ASPECTS OF THE PLANETS FOR MAY.

SATURN

is evening star until the 6th, and wins the place of honor on the May annals, as he is the first of the five planets traveling to the same goal to reach conjunction with the sun. This prominent point in his course is reached on the 6th, at 3 o'clock in the morning. He is then, as the word conjunction implies, joined to the sun, rising and setting with him, completely hidden in his rays, and, of course, invisible. At that time the earth, the sun, and Saturn are in a straight line, with the sun in the center. Saturn is at his greatest distance from the earth, being more than ten hundred million miles away, instead of about eight hundred and thirty million miles, his distance at opposition.

Conjunction finishes Saturn's course as evening star. He then passes from the eastern to the western side of the sun, becomes morning star, and, about a month hence, may be seen shining faintly in the east not long before sunrise. He will move every day farther from the sun and rise earlier, until, by the last of June, he will appear above the horizon as early as 2 o'clock, and become an object of constantly increasing interest to observers through the summer and autumn, presenting a brighter phase than he has done for thirty years. The eyes of the whole observing world will scan this superb planet with intense attention as he makes his way from conjunction to opposition, and if there is power in the telescope to learn anything new concerning his complex system it will be accomplished.

It is an interesting planetary event of the month that Saturn and Neptune reach conjunction with the sun on the same day, the former at 3 o'clock in the morning and the latter at 6 o'clock in the afternoon. Therefore, a straight line drawn from the earth through the sun and Saturn would, if extended, pass near the huge bulk of Neptune, the planet that travels on the system's remotest bounds, and is only exceeded in size by Jupiter and Saturn.

A close conjunction of Saturn and Neptune takes place at 8 o'clock on the morning of the 11th, Saturn being twenty-two minutes south. Neptune for months has been slowly gaining upon the steps of his brother planet, and has at last overtaken him. After the conjunction he will take the precedence, and be the first to make his advent in the morning sky. As he is unfortunately invisible, his course must be traced by the eye of fancy. Such is the precision of mathematical calculation, and so simple are the laws that rule the solar scheme, that we are as sure of the point of space in the star depths occupied by this far-away Neptune as if he were as plainly discernible to the naked eye as the majestic sun from whom he borrows light to shine as a faint disk in our great telescopes. Even the superb Saturn is as effectually blotted from our vision as his more distant brother planet. For a time his presence in the sky is only visible to the eye of imagination, which, gifted with transcendent power, cannot only behold a pale star serenely following its appointed course amid the dazzling beams of the all-powerful sun, but can span the distance separating us from the Saturnian system with its rings and moons, and picture scenes that words are powerless to describe.

Saturn sets on the 1st of the month a few minutes after 7 o'clock; at the end of the month, he rises not far from half past 3 o'clock in the morning.

NEPTUNE

is evening star until the 6th, and then morning star for the rest of the month. He reaches his conjunction with the sun at 6 o'clock on the afternoon of the 6th, when, in his turn, he comes into line with the sun and the earth, the sun being in the center. His distance, then, from us is more than twenty-eight hundred million miles. Incalculable as this distance is to finite powers it is more than probable that other planets pursue their yet undetected course beyond the vast sweep that marks his orbit.

The movements of Neptune and Saturn are so closely interwoven during the month that the history of the one includes that of the other. For the brother planets travel almost side by side as they pass conjunction on the same day, meet and pass each other a few days later, and change places on the celestial track, Neptune now preceding and Saturn following.

Neptune sets on the 1st of the month about a quarter after 7 o'clock; at the end of the month he rises a few minutes before half past 3 o'clock in the morning.

JUPITER

is evening star until the 30th, when, at 3 o'clock in the morning, he takes his turn in coming into conjunction with the sun. Jupiter, the sun, and the earth are then in a straight line, with the sun in the center, the giant planet being nearly six hundred million miles from the earth. He is so much brighter than Saturn that he will be visible when nearer the sun, probably within a few days of conjunction, when he, too, will disappear from mortal vision, eclipsed in the sun's bright rays.

Before he is lost to sight he makes his farewell appearance in a charming tableau in the western sky; for, on the 5th, he pays his respects to Venus, fairest of the stars, passing fifty-nine minutes south of her. The conjunction will be well worth seeing, for the two largest planets that grace the firmament will then be side by side, though they will not present the brilliant aspect that distinguishes their nearest approach to the earth. The planets set within a few minutes of each other, about half past 8 o'clock, nearly an hour and a half after the sun. Venus must be looked for about five degrees and Jupiter four degrees north of the sunset point. For an hour this brilliant picture will be painted on the sky in a vivid coloring that will be beautiful to behold, one of the loveliest views of a month when the planets are in a condition of tireless activity.

Jupiter sets now at thirty-seven minutes past 8 o'clock; at the end of the month he rises nearly with the sun at half-past 4 o'clock in the morning.

MARS

is evening star during the month, and his movements are devoid of incident. His brother planets have absorbed all the interest and left him to plod along with slow step and lessening luster toward the goal they have passed. On the 4th Mars is in aphelion, or his most distant point from the sun. On the 18th he passes through Præsepe, a cluster of stars in the constellation Cancer, and thus his position is easily identified.

Mars sets now at twenty minutes before 1 o'clock in the morning; at the end of the month he sets about half past 11 o'clock in the evening.

URANUS

is evening star, and, like Mars, is simply a looker-on while the other planets play their more active roles. He is moving slowly along in the constellation Leo, his position in the heavens differing slightly from that of last month. His present right ascension is 11h. 4m., and his declination is 6° 47′ north. Mars and Uranus will be, at the end of the month, the only planets traveling toward conjunction.

Uranus now sets a few minutes before 3 o'clock in the morning; at the close of the month he sets a quarter before 1 o'clock.

VENUS

is evening star, and stands first on the list as the peerless representative of starry beauty. She is now a fascinating object in the western sky, growing brighter and larger at every successive appearance as she speeds on her eastward course and approaches the earth. She is in conjunction with Jupiter on the 5th, when, as we have already described, the fairest of the stars and the star of imperial Jove make a charming appearance in the glowing west. She is near Mercury on the 30th, and the two inner planets will then be seen to rare advantage. All through the year Venus will reign first and foremost in the star-spangled firmament, not only for her great importance in connection with the transit, but also for her own serene and transcendent loveliness.

Venus now sets at twenty-one minutes past 8 o'clock; at the close of the month she sets at twenty-two minutes past 9 o'clock.

MERCURY

is evening star after the 1st, and though we place him last on the list he plays a prominent part on the May records. On the 2d he is in superior conjunction with the sun, when he passes to his eastern side and becomes evening star. He follows in the track of Venus, oscillating in a straight line east of the sun towards his eastern elongation. As his orbit is within that of Venus, and he is nearer the sun than Venus, he is never more than twenty-nine degrees from the sun at his elongation, while Venus is sometimes forty-seven degrees distant under similar conditions. Mercury, therefore, traveling at a more rapid pace—for the nearer the sun the faster the planet travels—will overtake Venus on the 30th, the day before he reaches his eastern elongation. A rarely beautiful conjunction then takes place between Mercury and Venus, the swift-footed planet passing a degree and three-quarters west-northwest of his fairer neighbor. The planets must be looked for in the northwest, Mercury four degrees and Venus three degrees north of the sunset point. As they are above the horizon an hour and a half after sunset a fine view of the conjunction may be anticipated.

Mercury is in conjunction with both Saturn and Neptune on the 4th, passing about two degrees north, but all three planets are too near the sun to be visible.

Mercury is in conjunction with Jupiter on the 13th, when, as the planets do not set till after 8 o'clock, bright-eyed observers may see the smallest and the largest world of the sun's family only two degrees apart.

Mercury is in his descending node on the 2d, and in perihelion on the 7th.

Thus it will be seen that the fiery little planet traveling nearest the sun will not be idle as the month of May runs its course. The most favorable time in the whole year for seeing Mercury as evening star with the naked eye commences about the middle of the month and continues through the first part of June. Any painstaking observer with good visual power will be sure to find him east of the sun and about three degrees north of the sunset point, while the proximity of Jupiter and Venus at the time of his conjunctions with them will be a sure guide to his position.

Mercury now rises about 5 o'clock in the morning; at the close of the month he sets at twenty-two minutes past 9 o'clock in the evening.

THE MAY MOON

fulls on the 3d, and is not remarkable. But the new moon of the 17th plays a distinguished part. She signalizes the commencement of her course by causing a total eclipse of the sun, invisible here, but visible in the eastern hemisphere, the path of totality passing across the north of Africa, the southern part of Asia, and ending in the Pacific Ocean.

The new moon also signalizes her course on the same day by a most interesting phenomenon.

THE OCCULTATION OF JUPITER.

At twenty-four minutes after 7 o'clock, Washington time, which means twelve minutes later New York time, and twenty-four minutes later Boston time, the moon, only sixteen hours old, will pass directly over the planet Jupiter, and occult or hide him from view. As from new moon to full, the moon moves with the dark edge foremost, Jupiter will disappear at the dark limb, producing a startling effect as if a star were suddenly annihilated from the sky. There are few observers who will possess the practiced eye required for witnessing an occultation with the moon so near the sun. But we are assured that it can be done by those who know where to look both with the naked eye and by the aid of a good opera glass or small telescope. Jupiter on that evening will be 1° 18′ north of the sunset point, 10° east of the sun, and will set about 8 o'clock. The occultation of a planet by the moon is a rare sight, and that of Jupiter by the slender crescent will be something to remember for a lifetime. The moon seems to be satisfied with the production of a total solar eclipse and an occultation, and has nothing more to do with the planets during the month, except to pass at a respectful distance near Mars on the 22d and near Uranus on the 25th.

Telescopic observers will find interesting objects for observation. Venus preserves her gibbous phase, the illumined portion of her disk diminishing as she approaches the earth like the moon from the full to the last quarter.

Mercury, though a disappointing object in the telescope, takes on the same phase as he rapidly gains upon the slower moving Venus. The numerous conjunctions of the prominent planets present aspects of exceeding interest for amateur observers with small telescopes, and any amount of painstaking that results in a sight of the occultation of Jupiter will be abundantly rewarded.

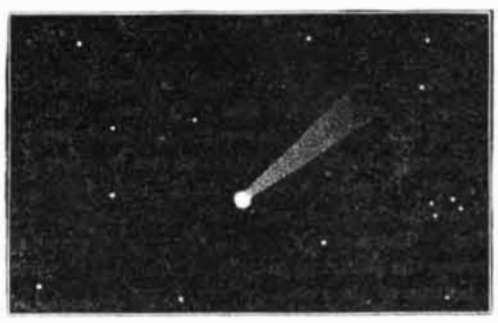
It is seldom that so many grand celestial events occur within the compass of one short month. The conjunction of the three giant planets—Saturn, Neptune, and Jupiter—with the sun; the conjunction of Mercury with Saturn and Neptune on the same day; the conjunctions of Venus with Jupiter, Saturn with Neptune, Mercury with Jupiter, and Mercury with Venus within an unusually short period of time; the superior conjunction of mercury; the total eclipse of the sun; and the occultation of Jupiter by the moon indicate an extraordinary condition of planetary activity, and a brilliant succession of interesting incidents that will make star gazing as delightful as it is instructive.

Wisely did ancient astronomers give the name of wanderers to the bright stars that are forever changing their places, now clustering near the sun, and now getting as far away from him as possible; now traveling in pairs and trios, and now as far apart as the east is from the west; now glowing in the twilight sky, and now heralding the approaching dawn.

And yet amid this apparent intricacy nothing in astronomy is more easy than to become familiar with the position and movement of each separate planet, and learn to recognize each member of the brotherhood by traits as characteristic as those in which friend differs from friend, while all the restless ways, the waxings and wanings, and the unremitting changes are but shining illustrations of the simple laws that hold the planets in their places and sway them in their courses in heavenly harmony around the great central sun.

Comet *a* of 1882.

Many observations have been made by me of the new Wells comet, the first observation being on the morning succeeding its discovery. From what was at first a faint object with moderate apertures, it has steadily grown in brightness, until it can at this date be readily picked up with a telescope of three inches aperture, and afterward seen with a still smaller objective. My latest observation was made last evening, and although interfered with by the light of an exceptionally brilliant aurora, it showed a marked increase in brilliancy over previous observations. With its present rate of increase in size and brilliancy it must in a few weeks become a beautiful object even to the naked eye. As a matter of record I give herewith a drawing of its telescopic (inverted) appearance on the evening referred to, April 16, 1882.



It is now a very pretty telescopic comet. The head is bright and solid looking, the tail delicate and nearly straight. The head appears larger than the width of the tail immediately joining it, and has very much increased in apparent size since discovery.

The comet's approximate position on May 1 will be: Right ascension, 20 hours 38 minutes; north declination, 68 degrees 50 minutes. On May 9: R. A., 23 hours 5 minutes + 74 degrees 27 minutes.

WILLIAM R. BROOKS.
Red House Observatory, Phelps, N. Y.,
April 17, 1882.

A Burning Lake.

It is said that from one of the chief naphtha wells of Russia, the liquid shoots up as from a fountain, and has formed a lake four miles long and one and a quarter wide. Its depth is, however, only two feet. This enormous surface of inflammable liquid recently became ignited, and presented an imposing spectacle, the thick black clouds of smoke being lighted up by the lurid glare of the central column of flame, which rose to a great height. The smoke and heat were such as to render a nearer approach than one thousand yards' distance impracticable. Suitable means for extinguishing the fire were not at hand, and it was feared that the conflagration would spread underground in such a manner as to cause an explosion. This supposition led many inhabitants of the immediate vicinity to remove to a safer distance. The quantity of naphtha on fire was estimated at four and a half million cubic feet. The trees and buildings within three miles' distance were covered with thick soot, and this unpleasant deposit appeared on persons' clothes, and even on the food in the adjacent houses. Not only was the naphtha itself burning, but the earth which was saturated with it was also on fire, and ten large establishments, founded at great expense for the development of the trade in the article, were destroyed.

Largest Gasometer.

The dimensions of the gasholder for South Metropolitan Gas Company, London, Eng., is as follows: Inner lift, 208 feet diameter, by 53 feet 6 inches deep; middle lift, 211 feet diameter, by 53 feet 3 inches; outer lift 214 feet diameter, by 53 feet, thus having a total height of 159 feet 9 inches. This, it is said, is the greatest height and the largest capacity of any gasholder that has ever been made. There is, according to Mr. Rees (*English Mechanic*), another gasholder 220 feet diameter, but has only a height of 90 feet. It has a capacity of 5,500,000 cubic feet. The total weight of standards and body for this gasholder is 1,400 tons.

Women's Silk Culture Association.

The second annual meeting of the Women's Silk Culture Association was held in Philadelphia, April 18. Among the exhibits was a piece of brocaded satin for a dress pattern to be presented to Mrs. Garfield. Fifty pounds of cocoons, contributed from fourteen States, and yielding fourteen pounds of silk, were used in it. Some silk was also shown, spun by worms fed upon osage orange. Three pounds of the osage orange cocoons are said to yield one pound of silk. In her annual report the president asserted that enough had been accomplished to insure success to the movement inaugurated by the society.

NEW ELECTRIC LOG.

This apparatus provides for a continuous registration, on board the ship, of the actual distance traveled by her through the water. The distance run is shown on dials

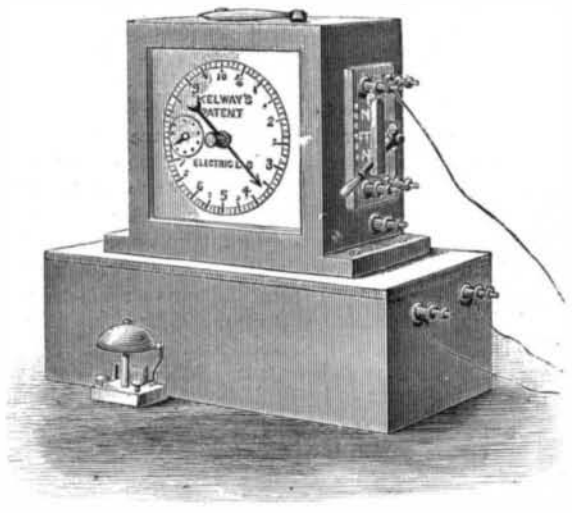


Fig. 2.—KELWAY'S ELECTRIC LOG—THE RECORDER.

placed in the captain's cabin and elsewhere; each indication being also announced on a single stroke electric bell within audible distance of the officer on watch. The electric log, which has received favorable attention from the Admiralty, seems calculated to be of service in navigation, scientific speed, trials of vessels, nautical surveying, the testing of various forms of screw propellers, and in naval range finding. The Kelway's electric log screw or rotator, which actuates the electrical portion, is placed in a cylinder below the bottom of the vessel, where, by a passage of the vessel through the water, it rotates in a body of water of uniform pressure or density, thus eliminating, even in the roughest weather, the well-known inaccuracies of ordinary towing logs, which are notably affected by the disturbing influence of the ship's propeller or by surface waves.

Fig. 1 shows the interior of the electric log. At its lower part is a sluice valve bolted to the bottom of the vessel; the sluice valve is shown open and allowing the sea full access to the iron box, D D. This iron box is bolted to the upper flange of sluice valve, and is closed at its top by the metal plate, E, which effectually prevents the ingress of water to the ship's hold. Through the stuffing box, F, in plate, E, passes the metal rod, G, the screw thread on which raises or lowers the metal cage, H H. To the bottom of this cage is affixed the cylinder, having its opening for the passage of water in a fore and aft direction or in a line with the keel of the vessel.

The passage of water through the cylinder causes the screw, R, to rotate with the spindle, L. On this spindle is

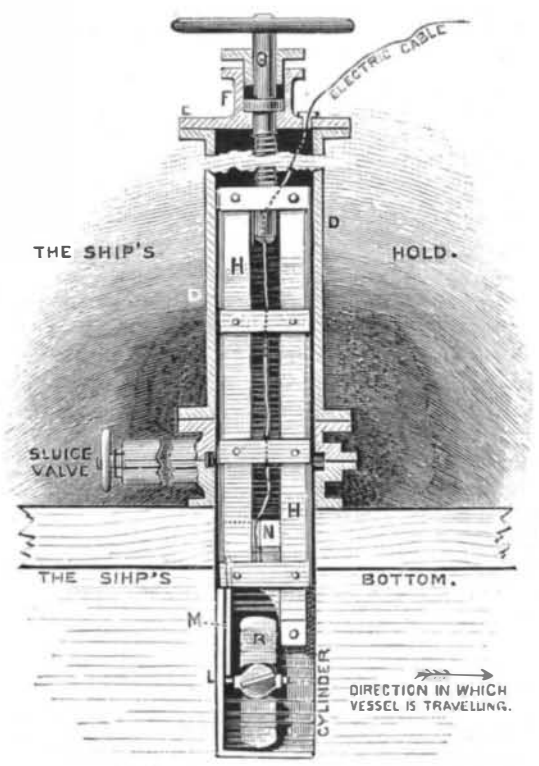


Fig. 1.—KELWAY'S ELECTRIC LOG.

also an endless screw which revolves, by the intervention of a wheel, the vertical spindle, M, which in its turn actuates a series of wheels in the box, N. The last of these wheels, termed the "mile" wheel, makes one revolution while the vessel passes through the water one nautical mile. On the spindle of this "mile" wheel is affixed a second wheel, having eight ratchet teeth; and these teeth, by moving a lever, cause an electric circuit to be completed—obviously eight times in the mile, the current passing through the electric cable to the indicating dials and bells. Referring to the dial, Fig. 2, it will be seen that there are eighty graduations on the outside circle; and, as the pointer in front of the dial jumps one graduation at each completion of the electric circuit, one revolution of the larger pointer represents ten miles. Ten revolutions of this pointer cause the smaller one to make one revolution, recording one hundred miles. The mechanism of this dial is similar to a gas-meter index.

The Australian Drought.

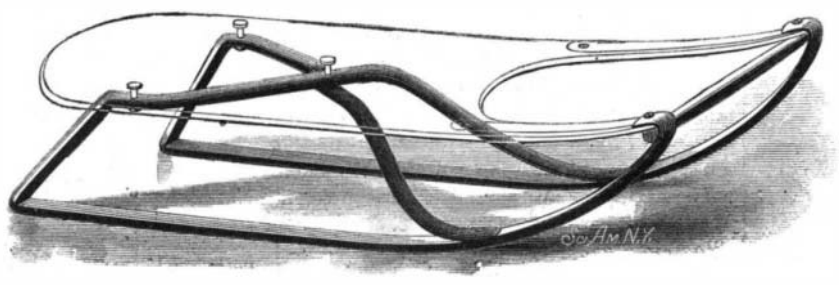
Late mails from Australia report the prevalence of fearful heat and drought. For several months scarcely any rain had fallen, and the heat in the inland districts had been terrific, the mercury once reaching 124° in such shade as was obtainable. Morning after morning, for weeks together, the sun had risen in a cloudless sky and set at night "like a huge red ball of fire at the edge of a copper dome." The losses of station owners are extraordinarily heavy, and the grain harvest will be below the average all over the continent, though in isolated districts the crop is a good one, owing to heavy local rainfalls. In Queensland the drought had broken up, and heavy floods had done much damage; at one station alone two thousand sheep had been drowned by a freshet. It has been said that Australia is a land of contradictions; this, according to the nineteen years' cycle theory, was to be a wet year; thus far, in four of the five colonies, it has been a year of drought.

A NOVEL SLED.

The engraving shows a new iron sled recently patented by Mr. Asa S. Russell, of Ellenville, N. Y. The novelty in this device consists in a frame made of two bars of iron, each forming a runner. Each bar is attached to the front of the board, and extends thence downward in a curve and passes back, forming the runner. At the back of the sled it is bent and extends upward, at an angle to the board to which it is fastened. It extends thence under the board diagonally across it until it meets and crosses the other bar at the center of the board, where the two are fastened together and to the board; it extends diagonally forward, downward, and outward to the opposite runner, on which its end rests, and to which it is fixed by a bolt.

In the engraving the board of the sled is indicated only in outline to show the form and arrangement of the iron-work more clearly.

This sled is very strong and entirely free from liability to twist and become loose jointed; it is, therefore, more durable than the ordinary sled. As the two parts may be readily bent over a form, the sled may be easily and cheaply made, and as several of the parts which are necessary in ordinary sleds are omitted in this, it may be made very light without impairing its other qualities.



RUSSELL'S IMPROVED SLED.

License Fees of Officers of Steam Vessels.

The recent act of Congress reducing the license fees of officers of steam vessels was approved by the President, April 5. The new charge for certificates is uniformly fifty cents for all classes. A treasury circular, dated April 11, authorizes inspectors of steam vessels to refund to all masters, engineers, pilots, and mates, licensed on or since April 5, all sums in excess of fifty cents exacted from such officers for their licenses. The form of licenses now in use, indicating grades of officers, will be continued.

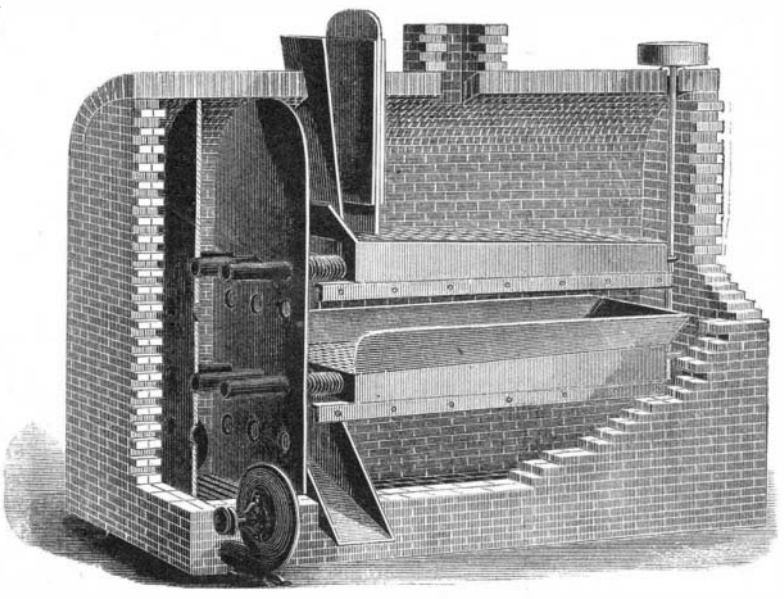
Tempering by Compression.

The author heats metals, and especially steel, to a cherry-red, compresses them strongly, and keeps up the pressure till the mass is perfectly cold. The metal acquires an excessive hardness, and a striking fineness of grain. Steel thus treated acquires a coercitive force, which enables it to become magnetic. The durability of this property requires to be studied.—*M. Clémandot.*

NEW GRAIN DRIER.

The engraving shows an apparatus by which oats and other grain may be dried by the direct application of the heat from the fire without being injuriously affected by the smoke ascending therefrom. It is so arranged that the grain may be thoroughly dried while passing through it, without requiring any manual labor from the time it enters the machine till it is discharged.

In this drier there are two movable screens, placed one above the other and inclined in opposite directions, so that the grain which is supplied through the spout at the top of the chamber passes toward the rear of the drier on the upper screen and is delivered to the rear end of the lower screen, along which it passes to the discharge spout near the front of the furnace.



BARCLAY'S GRAIN DRIER.

Each screen forms the top of a wind chamber which receives air from a blower at the front of the furnace. The wind passes from these trunks upward through the grain, and the heated air and products of combustion pass upward from the furnace over the grain on the lower screen, thence upward and forward over the top of the upper screen on its way to the flue. The screens are constantly agitated by wipers on the revolving vertical shaft at the rear of the drier

Although the smoke is admitted into the space immediately over the grain it cannot come in contact with it, as the pressure of the heated air escaping through the perforations in the screens prevents so undesirable a result, while the heat from the smoke is fully utilized for the purpose of assisting in drying the grain.

This invention was recently patented by Mr. John Barclay, of Toronto, Canada.