for use in parks, pleasure-resorts, and other places and arranged to give an exciting ride to the occupants of the car and to afford considerable amusement to the onlookers.

BOWLING-SLIPPER.—W. J. BARNETT, New York, N. Y. One purpose of the invention is to provide a slipper for the heel of a shoe which can be readily carried in the pocket and whenever required may be conveniently and expeditiously applied and secured and as readily removed, and also to provide the heel-slipper with an effective attaching medium to effectually hold the slipper in place under all conditions of usage, but which will in no manner interfere with the muscular play of the foot.

MERRY-GO-ROUND.—J. L. ARIZTIA, Iquique, Chile. This invention is an improvement on that class of apparatus which include a circular rotatable platform carrying horses or other quadrupeds ridden by persons. Mr. Ariztia has devised an improvement in which a series of annular platforms or rails is substituted for the ordinary rotatable platform, the same being supported and adapted to travel circularly on flanged rollers fixed on horizontal shafts radiating and driven from a common center.

Pertaining to Vehicles.

WAGON-BRAKE.—T. N. JOHNSEN, Wilbur, Wash. The operation is entirely automatic. Moving on level ground, the relation of parts is unchanged; but on starting down an incline the bed tends to swing forward when spring-supported or to roll forward when on the rollers, rocking the rock-shaft and drawing the brake-beam to the rear, thus pressing the shoes against the peripheries of the wheels. As soon as level ground is reached the bed swings or rolls back, rocking the rock-shaft in the reverse direction, releasing the brake-shoes. Means are provided to regulate the power of the brake.

VEHICLE-BODY.—W. D. MCNUTT, Upper Sandusky, Ohio. While relating generally to improvements in wagon-bodies, the invention more particularly seeks to provide an improved construction of "storm-wagon" body which while useful for the ordinary purposes of light wagons is more especially designed for use for those who have to ride more or less through rough weather, like mail-carriers, parcels-delivery carriers, etc.

COOLING APPARATUS.—D. MCR. LIVINGSTON, New York, N. Y. The invention relates more particularly to cooling apparatus employed in connection with motor-vehicles propelled by explosive-engines. It has a wider field of usefulness and may be embodied in a condenser or heating apparatus. In coolers of this character walls are provided having such a conformation and such a relation to each other as to produce when assembled conduits for the passage of water or other fluid to be cooled and passages at approximately right angles to the conduits for passage of atmospheric air or other cooling fluid.

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.

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READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. **In every case it is necessary to give the number of the inquiry.**

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Inquiry No. 8141.—Wanted, addresses of companies having experience in crude oil burners for annealing ovens.

For hoisting engines. J. S. Mundy, Newark, N. J.

Inquiry No. 8142.—For manufacturer of McCall sleeping tent.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 8143.—For manufacturers of small gear wheels, small spur wheels and cams.

I sell patents. To buy, or having one to sell, write Chas. A. Scott, 719 Mutual Life Building, Buffalo, N. Y.

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Automobile experts are in constant demand at high salaries. Our seven weeks' course is the most thorough and practical, fitting men to drive, handle and repair. Day and evening classes. Special course for owners. New York School of Automobile Engineers, 146 West 56th Street, New York.

Inquiry No. 8147.—For parties interested in the manufacture of the genuine French Chartreuse liquor.

WANTED.—The partial services of several men who have facilities for observing, and ability to comprehend the performance and good features of different automobiles. The work will occupy little time, and be chiefly in the nature of correspondence. Address Thomas B. Jeffery & Company, Kenosha, Wis. Department of Construction.

Inquiry No. 8148.—Wanted, addresses of firms that want articles manufactured of wood under contract for them.

Notes and Queries.

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(9995) B. T. asks how to make buff wheels. A. Turn up the wooden disk to form the wheel on the mandrel on which it is to run. Cover the periphery of the wheel with good glue, prepared as for gluing wood, stretch the leather around and confine it with shoe pegs driven in about 2 inches apart. When dry turn off true with a sharp chisel. Give the leather a coat of glue and roll it in emery, so as to make it retain it by being imbedded in the glue. Let the wheel dry until the glue is hard and it is ready for use.

(9996) C. L. F. asks how to preserve bird-skins. A. Make an incision from the breastbone to the vent; with a small piece of wood work the skin from the flesh. When the leg is reached, cut through the knee joint and clear the shank as far as possible, then wind a bit of cotton wool on which some arsenical soap has been put round the bone: do the same with the other leg. Now divide spine from root of tail, taking care not to cut too near the tail feathers, or they will come out. Next skin the wings as far as possible and cut off. The skin will now be entirely clear of the body. The skin must now be turned inside out and the neck and skin gently pulled in opposite directions till the eyeballs are fully exposed. The whole of the back of the head may be cut off and the eyes and brains taken out and their places filled with cotton wool. The whole skin should be rubbed well with arsenical soap or plain arsenic, and the neck returned to its natural position, when, after filling the body with a little dry grass or wool, the job is done. It is very easy, and the skin of a bird is much tougher than one would suppose, though, of course, they vary, the nightjar being very thin, while humming birds are fairly tough. All the apparatus required is a sharp knife and a pair of scissors, or, for large birds, a strong pair of nippers to divide the bones.

(9997) C. N. asks how to destroy weeds. A. 1. The best way, says a correspondent, to apply salt to paths, to destroy weeds, is as follows: Boil the salt in water, 1 pound to 1 gallon, and apply the mixture boiling hot with a watering pot that has a spreading rose; this will keep weeds and worms away for two or three years. Put 1 pound to the square yard the first year; afterward a weaker solution may be applied when required. 2. The plants should be cut off close to the ground and a few drops of coal oil poured on to the crowns. They immediately commence to decay and are utterly destroyed. Troublesome weeds on the lawn can thus be speedily disposed of, but others will likely take their place.

(9998) J. N. A. asks for formulas for writing on zinc. A. 1. Mix verdigris, 1 part; sal ammoniac, 1; chimney black, or any mineral color, ½; water, 10; stir well or shake the bottle before employing, and use a quill, not a steel pen, for writing. This ink is a poison. 2. Get a lemon, squeeze the juice out of it into a pot, and put into it an old copper cent or piece of copper, not the present bronze coin. Let it stand for a day or two. Write with a quill pen. 3. Dissolve 100 grs. of chloride of platinum in a pint of water. A little mucilage and lampblack may be added.

(9999) C. L. asks how to lace belts. A. The ends of a belt should always be cut off square, not guessed at by the eye, but laid off with a tool. The holes ought to be made with a small punch at a proper distance from the end; the size of the holes and the distances of them depending on the width of the belt. The use of an awl is reprehensible, for the holes are apt to be made irregular by it, and much larger than there is need of. The end of the lace should be tied with a square knot in the middle of the outside, for the corners of the belt where it is cut are most exposed and apt to whip out. Tying a belt lace does not look so neat as where the ends are put through an incision, but tying saves the belt from having extra holes made in it. The laces ought to be of the same thickness from end to end, or as nearly so as possible. It often happens that laces have very thin spots in them; such should be kept for short belts, and never used for long ones. Moreover, the holes must be made at equal distances apart and not too many of them. Every hole weakens the belt, and none that are not absolutely essential should be cut. All new laces, as well as new belts, should be stretched by hanging weights on them before they are used; petroleum, sawdust, resin, and similar substances should never be used. When a belt gets harsh or dry, neat's-foot oil is the best thing to apply to it.

(10000) C. W. asks: Please explain the following phenomenon. I had occasion to use an electric light bulb, and I observed that whenever I touched it in a dark room with my hand it became luminous. I found that the filament was not luminous, and that the luminosity occurred when it was touched by the flesh or other soft objects, and also when rubbed by them. If the bulb was moist, the phenomenon did not occur. A. All glass tubes or bulbs in which there is a vacuum of the right degree will glow in the dark when near an electrified body, as you have observed in the case of the lamp bulb. The static electrical charge is probably the cause of the glow.

(10001) C. M. S. asks: 1. Why does not an arc lamp short-circuit a current or cause a live wire, the same as when the two wires leading from the generator are touched together and pulled apart, thus making an arc? A. The carbons of an arc lamp do not short-circuit the current because the resistance of the coils in the lamp cut the current down to the number of amperes needed to light the lamp. 2. Is there any form of a rheostat used in the ordinary arc lamp? A. There is a rheostat in all arc lamps. 3. Please send me one of the SCIENTIFIC AMERICAN SUPPLEMENTS showing the construction of an electric furnace. A. Our SUPPLEMENT 1182 contains a good article upon the construction of an electric furnace.

(10002) M. G. F. asks: Will you state through Notes and Queries how a plate of glass should be shaped or cut so as to reflect the colors of the rainbow from the sun's rays without any water being used? I have seen, apparently, a flat glass reflect a rainbow on a screen or background when no water was present. A. If two glasses are placed one upon another and slightly pressed together, there will frequently be small circular rainbows, which may be projected upon a screen by a lens. No water need be used. The glasses for this purpose should not be very smooth or fit each other very closely. Wright's "Optical Projection," price $2.25, describes the mode of arranging to show these rings, under the title Newton's rings.

(10003) J. E. S. asks: 1. How can one tell the positive terminal of a dynamo? A. The best way to tell the positive pole of a dynamo is by an instrument called a pole tester. These can be had from dealers in electrical goods, for which see our advertising columns. 2. In a compound-wound direct-current dynamo does the current on leaving the positive brush flow through the series field, thence through the external circuit to the negative brush, or does it on leaving the positive brush flow through the external circuit and then through the series field winding to the negative brush? A. It makes no difference whether the series field of a compound-wound dynamo is connected to the positive or the negative brush and the external circuit. 3. On a compound-wound "Wood" Fort Wayne alternator the name plate reads thus: "K. W. 75. Poles 16. R. P. M. 1050. Volts no load, 2,000; full load 2,200. Amps. full load, 35." The machine is now run at 550 R. P. M., generating current at 1,060 volts, and the peak of the load is 31 amperes. The machine heats considerably. What causes it, and what is the full load at that speed and voltage? A. For the cause of the heating of your alternator you would better address the company which made the machine. Their engineer can give you the advice needed.

(10004) K. G. C. asks: Owing to the precession of the equinoxes, is the apparent diurnal motion of Polaris around the pole of the northern celestial sphere describing now a larger or a smaller circle than formerly, or in other words, is the star approaching or receding from the actual pole? A. At present the distance of Polaris from the North Pole is about one and a quarter degrees. At the time of the Star Catalogue of Hipparchus, it was 12 degrees distant from the pole. It will approach the pole for the next hundred years, at which time it will be within a half degree of the pole. After that time it will recede from the pole, or rather the pole will recede from the star.

(10005) S. asks: Since the recent earthquake in California, many questions have arisen regarding earthquakes and their effects on buildings. If you will publish an opinion on the following one, you will oblige many of us: In the case of earthquake, where is the greatest oscillation—at the top of buildings, or at the base? A. If a building is overturned by an earthquake, the top moves farthest. If it is not overturned, we should suppose the bottom would move farther than the top. Inertia would hold the top still, while the sudden motion of the earth would move the bottom. This is often seen in monuments in cemeteries. See illustrations on motions of cemetery monuments in SCIENTIFIC AMERICAN, Vol. 94, No. 20. The base moves away from the upper part of the monument.

(10006) C. M. asks: 1. Can you give me any advice how to vulcanize bicycle tires? A. The process of vulcanizing rubber is described in the SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 251, 252, 731, and 895, price 10 cents each by mail. 2. Will a fan motor, having permanent magnetic fields, need the same number of batteries to drive it, as the same motor with electro-magnet fields? A. The power is less with permanent magnets by the small amount of current to magnetize the field, of course. 3. Is telephoning allowed during a thunder storm, and why are the lights turned on during the same on a trolley car? A. The telephone exchanges do not cut off subscribers during a thunder storm. They depend upon the lightning arresters for protection. For the same reason the trolley service is not interrupted. Once in a while a burn-out occurs, but very rarely in comparison with the number of telephones and cars. Lamps are only lighted when it is dark enough to require their light.

(10007) W. W. S. asks: Does a piece of iron have more or less cubical contents when magnetized? I have tried to find out by using water and hair tubes, but I can see no change whatever. A. We should not expect to demonstrate any change in contents of an iron bar by magnetizing it. The change is of an infinitesimal order at the largest. The question has at most a theoretical interest. According to theory, the molecules are turned with their lengths in the same direction while the magnetizing current flows. They occupy no more space in this condition. We should, therefore, think that the bar as a whole would occupy no more.

(10008) L. C. S. writes: 1. As I understand it the resistance is what makes the field coil get hot. In order to avoid the heating more wire is added; now, if resistance is what heats the coil, how do you account for the coolness of the fields after adding more wire, consequently more resistance? A. Your statement that resistance causes the heating of an electric circuit is less than half right. The exact statement is that the heat developed in a circuit is directly proportional (1) to its resistance in ohms, (2) to the square of the current in amperes, (3) to the time that the current flows in seconds. Now one ampere flowing through one ohm develops 0.24 calorie in one second. Putting these facts in a formula we have: Heat in calories $= 0.24\ C^2Rt$. It can now be seen why the heating of a coil can be remedied by adding more wire. The increase of resistance cuts down the amperes in the same ratio as the increase. But the reduction of the amperes affects the heating power in the ratio of the squares of the amperes. Thus, if the resistance were doubled the amperes would be halved, but the heat produced would be reduced to one-fourth of what it was, since the square of ½ is ¼. 2. What is the cause of the humming in the field coils and pole pieces of an induction motor when the armature does not revolve, but the current is passing through the fields? A. The alterations of an electric current produce vibrations which are heard as sound. These can be heard near an arc light run by an alternating current, or near an alternating electro-magnet. 3. What changes are necessary to reverse the running of an induction motor? Crossing the positive and negative wires at the binding posts will not do it. A. Of course, merely reversing the main wires will produce no effect upon the direction of rotation of a motor. If the induction motor is two phase, the direction of rotation will be reversed by changing the two leads of either phase. If it is three phase, it will be reversed by changing any two of the leads. The different phases are a fraction of a period behind each other, and the direction of rotation depends upon the direction in which the phases lag behind around the rotating part of the motor, whether clock-wise or contra-clock-wise. To reverse the motor the direction of the lag in phase must be reversed. 4. Would it be possible to illustrate and explain the induction motor in the SCIENTIFIC AMERICAN some time in the future? A. The induction motor has been fully treated in several books recently published: Oudin's "Polyphase Apparatus," price $3 by mail; Thompson's "Polyphase Currents," price $5 by mail. These, with Thompson's "Elementary Lessons," price $1.40, will put you in possession of quite a complete library of the subject at present.

(10009) C. B. M. writes: I have a small motor which has a magnet in place of field winding. An electrical engineer told me if I put it on a large machine it would give greater power. I did so, and it does not give any power at all. It will run without a load, but will not run backward when current is reversed as it did before. A. A motor requires the proper current, that is, a current of the number of volts for which its winding was made. It will then develop under this pressure the power it was intended to yield, for the reason that it will take the proper number of amperes from the line. A current less than this will not run the motor up to its limit, one greater than this will overheat its coils. It would appear that you must have put the motor upon an alternating current, when it was intended for a direct current, since it would not reverse nor develop power.

(10010) E. H. W. writes: I read with much interest the article of M. Tommasina's automatic coherer, in your issue of June 16, 1900, page 376, and would like to ask if it is