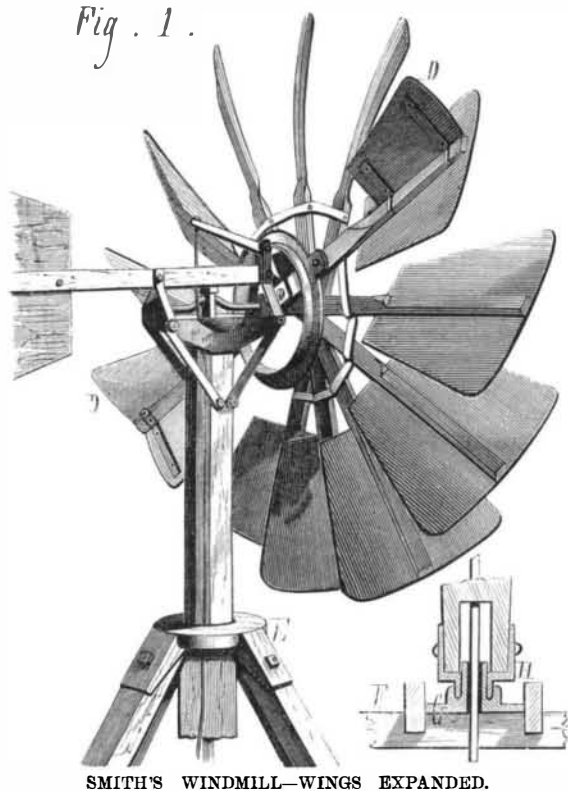


SMITH'S IMPROVED WINDMILL.

The novel windmill represented in the annexed engraving is, from its simple construction and capability of self-adjustment, according to the strength of the wind, excellently suited for raising water for cattle, supplying water to houses, driving churns and other agricultural machinery, or to perform a number of the various duties for which a cheap and light motor may be required. The new features to which attention is directed are the mode of connecting the arms bearing the sails, so that an excess of wind tends to fold up the latter; a brake wheel whereby the motion may be retarded, and an arrangement of a hollow revolving standard, which is held vertically and is free to be acted upon by the slightest change in the direction of the wind.

Fig. 1.



SMITH'S WINDMILL—WINGS EXPANDED.

Fig. 1 shows the wings expanded and also a sectional view of the revolving standard. Fig. 2 exhibits the wings closed. In the latter figure the outer arm, A, alone is connected rigidly to the shaft, the other arms being free to revolve thereon. The sails, however, near their extremities are connected by leather straps which allow the wheel to spread out only to its full size. The rear end of the shaft has a crank arm, and this communicates with the pump rod. On the rear of the rear arm the brake wheel, B, is secured, in contact with which is the pivoted brake, C, governed by a rod leading down the standard which supports the mill. The tail board serves in the ordinary manner to cause the wheel to turn in whichever direction the wind may be blowing. When the wheel begins to revolve, and power is thus applied to the crank arm, the front arm, A, being rigidly fixed to the shaft, is retarded. The other arms, however, are free to spread out and complete the wheel, transmitting all their power through the straps to the front arm, A.

In order automatically to govern the speed in case of storms, the check wing, D, is applied to a sail of the rear arm. This wing is slightly held by a spring, and opens out when the wheel is in high motion, so far as to form a plane at right angles with the sail proper, thus retarding the movement sufficiently to fold the wheel but not to stop the same. To obtain

very slow motions the brake is employed as already indicated. A weight on the end of the brake rod may be employed to hold the wheel when the latter is not required to revolve.

Referring to Fig. 1, the vane is attached to a cross head on the standard, and suitable bearings are provided for the crankshaft to which the pitman is attached. This pitman passes down through the hollow of the standard to the pump rod. A frame composed of four angular legs is attached to arms in the cap, E. Near the lower end of the legs is placed a cross piece, F, on which the lower end of the standard

rests (see sectional view). In the center of this cross piece is attached a metal plate, G, provided with a tube in the center, through which the pitman passes. On the lower end of the standard is attached a metal plate, H, provided with up-turned flanges and arranged to fit over the tube plate, G, and rest thereon. Any wind acting on the vane causes the standard to turn in the proper direction to keep the wheel always in the right position.

The inventor states that this windmill has been thoroughly tested with uniformly successful results. Patented May 5, 1874, and December 11, 1877. For further information relative to sale of rights, etc., address the inventor, Mr. E. S. Smith, Good Hope, McDonough county, Ill.

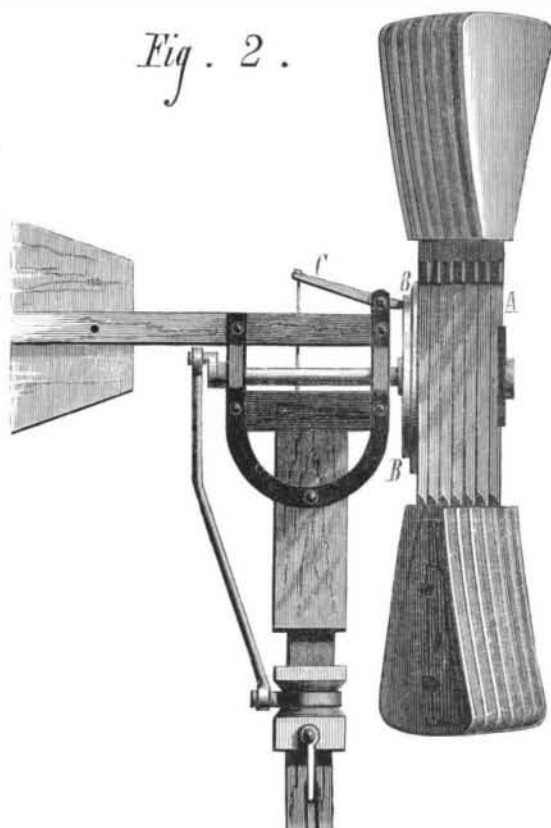
A NEW DIGGING MACHINE.

The digging machine illustrated is the invention of Mr. J. H. Knight, of Farnham, Surrey, England, and is the latest production of this engineer. The illustration, which we copy from *Iron*, will materially assist the reader in following our description. The angle iron frame, of the form shown, is supported in front by the fore carriage, which swivels on a pivot, and is provided with a pole for steering; the wheels have a central flange cast on them for giving a good grip on the ground. The hind axle is carried by bearings bolted under the frame. The land wheels, which are dished and roughened for greater adhesion, run loose on the axle, until made fast to it by clutches, which are independent for each wheel, so as to facilitate the work of turning round a corner. The clutch is keyed on the axle, and, on the screw being turned, is forced on the boss of the wheel, thus making the latter revolve with the axle. Carried by brackets on the top of the frame are three pulleys revolving freely in a horizontal plane. These pulleys are made to revolve by a high-speed rope, preferably of hemp, driven by a portable engine, which does not require to be reversed for running in a contrary direction. On the lower end of the vertical shaft of the central or driving pulley is keyed a spur pinion which communicates the motion, at a speed reduced to about one-third, to the spur wheel keyed on the crank shaft which actuates the digging forks. This shaft is cranked in the center, and has also two other cranks at its ends, all three forming an angle of 120° with each other. The shaft thus gives an oscillating motion to three wrought iron connecting rods terminating in cross ends. Into these ends are fitted separately the tines of steeled iron forming the fork, each having a shoulder and being secured by a set screw. The connecting rods are guided by segments attached to the lower part of the frame, for keeping them in a line parallel with the travel of the machine, and they are jointed near their cross ends to radius rods, which, being keyed on to a kind of weigh shaft working in bearings near the front of the machine, are capable of being raised or lowered, according to the depth of spit required. This action is effected by means of a hand wheel, worm, and lever, by which also the forks may be raised quite clear of the ground, while the machine is traveling but not digging. For cutting off the motion altogether, a friction clutch, worked by a lever and ball from the outside, is provided just below the driving pulley. The traveling motion is communicated by a spur pinion on the crank shaft, working through a train of spur wheels and pinions gearing into a pinion fast on the axle, thus reducing the speed of the latter to one revolution

ners of the gradually increasing rectangle described by the rope. By passing round the driving pulley, the rope causes the machine to propel itself by means of the land or bearing wheels. The tail rope is merely carried on porters back to the engine, the tension being kept up by the anchor carriage, which is in charge of the engine driver.

The speed of the rope is about 3,000 feet a minute, and that of the machine about 100 feet. The forks are driven into the ground one after the other, sending the earth flying out behind, with such speed that some minutes are required before the eye can follow their movement. It is natural to suppose that the forks would be simply inserted in the

Fig. 2.



SMITH'S WINDMILL—WINGS CLOSED.

ground, and taken out, without turning over the earth; but this is not the case. The cranks give the vertical motion to the forks, and as the latter are pivoted, near their lower end, to the connecting rods, a leverage is exerted at this point for turning over the soil. The effect of this action is intensified, owing to the fact that from the time the points of the forks enter the ground to their leaving it, the machine has progressed a certain distance.

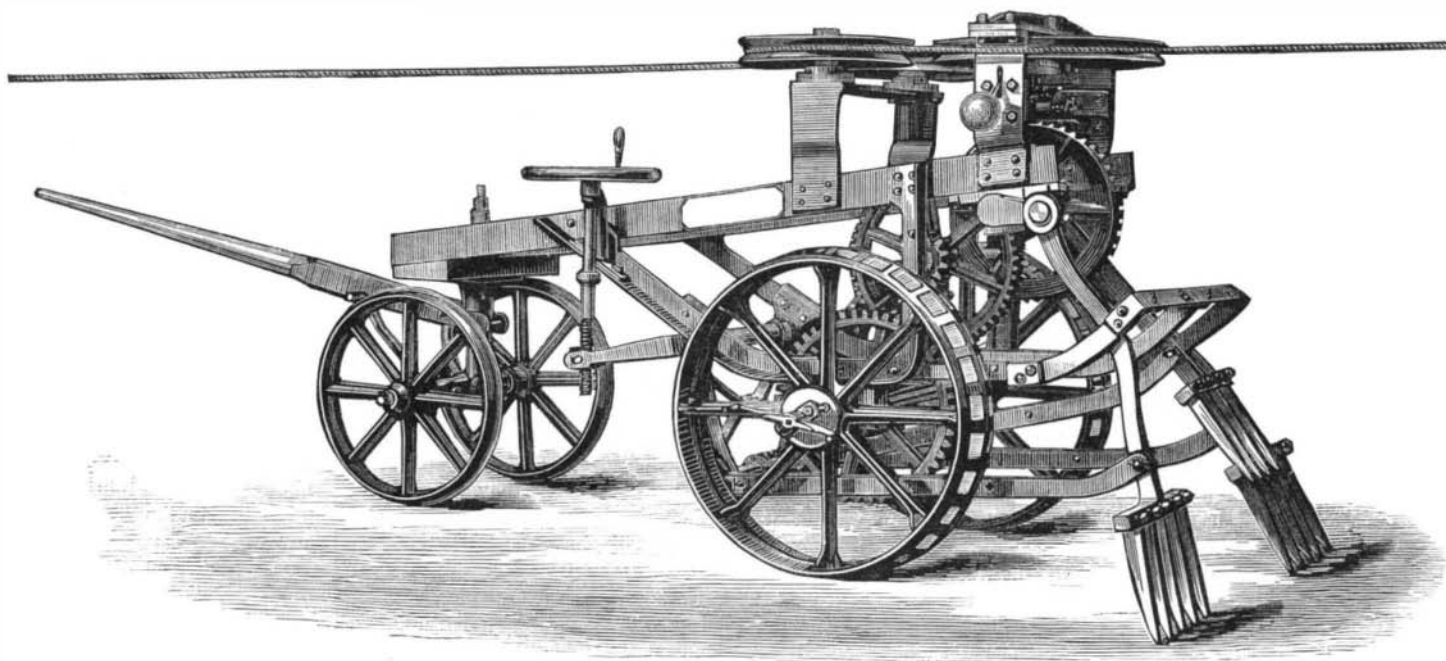
New Inventions.

The improvements in a new Box Iron devised by M. Jean G. Ruger, of Paris, France, consist in providing one end of the iron with a partition plate, so arranged as to form an air inlet passage; and second, in a movable chimney for the escape of the gaseous products of combustion, the chimney being adjustable to discharge the gases in the direction least liable to interfere with the operator or to injure the material.

A Sled Propeller has been patented by Mr. Daniel Williams, of West Philadelphia, Pa. To the forward end of a flexible bar projecting from an ordinary sled is pivoted a third runner, to which is attached a cross bar, by which the driver can steer the sled. On both sides of the sled there are placed levers which work dogs intended to take hold of the snow and thus assist in steering.

Mr. Lars P. Bergstrom of Rock Island, Ill., has invented an improved Winding Alarm for Clocks. It is attached to eight day and thirty day clocks, run by weights, to cause them to give an alarm when they are about to run down.

Mr. Wm. T. Urie, of Warrensburgh, Johnson Co., Mo., has devised a new Spark Arrester. In the smoke stack is arranged a curved, downwardly projecting, annular flange, which deflects the sparks downwardly and to the center. Below this is arranged a centrally located two-part hopper, which, in combination with the deflecting flange, causes the



KNIGHT'S IMPROVED DIGGING MACHINE.

for every twenty-two of the former. Reference to the illustration will show how the power is applied. The motion is transmitted to the machine by an endless rope, about three quarters of an inch in diameter, from an eight horse-power agricultural engine, moored as in steam plowing. The rope passes round a pulley on the driving shaft of the engine, and also round the pulley of an anchor carriage for securing the necessary tension, and is then led to the machine direct, being supported in a straight line by simple "porters," as they are called, or pulleys carried on a movable stand, and the direction being changed by "angle porters" at the cor-

sparks to be first diverted outwardly, then deflected downwardly and centrally against the inner walls of the upper furnace, whence they fall into the lower closed funnel, and are drawn (by a current induced by the force of the next blast) up between the inner walls of the lower furnace and the outer walls of the upper funnel into the main current, in which they circulate.

An improvement in that class of Curtain Fixtures in which the rolling curtains are adapted for lowering from the top has been devised by Mr. William W. Pickford, of East Palestine, Ohio. In this improved curtain fixture the holders and clamps for the curtain cords are arranged in a novel and ingenious manner.

A Tail Piece for Guitars has been invented by Mr. Jacob Abraham, of Silver City, New Mexico, which is made of metal or other suitable material and is combined with a flanged foot rest, the object being to effect the vibration and at the same time prevent cutting or scratching the box of the guitar.

Communications.

Our Washington Correspondence.

To the Editor of the Scientific American:

As a result of a recent competitive examination the following promotions have been made in the corps of assistant examiners in the Patent Office: To be first assistant examiners—R. L. B. Packard, of Maine; L. B. Wynne, of the District of Columbia; S. Brashears, of Maryland; and F. S. Williams, of New York. To be second assistant examiners—F. B. Pierce, of New York; H. S. Underwood, of Mississippi; George P. Fishie, of Delaware; and R. Mason, of Tennessee.

PATENT OFFICE MATTERS.

The Commissioner of Patents has recently sent a circular to the examining corps which is causing some little excitement among the attorneys practicing before the office.

The circular requires that the examiners shall exercise greater care in cases before them to see that the state of the art prior to the applicant's invention is stated specifically in the specification, and where it is an improvement on a previously patented article, it must be so stated, in order that any one reading the patent, even if unskilled in patent matters, would see not only what is claimed, but would see set forth clearly the exact state of the art upon which the invention was based. The fact that, owing to the great number of patents granted with claims of a trivial nature, our patent system has grown into considerable disrepute, the Commissioner thinks is sufficient reason for greater care in this respect.

Many of the attorneys are of the opinion that the ideas set forth in the Commissioner's circular cannot be carried out, as it would be impossible to set forth the state of the art in many cases without making the specification of an inordinate length. It is probable, however, that the office will not require such a full statement as to cumber up the specification in this manner, but only when it can be clearly seen that the alleged invention is only a slight improvement on a previous machine or device that it shall be so stated, instead of having the specification so worded as to convey the idea to unskilled readers that the patent covers the whole machine or device shown therein, when it really covers only some little point that is of very little value to any one and only useful as a means of obtaining a patent. There is no doubt that many worthy people have been badly swindled through purchasing "rights" in patents of this character, and if such swindles can be avoided it will certainly help to sustain our patent system against the outcry now being made against it.

In the application for the reissue of the patent No. 19,786, granted to John L. Mason March 30, 1858, and extended in 1872, an appeal having been taken from the Board of Appeals, who had rejected the first and fourth claims, the Commissioner affirmed the decision on the ground that the first claim, which was for "a screw chuck or former for caps of sheet metal provided with a rounded thread," was met by the reference cited, which showed a V-shaped thread only, as it required but the smallest amount of intelligence to enable one to take off the cutting edge formed by the apex of the thread so as to make it round, when it was found that it cut the metal of the cap during the process of spinning. With regard to the fourth claim, which was for a screw chuck or former made tapering toward its outer end, the Commissioner decided that as screw chucks were old and tapering formers were also old, there was nothing patentable in combining the two, as their functions were in no wise modified by the combination.

In the interference case of Adelbert Gates (deceased) vs. Hiram Rowe, motion having been made that the preliminary statement be amended, and it appearing that said statement was made by the brother of the inventor, acting as administrator, who, since filing the statement, had discovered that one E. P. Bennett, who had recently returned home after an absence of several months, had knowledge that the invention was of earlier date than that given in the statement, and that it was unknown by the administrator at the time of making the statement that said Bennett knew anything of the invention, the Commissioner decided that the statement ought to be amended, especially in view of the fact that no testimony had been taken in behalf of Gates.

In the interference case of Stearns vs. Wood, in which the parties occupied the relative positions of employer and

workman, the Assistant Commissioner affirmed the decision of the Board of Appeals to the effect that, although the workman may have been the first to suggest and describe a certain portion of the device in controversy, yet, in view of the decision of the Supreme Court in the case of the Union Paper Collar Company vs. Van Deusen et al., 7 O. G., p. 919, that a person having made a new invention and employing others to carry it out, if the employed persons make discoveries auxiliary to the plan and preconceived design of the employer, the suggested improvements are in general to be regarded as the property of the latter, and may be embodied in his patent as part of his invention, the priority would have to be awarded to the employer.

An appeal having been taken in the case of Chas. McEvoy for the registration of the word "Hibernicon" as a trade mark, to be used in connection with an exhibition, against the decision of the examiner of trade marks, the Assistant Commissioner decided that the trade marks which the law contemplated referred solely to marks to be used on articles of trade, and that the purpose of a trade mark was to denote the origin or ownership of the articles of trade to which it was attached, and that therefore a trade mark connected with an amusement was something not contemplated by the law, and the examiner's decision was therefore affirmed.

The Commissioner in Kilmer's interference case has again decided, as on a former occasion, reported some weeks ago, that he would not allow a preliminary statement to be amended where the testimony of the opposite party had been taken.

In the case of the application of Getzendanner and Margreardt, which had been required to be divided, by the examiner, because one of the devices related to a harness collar having a peculiar contrivance for automatically connecting the two parts of the collar at the lower ends, and the other device consisted of a suspending apparatus for holding the harness up until the horse should be placed thereunder, when the harness was released and dropped on the horse, the Commissioner decided that in view of the fact that each of the devices in question operated independently of the other, that the harness would act just as well without the suspending device, and that the latter could be used to hold up a collar having a totally different fastening, or any other article, the case ought to be divided, as a strict attention to the maintaining of the classification of the office was necessary both for the good of the public and for the convenience of the office in making searches.

The St. Louis Beef Canning Company having applied for a trade mark for canned meats in which the figure of an ox was the symbol desired to be registered, the examiner of trade marks refused it on the ground that it was descriptive; the Assistant Commissioner reversed the decision on the ground that as the trade mark was designed to be applied to all kinds of meat, it could hardly be considered as descriptive, certainly not to all other meats except beef, and as to the latter the name of the figure represented was different from the commercial name of the article contained within. In this respect the use of a tomato on canned tomatoes or an ear of corn on canned corn differed essentially, and as these considerations give rise at least to a doubt, it should be given in favor of the applicant.

A recent visit to the burned district shows that considerable progress is being made with the work of restoring the partially destroyed models. About 140 hands are employed at present, and the interior of the north hall has the appearance of a large machine shop. Long rows of benches furnished with lathes and vises extend from one end to the other, and on which a variety of work is carried on. Large numbers of models are being picked out which when cleaned and painted look as good as new, and many of them I have no doubt look better than before the fire.

The first number of the Patent Office Gazette for 1878 has just been issued, and is a great improvement on that of last year. The form of the page has been changed from three to two columns, which allows of a much better display of the engravings, as under the old style the engravings had to be so much cut down as to render them almost unintelligible in many cases.

It has been the practice with many persons desiring to begin the business of a patent agent to get a position in the Patent Office in some way, and then, as soon as they had a slight knowledge of the practice of the office, resigning on purpose to open a patent agency. In this manner they got Uncle Sam to pay them while they were educating themselves for their own private business. This, however, is not the worst of the matter, for some of them took lists of all partially rejected cases they could find and then wrote to the inventors, boasting of the facilities that their connection with the Patent Office had given them, and stating that unless they were employed, the cases referred to would finally be rejected, and in this manner took a large amount of business out of the hands of experienced practitioners. Worse than this, one or two have been credited, or rather discredited, with rejecting cases previous to their leaving the office, so that they might have a chance to get them passed afterward, when acting as agents. To prevent these practices a bill has been brought into the House by Mr. Douglass, which provides that it shall be unlawful for any officer, clerk or employé of the Patent Office to act as counsel, agent or attorney in the prosecution of applications for letters patent, or of any interest in letters patent, or be interested, directly or indirectly, in any firm established for prosecuting patent applications, or of any interest in letters patent, nor by any

manner or means to aid in the prosecution of such patent applications within two years next after he shall have ceased to be such officer, clerk or employé; that any person in the service of the United States violating the provisions of this act by knowingly recognizing any such officer, clerk or employé in any application for letters patent or any interest in letters patent as counsel, attorney or agent, shall be, *ipso facto*, discharged from the service of the United States; and the District Attorney shall proceed by writ of quo warranto, against any person in the United States service who shall violate the provisions of this act, and shall prosecute the same to the removal of such person from office. Bills similar to this have been introduced into Congress several times before, but have never passed, and it is doubted if Congress has power to pass such a law under the Constitution.

A CHANCE FOR INVENTORS.

I find the following in one of our dailies:

"The Post Office Department is considering a large number of petitions from persons in all sections of the country who desire to transmit samples of flour through the mails at third class rates. Heretofore the principal difficulty in the way of compliance with the petitions is the objectionable nature of the material sought to be transmitted. Under the postal regulations, as now existing, articles transmitted in the mails must be so put up as to enable postmasters to ascertain the contents without damaging the wrappers, and flour cannot be so inclosed without damaging the other contents of mail pouches. It is believed that, could this difficulty be overcome, a very considerable revenue might be derived to the department from the increased business that would be brought thereto by the large dealers in the commodity referred to. The matter is receiving careful consideration, and if any way can be devised to overcome the obstacle, a reasonable latitude of construction will be given to the law governing the transmission of third class matter through the mails."

This seems to be a good chance for inventors to get up some new style of envelope or bag for mailing purposes, to be used for samples of flour, sugar, tea, and many other articles in the grocery line, that will not spill the contents among the other mail matter and yet allow of a ready examination being made by the Post Office authorities without damaging the covering.

ANOTHER RAID ON "DESERT" LANDS.

The Commissioner of the General Land Office has under consideration a bill referred to him by the House Committee on Public Lands, to authorize O. W. Wozencraft and his associates to irrigate the "desert" west of Fort Yuma, in California, which is said to contain about 3,500,000 acres. The bill provides that the company shall be allowed ten years to supply this tract with water from the Colorado river by aqueducts, ditches, or canals sufficient for the purposes of travel and emigration over the said desert, and also for irrigation. The land so irrigated at the end of ten years is to be conveyed in fee simple to Wozencraft and his associates at such price as shall be fixed by a commission to be appointed by the Secretary of the Interior. This tract is supposed to have been at some remote period the bed of a sea or a part of the Gulf of California, and is represented as being about 200 feet below the Colorado, from which it is proposed to take the water for irrigation, etc. In order to avoid the surrounding highlands, the water will be taken round through the upper portion of the Mexican State of Sonora, but the distance the water supply has to be taken is not mentioned in the bill.

It would appear, however, from the official surveys in the Land Office that this said-to-be useless waste or "desert" of 3,500,000 acres is already capable of growing tolerably abundant vegetation. It is stated therein that when the Colorado overflows into the New river, that sinuates through the so-called desert, leaving a little water in the hollow places, "weeds" spring up which in thirty days grow to a height of 12 feet and a diameter of 14 inches. The mosquito bean also flourishes here. This bean grows on trees, not vines, and supplies the nomads of that region with abundant shade and cheap food, and it is stated that a single tree feasted twenty mules for three consecutive nights, without apparently making a diminution of the crop! If land that is so prolific in vegetation as this is called a "desert," what must fertile regions be?

THE NATIONAL OBSERVATORY.

A bill has been introduced into the Senate and debated to some extent, looking to the removal of the Observatory to some position which shall possess the advantages of healthfulness, clearness of atmosphere, and convenience of access, which the present location lacks, as the river fogs obscure the sky, rendering observations at many times impossible; the malaria sickens the officials; the hill on which it is built has been so cut into in laying out streets surrounding it that access is difficult, and the traffic in the neighborhood affects the instruments. In addition to this the buildings are so old as to be falling to pieces, and are not worth repairing. These old buildings, which the recent "Fire Commission" stated were regular tinder boxes, contain a valuable library, priceless records, and the finest telescope in the world; and the Senate committee therefore agreed to report a bill appropriating \$300,000 for the purpose of erecting a new building, which it is believed will be put up on the hills north of the city. It is intended to purchase about thirty acres of ground, so that the Observatory will not be interfered with by the smoke of surrounding factories or dwellings.

Washington, D. C.

OCCASIONAL.