, and he is afraid the cold there will be very severe indeed." The president, however, called particular attention to the total eclipse of January 3, 1908, and hoped that some of the members of the association would be represented at this, although the journey would be a long one.

Is it any wonder, when we realize that although a total eclipse occurs every year from 1907 to 1912, and that none are easy to observe between those dates, that no effort has been made to observe the total eclipse of January 13, 1907, at one at least of the ten possible stations whose positions have been so carefully computed by Prof. David P. Todd.

Inasmuch as there is a difference between the civil and the astronomical day, some confusion may arise from the conflicting dates on which the eclipse will occur. The astronomical day begins at noon; the civil day at midnight, twelve hours earlier. Hence according to the one system the eclipse will occur on January 13, and according to the other on January 14.

Correspondence.

Alcohol from Cacti.

To the Editor of the SCIENTIFIC AMERICAN:

The profitable manufacture of denatured alcohol from cacti has been found to be feasible by G. A. Burns, chemist, manager of the Southern Pacific Hospital, San Francisco, prior to the fire, who is now in Los Angeles. Mr. Burns declares that much desert land in California and New Mexico can be reclaimed by the growing of cactus, the manufacture of alcohol from the plant, and the use of the alcohol as fuel for power plants to pump water for irrigating. Mr. Burns says he knows for a certainty from his own experiments that denatured alcohol can be produced in sufficient quantities from the common desert tree—so monotonous to the tired eyes of the tourist coming from the East—to furnish heat, light, and power for all general farming purposes. From five pounds of pulp he distilled, in a crude way, more than a gallon of alcohol, which was clear in color and burned readily with a very bright, warm glow.

The product contains four times as much energy as wood alcohol. He believes it can be produced cheaply, and that five acres planted to cacti would be large enough "power plant" to run a farm of 160 acres. The plants could be cut down, ground up by special machinery, and put through the process of fermentation and distillation like corn, wheat, or barley. The surplus steam escaping from a stationary engine on the farm could be utilized in the process of distillation. The Nevada cactus grows from two to five feet high and with great rapidity, or about as fast as corn in Kansas. This being the case, it would soon grow up from the stubble or stump, and in about six or eight months would again be ready to produce nontaxable alcohol for commercial purposes.

Mr. Burns first got his idea of the possibilities of the commercial value of the cactus from Mexico, where it is well known that the natives make a very potent liquor from cactus.

Cactus alcohol could be produced more cheaply than wood alcohol, besides being four times as powerful. The raw material too would be right on the farm.

The plan could be adapted readily to the valley of Las Vegas. It is fifty miles long and on an average thirty miles wide. It is of a sandy loam, very fertile and very level, and with only a trace of alkali at odd places, and those places are few.

"Everything," said Mr. Burns, "that California produces, with the possible exception of oranges, can be grown in this valley. Water can be had at from ten to twenty feet, and with cheap fuel to pump it to the surface, such as I am convinced can and will be obtained from the cactus, Las Vegas will become a little Eden."

ALLIE ALGER.

Sawtelle, Cal.

A Plea for the Preservation of the Salton Sea.

To the Editor of the SCIENTIFIC AMERICAN:

Conditions and circumstances connected with the flow of the Colorado River into what is known as the Salton Sink have occasioned considerable comment in various publications; and since the strenuous efforts of government and railroad engineers to divert the river back into its original channel have succeeded, it has been advocated that means should be taken to retain the new sea in approximately its present dimensions, the argument being advanced that evaporation from this new body of water has caused rains the past season in sections of the Southwest where like precipitation has been almost wholly if not entirely unknown before. In opposition to this it is contended that the unusual rains have been merely coincident, without being caused either directly or indirectly by the new lake.

When considered with more than passing notice, and contemplated from the standpoint that from a seemingly not greatly important incident might come results of unthought-of beneficent effect to a very great part of the whole country, and when such effect really seems developing, then the matter becomes an interesting one, and is apt to attract the attention of anyone who looks forward to future eventualities, as well as to the first visible results. I am of the opinion that those who contend for the permanent retention of the Salton Sea are correct in their conclusions that the new sea has caused and indicates a decided modification in climate; and the unusual rains in the West and Southwest, especially in the latter section, the past season may only have been an indication of what is to continue through other seasons of the year—as instance the recent unprecedented storms in the Southwest. Also I anticipate that if the Salton Sea is retained, climatic conditions in the West and Southwest will experience great if not wonderful changes; and if such changes do result, I apprehend that they are brought about, not entirely alone because of fresh water evaporation from the new lake, but also and very considerably because of the attendant chlorine evaporation, that has its source in the immense salt