BOTANICAL NOTES.

Milkweed as an Insect Intoxicant.—A writer in the *P armaceutical Journal*, speaking of a visit to Kew Gardens, says: "It is amusing to see the numbers of bees hanging on the sweet-scented flowers of *Asclepias cornuti* (milkweed) perfectly intoxicated, so that they will not move even when roughly touched, one being noticed by the writer to be apparently 'dead drunk' on the ground. The numerous bees which visited the flowers of the teasel seemed to be similarly affected. It would be interesting to learn whether the flowers of the *Asclepias*, which are known to contain a sort of sugar, really do possess an intoxicating principle, since the soma plant of India, alluded to in the Sanskrit Vedas (which some place as far back as twenty centuries B.C.), and the juice of which yielded, by fermentation, an intoxicating liquor, is supposed to be a species of *Asclepias*." The milkweed must have acquired these intoxicating properties through change of soil and climate, since we are positive that they do not exist in the plant in this its native country. We have watched bees gathering nectar from the flowers many a time, but we never observed that it had any intoxicating effect upon them; and we do not believe that anyone has observed such a fact here.

How the Seed Buries Itself in t e Ground.—A paper on this subject was read at the recent meeting of the British Association by Sir John Lubbock. One of the most interesting parts in botany, he said, was the consideration of the reasons which led to the different forms, colors, and structures of seeds, and it was, he thought, pretty well made out that a large proportion of those might be accounted for either as serving to protect the seed or to assist in its conveyance to a place suitable for its growth. If the seeds of trees fell directly to the ground it was obvious that very few of them would have a chance of growing. It was an advantage to them, therefore, of which many availed themselves, to throw out wings, in consequence of which the wind wafted them to a greater or less distance. Others were transported by animals, and others again were thrown to a great distance by beautiful and wonderful contrivances in the plant. Some were enabled to penetrate the earth, and others sow themselves in the ground. In one of the clovers (*Trifolium subterraneum*), after the flower had faded, it turned downward and buried itself in the ground. The ground-nut of the West Indies, and more than one species of vetch, had the same habit. In the *Erodiums*, or crane's-bills, the fruit is a capsule, which opens elastically, and sometimes threw seeds to some little distance. The seeds themselves were in some cases spindle-shaped, hairy, and produced into a twisted awn. The number of turns on the awn depended upon the amount of moisture. If a seed be laid upon the ground it remained quiet as long as it was dry, but as soon as it was moistened the outer side of the awn contracted and the hairs surrounding the seed moved outward, the result of which was to raise the seed into an upright position. The awn then gradually unrolled, consequently elongating itself upward, with the result that if it was entangled among any of the surrounding herbage the seed was forced into the ground. A still more remarkable case was that of *Stipa pennata*, the seed of which was small, with a sharp point, and with stiff short hairs pointing backward. The upper end of the seed was continued into a fine twisted rod; then came a plain cylindrical portion attached at an angle to the corkscrew, and ending in a long and beautiful feather—the whole being about a foot in length. That end was supposed by Mr. Francis Darwin to act very much in the same manner as that of *Erodium*. Mr. Lubbock did not doubt that the end would bury itself in the manner described by Mr. Darwin, but he doubted whether it always did so. One fine day, not long ago, he chanced to be looking at a plant of that species, and around it were several seeds more or less firmly buried in the ground. There was a little wind blowing at the time, and it struck him that the long-feathering awn was admirably adapted to catch the wind, while, on the other hand, it seemed almost too delicate to drive the seed into the ground, as described by Mr. Darwin. He therefore took a seed and placed it upright on the turf. The day was perfectly fine, and there could therefore be no question of hygroscopic action. Nevertheless, when he returned in a few hours, he found that the seed had buried itself some little distance in the ground. He repeated the observation several times, always with the same result, thus convincing himself that one method, at any rate, by which seeds bury themselves is by taking advantage of the action of the wind, and that the twisted position of the awn, by its corkscrew-like movement, facilitates the entry of the seed into the ground.

Effect of Pressure on Seed Germination.—In a note communicated to *Nature* by Mr. W. Carter, an account is given of the effect of pressure on the germination of seeds. He found that under a pressure of two and a half atmospheres mustard seed germinated twenty-five hours earlier than under the ordinary pressure of the atmosphere; but that the early development became permanently arrested during the eight days of the experiment, and the cotyledons of one that had escaped entirely from the seed coat remained as etiolated as if grown in absolute darkness, while those under ordinary pressure grew rapidly, and their cotyledons became of a deep green color. The etiolated plants, when removed from the pressure, rapidly grew into vigorous young plants. An increased pressure would, therefore, seem to stimulate germination and prevent the formation of chlorophyl. The pressure was obtained by the use of a column of mercury. The seeds were sown on moist cotton-wool, placed in a small bottle, which was then secured to the curved extremity of a glass tube, into the long arm of which mercury was poured until it reached a height of 45 inches above the level of the metal in the short arm.

Poisoning by Carbonic Acid.

It is our painful duty to have to record from time to time fatal accidents in breweries arising from want of ordinary precautions being taken before men are allowed to descend into wells or fermenting vats. In wells there is always a natural evolution of carbonic acid gas, both from the water at the bottom of the well, and from fissures in the rock into which the well is bored. In fermenting vats carbonic acid accumulates from the fermentation which has taken place in them, and even when the wort has been all drawn off, the gas will remain in the vat unless precautions are taken to remove or disperse it. In spite of its high specific gravity and the well known law of diffusion, carbonic acid gas will remain at the bottom of a closed vessel for a considerable period. It has been asserted by some that carbonic acid is not in itself poisonous, but that animals immersed in it die simply from want of oxygen; this is not correct, for carbonic acid exerts a direct poisonous action when respired. Pure air consists of about one part of oxgen and four parts of nitrogen, but if the latter gas be replaced by carbonic acid, an animal placed in such a gaseous mixture will instantly expire, proving that carbonic acid has not the harmless properties of nitrogen.

It has been proved that as little as five per cent of carbonic acid in air will affect birds in two minutes and kill them in half an hour, and it has also been proved that a very small excess of carbonic acid will bring on an apoplectic fit in persons subject to this disease. Even aerated waters have been known to cause giddiness and intoxication when drunk too freely, and the rapid intoxicating effects of sparkling wines are probably due to some extent to this constituent. The instinctive effort to withdraw the face from the surface of a fermenting wort has been experienced by every brewer, and is due to the irritation of the throat produced by the gas, and which causes the glottis to rapidly close itself. It is a very common and wise precaution to lower a burning candle into a well or vat before allowing a workman to descend, but even this is not a sufficient test of security, for a candle will burn in air which contains ten or even twelve per cent of carbonic acid—a quantity more than sufficient to cause immediate death to some persons.

The disastrous accidents which have occurred—we record one in our present issue—ought to lead principals of breweries to take every precaution to protect the lives of their workpeople. The candle test is a most useful one, but too much reliance should not be placed on it; no man should be allowed to enter a fermenting vat without help being at hand, and care should be taken that the aperture through which the vat is entered is large enough to allow of a speedy exit in case of accident. In clearing a vat of carbonic acid, advantage should be taken of the heaviness of this gas; by having an opening in the bottom of the vat the gas will rapidly pour out like a liquid, and in this way the largest vat may be quickly and completely cleared of all carbonic acid. —*Brewers' Guardian.*

Theory of Lighting.

Lord Rayleigh, F.R.S., in a paper read in Section A, British Association meeting, York, says:

It is known that a large part of the radiation from terrestrial sources is non-luminous. Even in the case of the electric arc the obscure radiation amounts, according to Tyndall, to eight-ninths of the whole, and of the remainder probably no inconsiderable part is to be found in the extreme red rays of feeble luminosity. For practical purposes this obscure radiation is useless, and the question forces itself upon us, "Whether or not there is any necessity, absolutely inherent in the case, for so large a proportion of waste." The following arrangement, not, of course, proposed as practical, seems to prove that the question should be answered in the negative.

Conceive a small spherical body of infusible material, to which energy can be communicated by electricity or otherwise, to be surrounded by a concentric reflecting spherical shell. Under these circumstances no energy can escape; but if a small hole be pierced in the shell, radiation will pass through it. In view of the suppositions which we have made, the emergent beam will be of small angle and may be completely dealt with at a moderate distance by a prism and lens. Let us suppose, then, that a spectrum of the hole is formed and received upon a reflecting plate so held at the focus as to return the rays upon the lens and prism. These rays will re-enter the hole and impinge upon the radiating body, which is thus again as completely isolated as if the shell were unperforated. We have now only to suppose a portion of the focal plate to be cut away in order to have an apparatus from which only one kind of radiation can escape. Whatever energy is communicated to the internal body must ultimately undergo transformation into radiation of the selected kind.

REMEDY FOR INTERMITTENT FEVERS.—Dr. Bruneti recommends, as an efficacious remedy in intermittent fevers, a preparation composed of twelve grammes of the chloride of sodium and one gramme of ferric carbonate. This is to be divided into six doses, to be taken in twenty-four hours. To prevent the recurrence of the malady, one dose a day is to be taken for the following week.

MISCELLANEOUS INVENTIONS.

The "Law" system—that is, the *two-wire* system, one of which is used exclusively by all the subscribers of an exchange to talk to the central office to give orders to the operator in attendance, without any signaling forward and backward by bells and annunciators—seems to be the approved method, and will doubtless supersede all other plans in due course of time. Its general adoption has been retarded in a great measure for the reason that no good method has been discovered before of placing the system on circuit wires, or, more plainly speaking, two or more stations on the same wire. Telephonic companies have hesitated to incur the expense of giving each of their patrons a wire for their individual use, preferring to retain the magneto method, with all its faults, by which this could be done. With Mr. Crowley's improvement the Law system has no objectionable feature whatever. All the companies can adopt it now and place as many stations as is desired on the same wire. This improvement has been practically demonstrated on two exchanges, Augusta, Ga., and Richmond, Va., where the subscribers on the same circuit signal and talk with each other without the aid of the central office operator, and at the same time they have the superior method of communicating with the central office at their command, with a view of conversing with other subscribers not on their circuit. This improvement will be an immense advantage in cases where parties have telephones at their offices and manufactories or offices and residences, by being at all times in easy readiness to call their manufactories or families, and *vice versa*, by simply tapping on the little key placed at each station. It requires no awkward turning of a magneto crank and at the same time pushing in a button with certain pauses, giving an *uncertain* ring on the distant bell and annunciator, placing the switch to the right and left, thereby creating delay and confusion, and nine times in ten awakening the "wrong passenger." The day is fast approaching, if it has not already arrived, when the question of *room* to place the increasing number of wires on the street poles and housetops will seriously agitate the telephonic companies. These poles and wires are already unsightly, and in some cities the authorities have objected to any further encroachments. The wires will eventually be placed underground beyond a doubt. An application of machinery or battery, or both, that will work with satisfaction and calculated to reduce the number of these wires, even in a very small percentage, must prove a desideratum with telephonic companies, and will avail themselves of such discoveries without hesitation. The Western Union Telegraph Company appreciated this point by paying an immense sum for the duplex and quadruplex apparatus. Mr. Crowley's invention appears to have this essential point in view, for with judicious location of subscribers on the part of the Law exchange manager he certainly can put two subscribers on a wire where he has only one now without detriment to either, thus practically "duplexing" the wire. Managers of "magneto" exchanges will now be enabled to discard their old-time method and adopt the new at a minimum cost and inconvenience, and give their patrons an equivalent for their money.

An improved bobbin has been patented by Mr. Albert H. Carroll, of Baltimore, Md. This invention relates to an improvement in that class of filling bobbins for the shuttles of looms in which the head or cone is provided at its end with a transverse slot to receive the lug of the winding spindle when the bobbin is being filled, and in which a notch or cut is made in the sides of this head or cone to receive the spring of the shuttle, which holds the bobbin in place in said shuttle.

Mr. Gregory Lukins, of Sweetwater, Ill., has patented a composition of matter for preserving wood, consisting of carbonate of potash one part, saltpeter four parts, and common salt two hundred parts.

Mr. William Beeson, of Dillon City, Montana Territory, has patented a new flying ship or machine for soaring in the air by aid of the wind and gravitation. The invention consists in a boat or so-called "basket" or "car" provided with two uprights gradually separating from each other toward the top, and provided with transverse bars, to which sails are attached and stretched from one upright to the other, the ends of these transverse bars being connected by ropes wound around a drum provided with a crank, by means of which the inclination of the sails can be varied at will.

An improvement in the manufacture of sugar has been patented by Mr. Emil Fleischer, of Dresden, Germany. This invention relates to the manufacture of sugar from saccharine solutions, such as sirup, treacle, etc., by means of a bibasic saccharate of strontia, and in the apparatus in which the strontia sugar that has been formed is separated from the non-saccharine liquid. This invention consists in producing a bibasic saccharate of strontia, which is separated from the non-saccharine liquid and placed into cold chambers, in which the strontia crystallizes and is separated from the sugar.

Mr. George W. Ellis, of Philadelphia, Pa., has patented an improved truss for reducing hernia, in which the pad is attached to the spring by means of a metal bar having a spherical head that is confined between two clamping plates or jaws, forming a permanent and rigid attachment of the spring.

An improved swing which can be conveniently suspended from the walls of a room, and which can be operated by the person occupying the seat of the swing, or by a person in any other part of the room, has been patented by Mr. Joseph A. Tunnington, of Elyria, Ohio.

An improved car wheel mould has been patented by Mr. John Forbes, of Harrisburg, Pa. This invention relates to certain improvements in car wheel moulds of that form in which the metal is poured through a central hole in the core and rises into the wheel space from the bottom; and it consists in forming a hollow core with an annular re-enforcing metal stiffening in it, perforated to permit the passage of air and gas through it, and combining this with the drag-sand, which is formed with a circular recess to receive the lower end of the core, and radiating channels that connect the hole in the core with the wheel space.

The flat link chains in common use are made of links riveted together, the strength of the chain being determined by the quality and size of the rivets and their resistance to the shearing strain or pull of the links, and when a link breaks one or two links have to be cut out and a new link put in, and new rivets also, which latter must be upset. Hence the operation of repairing a flat link chain of ordinary construction is slow and expensive. Mr. James T. Brough, of Jacksonville, Fla., has patented an improvement intended to facilitate the repairing and lengthening and shortening of flat link chains. The improvement consists of a flat link chain having the thick or double link made with both faces recessed and socketed at each end, the socket being undercut, and in forming each single link with a flat-headed stud projecting at right angles from one face at each end. The chain is made by coupling the double and single links together by means of the engagement of the studs on the latter in the undercut sockets of the former.

An improved apparatus for the water packing of snow-roads has been patented by Mr. Henry I. Grennell, of Medford, Wis. The object of this invention is to water pack the snow in the runner-tracks of snow-roads, and thus form a solid path way for sleighs. The invention consists of a sleigh carrying a water tank and heater and suitable conducting and delivering pipes, whereby the water may be heated and the hot water delivered into the runner-track of snow-roads to pack and solidify the same.

Mr. William T. Hall, of Fayetteville, Ind., has patented an improved stock car. The invention consists in dividing the interior of the car into compartments or stalls by a series of hinged posts connected by hinged end partitions and separable side partitions.

There are various methods of pivoting the natural roots of human teeth, but they fail or are defective in the matters of strength and firmness and in preventing the decay of the root. Dr. Henry W. F. Büttner, of New York city, has patented an improvement in artificial teeth, which consists in turning down the upper end of the tooth root, so as to form a circular shoulder thereon, the irregular upper surface of the tooth being cut off in a horizontal plane to accurately fit the metallic cap which carries the artificial crown. A cap fits upon the root, and it has an artificial crown attached to it.

Mr. Isaac T. Tichenor, of Auburn, Ala., has patented an improved material for making bags, which is impervious to atmospheric moisture, is not destroyed easily by the corrosive action of the contents of the bag, and is rendered strong and durable. The invention consists in a coarse cloth, such as a burlap, which is covered on one or both sides with a mixture of clay and tar.

Mr. John J. Tierney, of New York city, has patented an improved door securer, consisting in the combination with a screw, for securing a door, of a post socket having on its forward end the right angled plate fitting into a rabbet of door post and secured by screws, so that a burglar cannot remove the socket, even after he has withdrawn the bolt.

Mr. John B. Bennett, of San Luis Obispo, Cal., has patented an acoustic or mechanical telephone in which certain improvements render the instrument more efficient in giving a louder and clearer sound than has hitherto been obtained. It is of such construction that it can he placed in almost any place or position required.

THE GASTROSCOPE.—AN ELECTRIC LIGHT FOR THE HUMAN STOMACH.

The application of electricity in ways the most varied, and, perhaps, we might add, unexpected, has, within the last few years, developed with almost bewildering rapidity. As in so many other things, it has its applications also in medicine; perhaps one of the most novel and ingenious of these, as well as the least generally known, is the employment of the electric light to illuminate various parts of the body which are only obscurely visible, if they can be seen at all, under ordinary circumstances. There have been many instruments, says Mr. H. Wilson in the *English Mechanic*, designed to facilitate in this way the diagnosis of the less accessible cavities of the human frame. The ordinary instruments are constructed to reflect the light either of day or of some artificial source upon the part to be examined. The bright tablespoon which a medical man will often use to help him to see a sore throat more clearly by reflecting additional light upon it, is of course a primitive form of such instrument. In some of the most recently perfected of these appliances a small piece of platinum joining the electrodes from a source of electricity, is placed in the focus of a small mirror. By allowing a carefully regulated electric current to circulate through the wires the platinum is, of course, raised to a white heat and emits a brilliant light. This is reflected upon the part to be diagnosed, which is thus made clearly visible to the operator. Instruments for viewing the interior of the bladder, the œsophagus, or the stomach (for this unruly and mysterious source of trouble is no longer to escape the searching gaze of science), are necessarily more complicated than those for diagnosing, for instance, the mouth or the ear.

We select the gastroscope for viewing the interior of the stomach, as the most ingenious and remarkable of all these instruments which have recently been brought to great perfection in Vienna, and also as showing to what a point of delicacy the execution of scientific instruments has been carried in our day. We should add that the gastroscope is not a mere model or plaything, but has been in actual use. A figure of the complete instrument is shown in the two blocks, Figs. 1 and 2, and reference to it and to the smaller cuts will enable us to explain the principal features, which will, we think, interest all lovers of ingenious mechanical appliances.

The gastroscope consists mainly of a rigid horizontal tube, Fig. 1, *a*, terminating in one direction in the eyepiece, L, and in the other prolonged into a partially flexible tube, which can be passed down the œsophagus until its end reaches the stomach. This flexible metal tube, Fig. 2, is formed of 60 annular pieces, united by lateral joints, and thus forming a completely closed tube, whether it be disposed in a straight line or in a curve, without any chinks or openings, in which, did they exist, the folds of the mucous membrane might easily be caught and lacerated. This close-fitting arrangement is effected by making the inside of the upper end of each annular piece taper outward, and the outside of its lower end taper inward to an equal extent, so that one piece fits into another. As this tapering is only effected out of the thickness of the metal, this gullet-pipe constitutes a tube of uniform diameter both within and without. Moreover, the edge of each of these annular joints is filed away on opposite sides; on one side to a considerable extent, so as to enable it to be bent into a spiral, but on the opposite side only enough to allow it to be opened out till it forms a straight line. A glance at Fig. 2 will best supplement this explanation.

The jointed flexible tube terminates in a sort of tiny lantern, *z*, which consists of an inner and an outer glass tube-head. Inside the inner glass is seen the little loop of platinum wire, P*t*, the ends of which are of course joined to wires which run up the interior of the tube and can be connected at pleasure with the electrodes of a battery, by means of the screws, *d* and *n*, Fig. 1, and thus cause the incandescence of the platinum, which furnishes the illumination From this, light radiates freely on all sides and illuminates the interior of the stomach. A portion of the rays which fall upon the side opposite to the little window, O, Fig. 2, situate immediately above the lantern, *z*, are of course reflected back into it, where by means of the prism, P*r*, Fig 3, they are reflected upward in the vertical direction of the tube. Passing through the series of lenses, L*i*, they are parallelized, and arriving at the bend, L*t*, Fig. 1, are deflected by refraction to a horizontal direction by the coupled prisms about to be described, and seen in Figs. 4 and 6, whence, reaching the eyepiece at L, they convey to the observer's eye an image of a portion of that side of the stomach which may be opposite the window, O.

In order to deflect the rays of light from the vertical direction of the tube. *s*, to the horizontal one of the tube shown in Fig. 1, which terminates in the eyepiece at L, prisms are employed in the bend at L*t*. Fig. 4 shows the arrangement of these prisms, which are coupled immovably upon the curved piece of metal, *bg*, and are attached at their apices on very narrow metal supports, *st*, *st*, to the curved plate, *pl*, the exterior of which is seen in the under side of the bend at L*t*, Fig. 1. (Fig. 5 represents the guide-tube without this plate.) The most ingenious feature of this arrangement is that it allows the gullet-tube to move freely backward and forward through the curved outer tube or guide, Fig. 5, and yet at the same time maintains the prism in a constant position. This is effected thus: The guide-tube, Fig. 5, has a small oblong aperture, O*e*, on the under side, which is of just sufficient size to allow the insertion of the prisms one after another. The aperture itself is prolonged into a slit for some little distance in the direction of the lower end of the tube. A corresponding slit in the tube, *s*, Fig. 1, slides along the prism supports, which thus offer no obstacle to the motion of the gullet tube, which in this manner is movable within the outer tube, while the latter and its inclosed prisms retain a constant position. This arrangement will be better understood by a reference to the sectional drawing of the two tubes and prism plate, Fig. 6.

To obviate the inconveniences which might arise from any elevation of temperature in the stomach, the space between the two glasses of the lantern is kept filled with water, and communicates with two diminutive caoutchouc pipes, *rr*, conveyed down the main tube, as seen in the sectional drawing, Fig. 7, and terminating in the bent nozzles, *c c'*, Fig. 1. To these further India-rubber tubes are adapted, one to supply, and the other to lead off the water which is thus kept in perpetual circulation, and the temperature of which has of course to be regulated so as to obviate any inconvenient degree of heat produced in the stomach.

The crowning piece of contrivance and delicate workmanship in the instrument is an elegant appliance, by which the extremity of the gullet-tube, with its little window, may be made to revolve. The operator has merely to turn the little milled wheel, R*l*, Fig. 1, round which is stretched the silk cord, *fd*. The latter passes down the tube and round the tiny wheel, *kr*, shown in the section of the tube, Figs. 8 and 9. This tiny wheel, which, it will be observed, is toothed, plays into an indented ring round the interior of the lower rotatory portion of the tube, Fig. 9, which it can by this means cause to revolve whenever motion is imparted to itself by the agency of the silk cord which communicates with the milled wheel, R*l*, placed conveniently near the eyepiece. This ingenious and delicate contrivance obviates the neces-

FIG. 1.

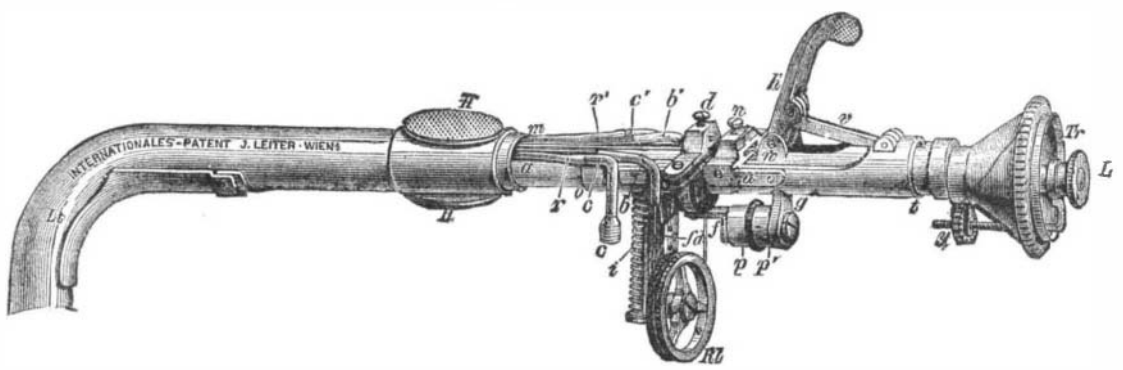

FIG. 3.

FIG. 2.

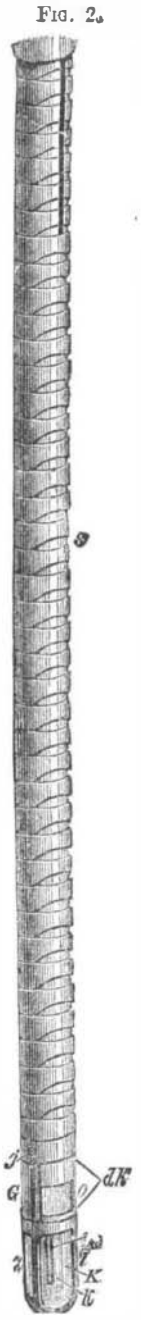

FIG. 5.

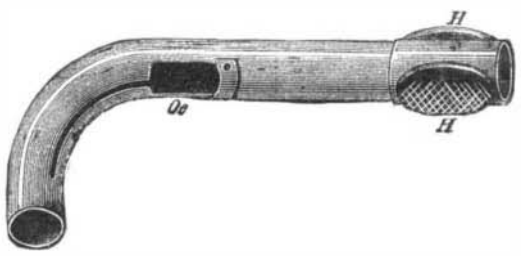

FIG. 6.

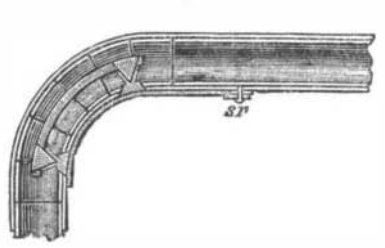

FIG. 4.

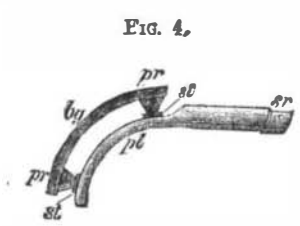

FIG. 7.

FIG. 8.

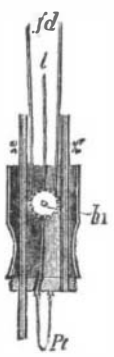

FIG. 9.