INCREASING THE POWER OF A TALKING MACHINE BY MEANS OF COMPRESSED AIR.

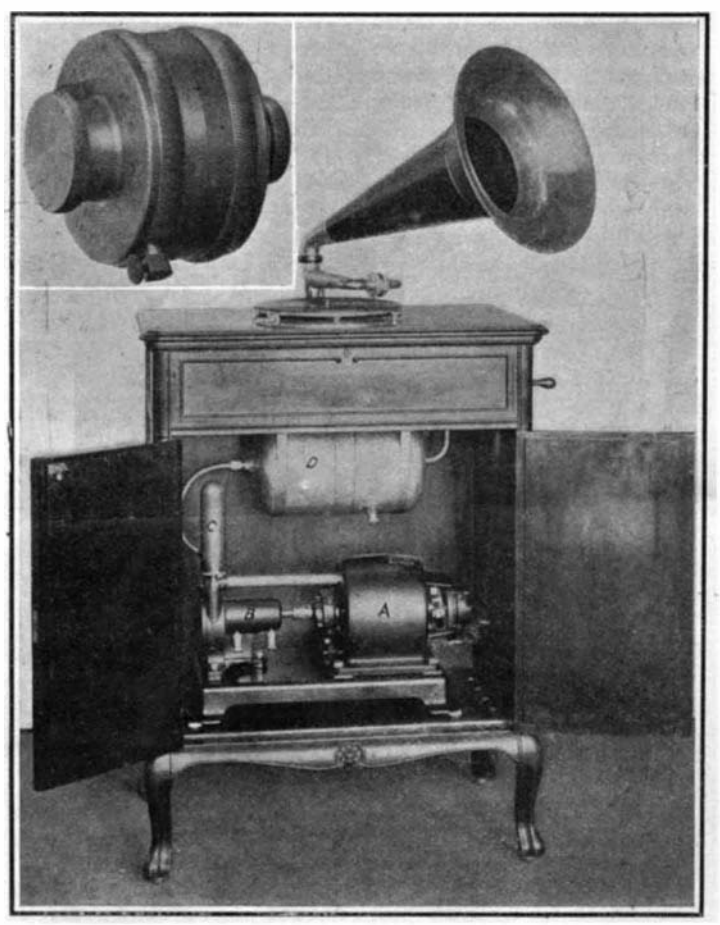
Heretofore it has been practically impossible to reproduce sounds "life size" on a talking machine. By using large horns it has been possible to concentrate the sounds produced by the diaphragm, and, by thus limiting the area over which they are projected, to give them a volume almost as great as that of the sounds originally impressed upon the record. But this concentration is secured at the expense of the quality of the tone; for to the sound waves produced by the record are added the vibrations of the horn itself, causing a harsh metallic sound.

The Victor Talking Machine Company has just perfected a machine which produces sounds of greater amplitude than can be obtained in the ordinary talking machine, avoiding the objectionable features of the large horn. The auxetophone, as the new machine is called, comprises a small air compressor and a talking machine of standard make. The usual diaphragm is, however, dispensed with in the machine, and the needle or stylus which travels over the record operates a balanced gridiron valve through which the compressed air is passed. In operation the air issues from the valve in intermittent jets, which are modified in frequency and character by the action of the needle in such a manner as to reproduce the sound originally impressed on the record. The needle and valve act merely as a relay, while the sound is actually produced by the compressed air.

To more thoroughly understand the philosophy of the machine, it may be well to discuss the form and action of sound waves. It is a common error to compare sound waves with waves of water in which, as is well known, the particles of water oscillate vertically, or at right angles to the direction in which the waves are traveling. In sound waves, however, the oscillations coincide in direction with the travel of the disturbance; that is, instead of having alternate elevation and depression, the wave disturbance produces alternate areas of compression and rarefaction. As the wave disturbance takes place equally in all directions under normal conditions, it follows that sound travels through air in a series of ever-expanding spherical areas of compressed and rarefied air which have their center in the source of the sound. In only two particulars can these sound waves vary, one being the rapidity of vibration, which governs the pitch, and the other being the amplitude of the vibration, that is, the length of travel of the vibrating particles, or the density and rarefaction, and this governs the volume or loudness of the sound. In a pure tone the oscillations are rhythmical, but various qualities of tone are produced by interference with the rhythm of the oscillation. However, these irregular movements take place in the direction in which the sound is traveling.

With this brief description of the principles of sound, we may be better able to understand the exact operation of the compressed-air attachment used on the auxetophone. In the usual form of talking machine, a diaphragm is employed which is connected with a needle in such a manner as to vibrate, causing alternate waves of compression and rarefaction to be emitted from the sound box. The compressed-air apparatus is more powerful because when the valve is opened to permit the issuing of a jet of air, this air travels through a greater distance in a given time than would the air set in motion by the diaphragm; consequently, waves of greater alternate density and rarefaction are produced, giving a much louder and rounder tone.

The accompanying illustration shows the new machine with the compressor attachment. It consists of a cabinet in the lower portion of which is a 1-6-horse-power electric motor, direct-connected to a blower. The air from this blower passes through a condenser, the office of which is to remove the moisture and oil it may contain. A flexible tube conducts the air from the condenser to a reservoir provided with a safety valve set to blow off at a pressure of 4 pounds. Thence the air is filtered and passes through a flexible tube to the sound box in which the valve connected to the needle is located. This valve is of a very delicate construction and responds to the slightest vibration of the needle. The record disk, which is of the usual form, is revolved under the needle by a spring motor, as in the regular talking machine. The electric motor which operates the compressor may be driven by power furnished from the city lighting system and may be started or stopped by means of push buttons at the side of the cabinet. One of the principal advantages of this improvement is that all the richness and mellowness of tone is retained. The new machine will, undoubtedly, prove of great value in large concert halls where machines of previous type have been of too low a power to give satisfactory results.



The Sound Box.

Front View, Cabinet Open to Show Air Compressor.

Rear View Showing Compressed Air Connection to Sound Box.

INCREASING THE POWER OF A TALKING MACHINE BY MEANS OF COMPRESSED AIR.

EYE-SPOTTING IN NATURE.

BY PERCY COLLINS.

While brilliant colors, striking contrasts, and more or less complicated patterns are common in nature, anything like a centralized design is extremely rare. One need only examine a number of birds' skins or butterflies in a museum to be convinced of this. Indeed, almost the only notable design seems to be that circular grouping of colors which, from its likeness to an eye, has been termed ocellus. Ocelli, or eye-spots, are seen at their greatest perfection upon the feathers of certain birds, such as the peacock, the peacock pheasant, and the argus pheasant. Among birds, too, and notably in the case of the peacock, we are able to gain a glimpse of the evolutionary process through which the eye-spot came into being. Before, therefore, we turn to a general consideration of the eye-spot, we will devote a few moments to the peacock's eye-spot in particular. It is, perhaps, the most lovely of all natural ornaments depending for their effect solely upon an arrangement of color. Yet this exquisite gem was not always what it is to-day. Its amazing complexity of beauty was acquired by slow degrees from a very small beginning. Moreover, we may trace, as it were, the successive steps in this wonderful progress upon the inconspicuous feathers toward the root of the peacock's tail.

If the reader will glance for a moment at the series of feathers which were taken from the skin of one Indian peacock for the purpose of illustrating this article (Fig. 1), he will notice that the first feather is pale in color, barred by darker areas; there is no sign whatever of the glorious eye-spot that is to be. It is probable that the ancestors of the peacock were completely clothed in these dull-colored feathers, just as are certain species of grouse and turkey at the present day. But Nature willed that the peacock should become of all birds the most magnificent. Thus, in the second and third feathers of the series we can trace dimly a small colored spot in the center of each. This spot is the commencement of the eye-spot; and if we continue to pass the feathers in review, we see this spot grow larger and more brilliant. The colors settle themselves, as it were, into rings, the feather itself increasing in size with every improvement, until, by closely-linked stages, each of which is represented by an actual feather in the peacock's train, the triumph of the perfect eye-spot is reached.

Now if, as seems highly probable, we have just been treated to a glimpse of the innumerable stages of gradual improvement through which this wonderful ornament was brought to perfection, we are justified in asserting that the eye-spot is far from being a thing of chance. It is obviously the outcome of intention. Some mysterious power has been constantly at work, age after age, with the definite object of producing a thing of superb beauty. So far as our present knowledge enables us to judge, this power consists in what we may call the inherent tendency to vary which is evinced by all living things. This is, as it were, the motive force; but it is harnessed, restrained, and driven along a definite channel by what Darwin called "natural selection."

So much for the production of the peacock's eye-spot; nor is there any reason for doubt that the other recurrences of the eye-spot in nature are all the outcome of a similar evolutionary process. For, be it noted, the distinction of the ocellus does not belong only to birds. The mark is present in a crude form on the hides of certain mammals, such as the jaguar, the leopard, and the ocelot. Two or three kinds of fish also show it. The North American eared sunfish, for instance, has in the breeding season a beautiful and very perfect eye-spot just where one would expect to find the ear of a higher animal. It is from this mark that the fish takes its popular name. Further, among insects, especially among certain groups of butterflies and moths, the eye-spot is extremely common; while it is again recognizable on several shells of the pretty cowrie group.

We may now ask: What is the meaning of this strange spot, so laboriously perfected by Nature, and of which—if we may judge by her constant reproduction of it—she is so proud? It is not possible to assign one reason which will explain the existence of the spot in every case. But if the reader will carefully examine the facts which will be brought to his notice in the following paragraph, he will probably share the writer's conclusion, namely, that in every case of its recurrence the eye-spot is not solely a thing of beauty, but that it also has some definite and utilitarian connection with the life histories of those creatures which possess it.

Take first the mammals. It may be said at once that the crude eye-markings on the hides of these big cats are certainly protective. To those who know the leopard and the jaguar only as captives in zoological collections, this may not be obvious. But all hunters and naturalists who have observed these creatures at home in forest or jungle agree that the eye-spots (Fig. 2) resemble closely patches of shade and sunlight, cast upon the ground through a screen of foliage. It only remains to be said that the jaguar and the leopard are both frequenters of forest land, and the protective value of their spotted hides becomes obvious. Moreover, besides hiding them from possible enemies, the eye-spots are of assistance to these beasts when they are lying in wait for their prey. Among the branches of a tree the jaguar is unobserved by its victim, which wanders unsuspectingly to its doom.

With birds, there can be little doubt that the eye-spot is an ornament pure and simple, albeit an ornament with a very definite use. It bears a most important part in bird courtship. Birds are particularly punctilious in all matters in connection with love-making, and it is invariably the male who makes the first advances. The female, especially in the case of species where the male is resplendently colored, is generally coy and watchful. She makes it clear to her suitor that she will not surrender her liberty at once; and the cock bird must make use of all the charms with which Nature has endowed him ere he may possess himself of his bride. Indeed, it may be said that as a general rule the most gorgeous and sprightly cock will find the least difficulty in providing himself with a hen. These facts doubtless account

in great measure for the brilliant colors and extraordinary ornaments which are so often the exclusive characteristic of cock birds. They account, also, for the eye-spot, which is borne only by the male birds and discarded by them at the molt which succeeds the breeding season. Those who have watched peafowl at the period of their courting will know well what an important part is played by the wonderful tail of eye-spotted feathers. The peacock struts and dances before the indifferent hen, and manifests an absorbing desire to show himself off to the best possible advantage.

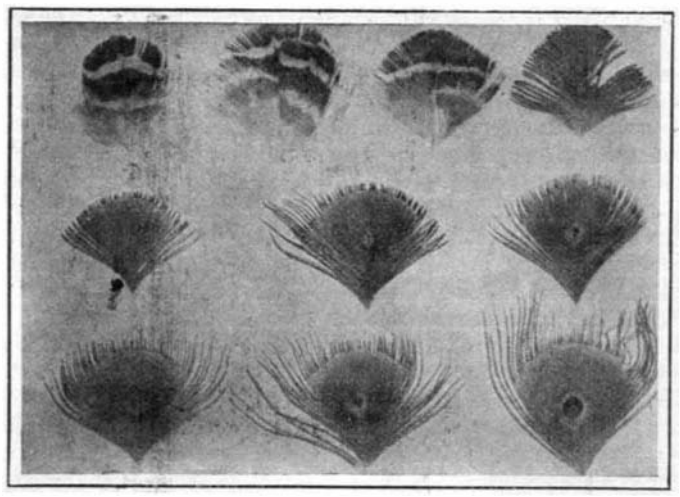


Fig. 1.—The Development of the Peacock Eye-Spot.

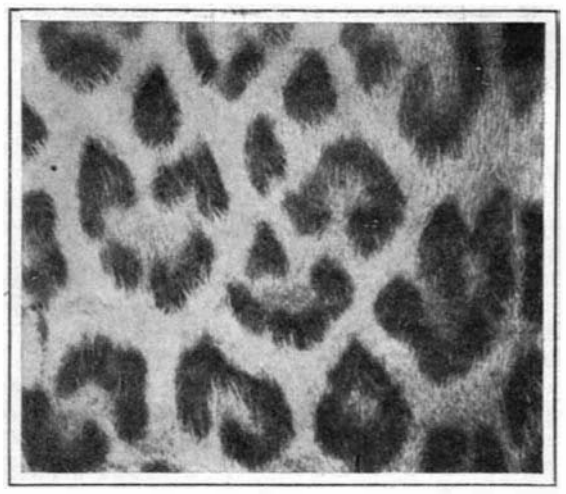


Fig. 2.—Eye-Spotting on a Leopard's Skin.

The peacock pheasant from Ceylon (Fig. 3) is said to make use of its eye-spots to attract a mate in much the same manner. Moreover, in this instance the eye-spots constitute the only ornaments possessed by the bird—the groundwork of the feathers being a uniform mottled brown, upon which the colored eye-spots stand out conspicuously, as a glance at the accompanying photograph of a "displaying" male will prove.

The recurrence of the eye-spot upon several fishes has probably the same significance as in the case of birds. The males of many fishes assume brilliant colors for the breeding season; and the ocelli are probably a highly specialized form of ornament produced with a like object. The facts that the eye-spots are small, or entirely absent, in the case of the females, and that they appear upon the males only during the breeding season, lend strong support to this theory.

The eye-spots which are so commonly seen upon certain kinds of insects are particularly interesting. In the case of certain kinds of caterpillars and beetles, there is little doubt that they are protective—rendering their possessors terrifying in the eyes of possible enemies. This theory is materially strengthened by the fact that such insects usually have some trick or device at their disposal, by means of which the eye-spots become more obvious and striking when danger threatens. Bates, for example, mentions a case in which a South American caterpillar startled everyone to whom it was shown by its snake-like appearance—an aspect dependent almost entirely upon its possession of eye-like markings, coupled with the peculiar pose of its body when at rest. The same is the case with certain Old World hawk moth larvæ belonging to the family *Chaerocampidæ*. Several species which possess eye-spots upon the anterior segments of the body have a habit of withdrawing the head and first three body segments into the fourth and fifth segments when alarmed. The front portion of the body is thus abnormally swollen, looking like the head of an animal, and upon it enormous, terrible-looking eyes are prominent. The effect is greatly heightened by the suddenness of the transformation — an innocent and inconspicuous animal being suddenly turned into what appears to be an awful monster. These caterpillars are, of course, perfectly harmless; but as they are sufficiently snake-like to startle human beings, it is not unreasonable to suppose that birds and other insectivorous creatures are often equally alarmed, and pass on their way without molesting what they judge to be some dangerous reptile.

The fact that the eye-spots of these caterpillars do not, as a rule, attract especial notice while the insects are quietly feeding will bear emphasizing. But as soon as the "terrifying attitude" is assumed in response to a danger signal, the eye-spots—owing to the swelling of the body segments—become enormous and prominent.

Fig. 3.—A Peacock Pheasant from Ceylon, With Tail Spread.

Very striking eye-spots are seen upon the thoraces of beetles belonging to the Central American genus *Alaus* (Fig. 4). These ocelli are delineated actually upon the hard integument, and cannot therefore be really more prominent at one time than another. Yet their power to terrify is much heightened when the beetle assumes the attitude with which it is accustomed to respond to signs of danger. It belongs to the great "click beetle" family, and has the power of hurling itself into the air when frightened, and falling to the ground with legs and antennæ tucked tightly beneath it. In this position it will remain, seeming to feign death, for an indefinite period.

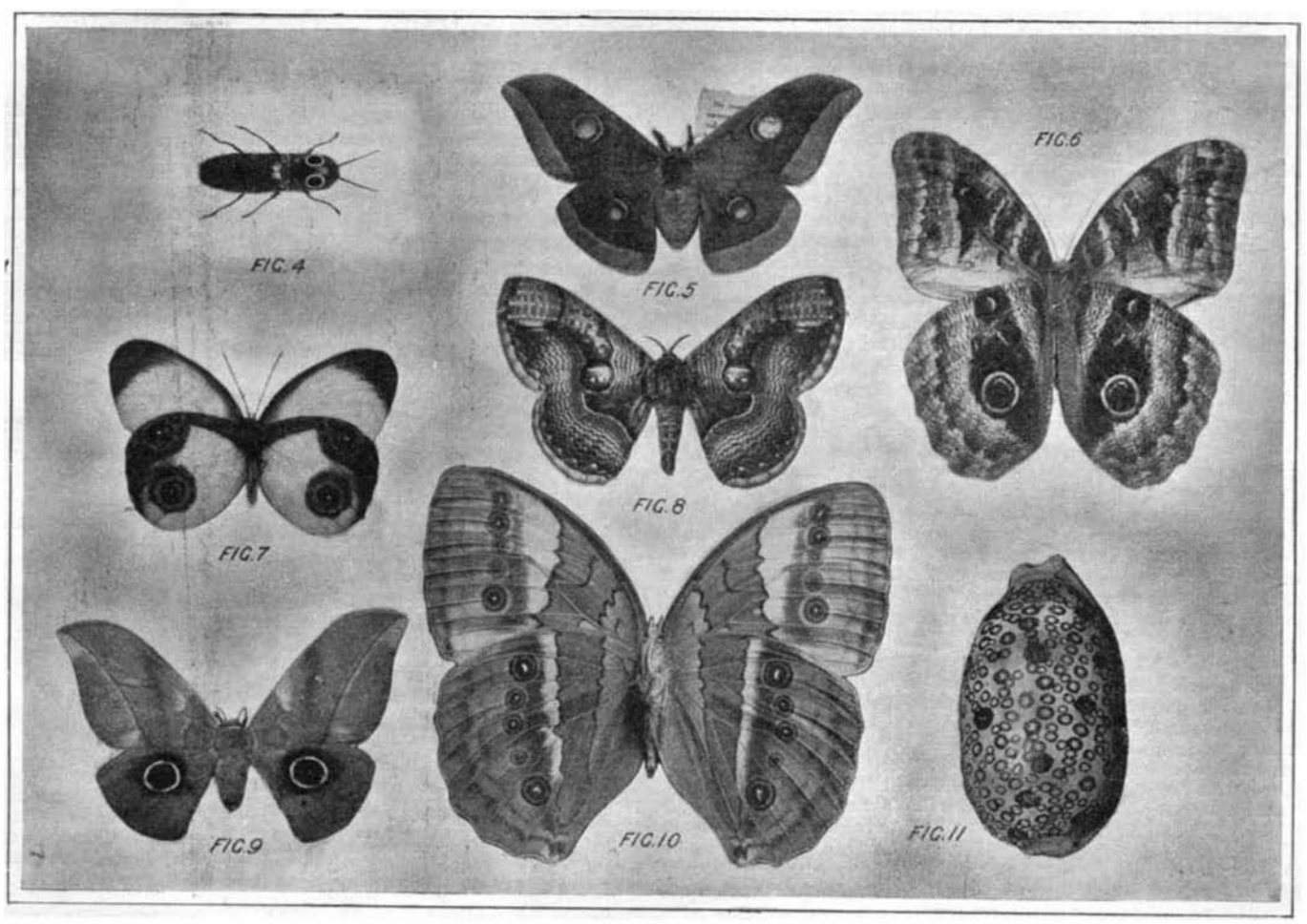
When surprised by a hungry bird, then, the beetle not only hurls itself out of immediate danger, but prepares a surprise for its enemy in the event of pursuit and discovery. For, with its legs and antennæ tucked out of sight, it has all the appearance of a dangerous and uncanny looking reptile; and the hungry but now thoroughly disconcerted bird turns away in search of some more appetizing object. Then the beetle, after waiting a few seconds to make sure that the bird has really decamped, puts out its feet and feelers and goes merrily about its business. Its strange eye-spots have been its salvation.

By far the most numerous recurrences of the eye-spot in the insect world are seen upon the wings of butterflies and moths. In some instances the distinctive mark is small and oft repeated; in others it is large, solitary, and staring. Moreover, the color and "make-up" vary as much as the size, the most curious variety being the eye-spot with a perfectly transparent center, which looks just as though a small piece of glass or talc had been let into the insect's wing (Fig. 5).

Now, such very striking and complicated markings cannot have become characteristic of large families of butterflies and moths without some important meaning attaching to the circumstance; and it has been suggested as possible that the "eye" possesses some protective value in that it would be likely to attract birds as a point at which to strike. If a bird, when in chase of a butterfly or moth, were to pierce one of its eye-spots, little damage would be done to the insect, which would gain time to evade its pursuer. On the other hand, the fate of an insect would be sealed if a bird once struck at and injured its body. This suggestion was first made by Darwin.

Moreover, in the case of solitary, staring eye-spots, such as those seen on the wings of the South American "owl" butterflies (Fig. 6) and many moths, the utility is probably to scare away inquisitive birds by giving the resting insect some resemblance to the head of a terrible monster. In the case of not a few moths, the ocelli occupy such a position upon the forewings that they are brought into particular prominence when the insect hangs waiting for its wings to expand fully after leaving the cocoon (Figs. 7 to 10). This is, of course, the most critical period of the moth's career, and any mark or device calculated to scare away enemies becomes extremely valuable.

Lastly, to the reappearance of the eye-spot on certain shells (Fig. 11) we may perhaps ascribe a meaning such as we saw to exist in the case of the



Figs. 4 to 11.—Examples of the Eye-Spotting of Insects, Moths, and Shells.

EYE-SPOTTING IN NATURE.

leopard and the jaguar. The mollusks inhabiting such shells are denizens of shallow water. Thus, the eye-spots upon the surfaces of their portable homes serve a protective office on account of their resemblance to the tiny motes cast upon the sea bottom by the light coming down through the water. Even in dark holes and crannies, too, the mottlings and eyed markings of these shells would serve to break up their outlines and cause them to resemble the sand and shingle upon which they lie.

In conclusion, it may be said that the eye-spot is a most striking example of the manner in which Nature applies a beautiful ornament to the exigencies of brute life, answering by one effort her twin demands for beauty and utility. The constant recurrence of the eye-spot must not be regarded as a mere economy of design, but rather as bearing the lesson that it is not possible to have too much of the best of its kind.

Electric Motor Troubles.

The unsatisfactory operation of a motor is usually attributed to some defect in the armature or commutator. The Street Railway Journal recently notes that many overlook the fact that the fields themselves may be the cause of the trouble. If proper attention were given to the testing of fields, it is safe to say that those mysterious troubles of motors that baffle solution would be fewer in number. Frequently attempts to test fields end in failure because the work is not done properly. Often attempts are made to test them with a voltmeter and an ammeter while they are in the motor. These tests are frequently unsatisfactory because not enough current is used to get an appreciable voltmeter reading or the current is not allowed to flow a sufficient length of time to heat the fields thoroughly. A heated field will often indicate the presence of shorted coils when the same field while cool and under a drop of potential test will show up O. K. When possible, coils should be tested while clamped in position in the motor, but if this is not possible, and they are tested on the floor of the shop, pressure should be put on them when the readings are taken. Sometimes standing on them or jumping up and down on them will cause a variation in the reading of the voltmeter; if so, the chances are great that the field is defective. In addition to the drop of potential method with direct current, fields may be tested when out of the motor by means of a transformer. A special transformer is required built in such a manner that the field to be tested may be slipped over a core and be made to serve as the secondary of the transformer. A short-circuited coil in the field makes itself evident by an increase in the primary current, by the heating of the field and by the sound given out from the transformer. As with direct-current tests, it is best to apply pressure to the coil in order to develop any shorts that would occur if the field were thoroughly heated and clamped in position in the motor shell.

Several field coil testing devices especially adapted for testing fields while they are clamped in the motor have also been developed within the last few years. When properly used, these devices usually give good results, and, further, the tests are made in a very short time. The machines are usually constructed on the principle of a Wheatstone bridge, a telephone or a galvanometer being employed to indicate when the known resistance is equal to the resistance of the field being tested. But in many instances where these instruments have been purchased, the shop man who is assigned to test the fields does not operate with the instrument long enough to get familiar with it. He seems to regard it as too complex to be understood. But if an earnest effort is made to test fields in this way it will not be long before satisfactory results can be secured. When the testing of fields is begun in shops in which it has not been carried on before, records of all tests should be kept and the condition of the fields when torn up should be noted. By so doing the proper resistance for a perfect coil may be obtained for each type of motor in use. When starting out, if there are no figures as to what the readings should be, the resistance of one field of the motor may be compared with that of another.

The difficulties in obtaining satisfactory results in testing field coils are no doubt largely responsible for the general inattention given them when the causes for the faulty action of a motor are being considered. But as there is such a great likelihood of the fields being the cause of motor troubles, certainly more attention should be taken to ascertain their condition whenever the trouble cannot be located elsewhere.

Upas Arrow Poison.

The upas tree, *Antiaris toxicaria*, which grows in Borneo and other East Indian islands, has long had an evil reputation, and it is still a common belief that birds flying within the influence of its poisonous vapors instantly perish, and that it is fatal for animals or men to rest beneath its shade. As is the case with many another fable of natural history, there is some groundwork for the exaggerated reports of the evil effects of the upas tree, for it resembles certain Rhus plants in emitting a volatile substance which affects the skins of certain susceptible persons coming near it, though others are quite unaffected. There is no question, however, as to the poisonous nature of the sap of the tree, and it is the chief substance used by the Dyaks of Borneo for poisoning the tips of their darts. An interesting account of their method of preparing and using the poison has been given by Mr. John Allen to the Manchester Literary and Philosophical Society. An incision is made in the bark of the tree and the milky exudation collected on a palm leaf and dried first in the sun and then over a fire until a thick brown mass is left. In this state it can be kept without the poison deteriorating, and when required for use it is made into a thin paste with the juice of "tuba" root (which is used to stupefy fish), or with tobacco or lemon juice, and the ends of the darts dipped into the mixture and dried. These darts are made from the middle stem of the palm leaf and are about six or eight inches in length and of about the thickness of a knitting-needle. They are used with a wooden *sumpitan*, or blow-pipe, which is about seven or eight feet in length and has an internal diameter of about ¼ inch. A bird struck by one of these little darts is instantly killed, and a pig dies in about 20 minutes. The fresh juice of the upas tree, whether swallowed or injected into the blood, acts as a violent poison, causing convulsions and death from paralysis of the heart. It was shown some years ago by MM. Pelletier and Caventou that the active principle in the juice was a substance which they termed *antiarin*, $C_{14}H_{20}O_5$. It was crystalline and soluble in alcohol, and when heated with dilute acid was decomposed into glucose and a yellow resin. Another poison prepared from the roots of *Upas tieute*, a climbing plant, is in less common use as an arrow poison. Its action is still more deadly than that of *Upas antiaris*, and its effects resemble those produced by strychnine.—Knowledge.

Determination of Ethereal Oils in Aromatic Waters.

For this purpose E. Beckmann employs the method elaborated by him and Dankwortt for the examination of foods (Pharm. Zeit.). It is based upon the depression of the boiling point and the freezing point which a liquid suffers through the substances it holds in solution. The aromatic water to be tested is shaken with ethylene bromide and the above-named constants determined for the pure ethylene bromide and for the ethylene bromide used in the shaking-out process. It should be remembered, however, that the alcohol present must be removed by shaking the ethylene bromide solution with water and that the maximum depression caused by water in the ethylene bromide is to be subtracted from the depressions obtained.

While tungsten is considered one of the rare elements tungsten compounds are of considerable use. Sodium tungstate is largely employed for impregnating fibers to make them fireproof. It is also used as a mordant in dyeing. Tungsten bronzes are largely employed as bronze powders and pigments. The chief consumption of tungsten in recent years has been, however, for high-speed tool steels and for hardened steel for armor plates and large guns.

RECENTLY PATENTED INVENTIONS.

Electrical Devices.

RECEIVER FOR TELEPHONES.—L. Steinberger, New York, N. Y. This invention relates to telephony, the more particular purpose being to produce certain improvements in the construction of the receiver. These are partly acoustic and partly mechanical. The oblate form of the large end of the receiver enables it to be applied to the ear with great precision. The receiver presents, as a whole, no crevices, chinks or ledges in which foreign substance is liable to lodge, it permits no undue catching of dust, and its sanitary properties are therefore greatly increased.

Of Interest to Farmers.

PLANTER ATTACHMENT.—G. Weidinger, Circleville, Ohio. The improvement is particularly useful in connection with devices adapted to the sowing of corn and the like, in which a runner is provided with lateral blades to run in the furrow. The blades are adjustable horizontally and vertically. There are no external projections on the runner to prevent the scouring clean of the same by contact with the earth.

CORN-CUTTER.—H. Willits, New Boston, Ill. The object of the present invention is to produce a machine such as is used for cutting corn into short sections. The improvement concerns itself specially with the mechanism for operating the knife and agitating the hopper, as well as other mechanism for gaging the length of the section into which the ears are cut.

PLOW ATTACHMENT.—N. T. Lien, Brinsmade, N. D. The purpose of the invention is to provide an attachment to plow-beams which will act to bend down stubble or weeds during the operation of plowing, insuring their being effectually covered up, and thus preventing the weeds and stubble interfering with the subsequent harrowing of the land.

Of General Interest.

DIRIGIBLE BALLOON.—E. M. Bossuet, 49 Boulevard Haussmann, Paris, France. The principal body is constituted by two conical vessels filled with gas and having their bases opposed and to which vessels a rotary motion is imparted from a motor carried by the balloon, the latter being characterized by, first, its mode of propelling by means of helical wings arranged throughout the length of the conical vessels forming the principal body on two, three, or four lines, so as to form a screw with interrupted multiple threads, the wings of each line being stepped; second, the arrangement of framing for bracing the parts, avoiding any distortion of the whole system and making the same perfectly rigid, while preserving the balloon and car.

AUTOMATIC WINDOW-CONTROLLING ATTACHMENT.—J. B. McKeown, Union Hill, N. J. The invention pertains more particularly to windows in factories, stores, and other buildings. The object is to provide an attachment arranged to allow moving the window-sash into an open position and holding it therein for ventilating and like purposes and to permit the sash to move into a closed position in case of fire to shut off draft, and thus prevent fire from spreading.

BOX-FASTENER.—A. Suter, New York, N. Y. The improvement relates to shipping cases or boxes, the object being to provide means for lacing or securing the cover on the case. The side boards of the body of the case are provided with recesses, into which spring-plates may be pressed inward of the plane of the locking devices to permit the outward swinging of the locking devices. The heads of the plates and portions of the locking devices may be provided with perforations to receive sealing-wires.

BRIDGE.—W. E. Whiteside, Mangum, Oklahoma Ter. The bridge is especially designed as a combined railroad and wagon bridge, and may be constructed of wood, iron, or other material. In practice the bridge is designed to be a suspension built in sections with the ends of the bridge resting on abutments on the opposite banks of the stream or space to be bridged, the bridge being constructed with sections or units may be made of any suitable length within reasonable bounds.

GAGE FOR FINDING THE LENGTHS, BEVELS, AND CUTS OF BUILDING MATERIAL.—J. D. Wall, Minneapolis, Minn. The purpose of the inventor is to provide a device for the use of carpenters and others whereby to quickly and accurately obtain the lengths, bevels, and cuts of any kinds of rafters employed, especially in all kinds of roofs, and also the lengths and bevels of other work, such as hoppers, trusses, braces, and stair-runs, either dome or circular. Any angle of any piece of timber used can be readily obtained.

COMBINED BUTT AND LOCK GAGE.—J. M. Realing, Daytona, Fla. The measuring and marking means combine in a single device a square, a bevel, and a marking-gage, so that the effectiveness of one does not impair the efficiency of the others, but are designed to co-operate with each other. It is useful in hanging and trimming doors, marking off butt or lock lines, affording the use of a try-square, and also a depth-gage in door operations.

WINDOW-BLIND GUARD.—L. D. Richardson, Providence, R. I. The object in this invention is to produce a device applicable to a shutter in order to prevent the same from being dislodged by the wind or other cause. The shutter cannot be raised in such a way as to remove it from the pintle. The guard, however, does not interfere with the opening or closing of the shutters, as it simply moves with the hinge-leaf, so that the finger or dog always projects under the hanger.

CHALKING DEVICE.—P. T. Erwin, Everton, Mo. The improvement is especially useful in connection with chalking devices used by carpenters or masons to apply chalk to cord and the like. The object is to provide a device which is simple and inexpensive to manufacture and which permits the chalk to be applied to a cord expeditiously and in a cleanly manner.

Heating and Lighting.

KILN-HEATING APPARATUS.—S. O. Larkins, Roland Park, Md. Mr. Larkins's improvement has to do with heating apparatus employed in lumber kilns or houses, and has for its object peculiar, novel, and improved apparatus using steam as the heating medium. It is designed for arrangement in kilns or houses adapted for the reception of cars loaded with lumber to be dried.

RELIEF DEVICE FOR WATER SYSTEMS.—L. W. Eggleston, Appleton, Wis. This invention refers to relief-valves or pressure-regulators for water systems. It is intended to be used especially in connection with water-heating systems. The object is to produce a device which will operate to maintain a substantially constant pressure and temperature for the water throughout a water system.

Household Utilities.

COMBINED CLOTHES WASHER AND WRINGER.—O. Guitar, Columbia, Mo. The tank is partially filled with water and the clothes are placed on a presser-bed and the bed is lowered until they are immersed. By alternately elevating and depressing a presser-plate the water is alternately drawn through and expressed out of the clothes. After they are cleaned the bed is elevated so that spring-latches engage the uppermost notch of the ratchet-bar, removing the clothes from the water, and the presser-plate is again lowered to express water from the cleansed clothes. They are then removed from the pressing-bed and operation repeated. The same operation is done in wringing after clean water has been introduced.

Machines and Mechanical Devices.

FEEDING MECHANISM.—G. H. A. M. Leroy, 10 Rue Bertin-Poirée, Paris, France. The present invention relates to a system of feed in which recourse is had to an automatic wedging for firmly fixing the band in the position which it occupies at the moment of the advance, which allows it to be carried forward for a distance exactly equal to the stroke of the feeding device. The band becomes unwedged in a manner likewise automatic.

GRINDING APPLIANCE FOR DRILLING-MACHINES.—E. M. Kinsella, Bisbee, Ariz. Ter. The invention relates to hand and power drilling-machines. The object is to provide a guiding appliance for guiding the drill-bit of the machine in the drill-hole to allow easy working of the bit in seamy or fitchety ground and to permit ready escape of the sand, dirt, or other borings from the drill-hole.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.