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- Inquiry No. 5497.—For makers of electrical welding machinery, for welding small wires, No. 8 and finer; also for dynamos suitable for the above.
- Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.
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- Manufacturers: We can satisfactorily represent and handle your account. Correspondence invited. Welbener-Patrick Company, Manufacturers' Agents, 172 Washington Street, Chicago.
- Inquiry No. 5499.—For makers of armature core punchings in sheet metal, of the ring type.
- WANTED.—To manufacture on reasonable terms anything in wood or metal. First-class facilities for manufacturing and shipping. Satisfaction guaranteed. Send samples for estimate. Wayland Incubator & Manufacturing Co., Wayland, N. Y.
- Inquiry No. 5500.—For clocks for a factory, which are electrically controlled from one master clock.
- FOREMAN WANTED.—A thoroughly capable man to take charge of brass shop employing about fifteen men. Must be between 30 and 40 years of age, married. Reply by letter only, stating experience and references to Wm. H. Wilkinson Co., West Medway, Mass.
- Inquiry No. 5501.—For the makers of the "Meritt" typewriter, or dealers in repair parts therefor.
- Inquiry No. 5502.—For parties engaged in the manufacture or designing of clock cases.
- Inquiry No. 5503.—For manufacturers of light wooden and metal specialties.
- Inquiry No. 5504.—For manufacturers of vulcanized fiber specialties.
- Inquiry No. 5505.—For manufacturers of machines for turning and boring hub blocks.
- Inquiry No. 5506.—For manufacturers of ball-rolls.
- Inquiry No. 5507.—For woodworking machines for such work as dowels, skewers, etc.
- Inquiry No. 5508.—For manufacturers of heavy corded webbing.
- Inquiry No. 5509.—For machinery for making earthenware water pipes.
- Inquiry No. 5510.—For the address of the Furber Patent Shoe Company.
- Inquiry No. 5511.—For the address of the U. S. Silver Co., also of the Crown Silver Co.
- Inquiry No. 5512.—For manufacturers of machinery for making tooth brushes.
- Inquiry No. 5513.—For the address of the Pyle National Electric Headlight Co.
- Inquiry No. 5514.—For makers of a power-hafting equipment.



**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.

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(9390) D. M. S. asks: Certain makers of automobiles who use the "planetary" type of gearing in their machines state, as an important point in the construction of their particular gear, that no internal gears are used. Why is the internal gear objectionable? And cannot an internal gear, if properly designed, be successfully used in an automobile speed gear? A. There is no inherent objection to the use of internal gear wherever its special construction and application is desirable, for its use is a most important adjunct in many machines; possibly the necessary compactness of a speed gear makes the outside gear preferable.

(9391) W. B. asks: 1. Which is the cathode—the place where the electricity enters the vacuum tube, or where it leaves? A. The cathode in a vacuum tube is the place at which the electric current leaves the tube. 2. How do they make liquid air? A. The process by which the air is liquefied is in general as follows: The air is compressed and cooled, dust and other solid matter removed from it, then dried or deprived of its moisture, and then passed to the liquefying coils under a pressure of 2,500 to 3,000 pounds to the square inch. From a specially constructed valve the air is allowed to escape and expand. It passes back along the outside of the coil through which the compressed air has passed on its way to the expansion valve. By its expansion it is gradually cooled, and in turn cools the compressed air in the inner pipe. In this way the cooling proceeds by successive stages until the temperature of liquefaction is reached, and a portion of the air then collects in a liquid form in the bottom of the machine. You will find the process fully described in Sloane's "Liquid Air," which we can send you for \$2.50 postpaid.

(9392) I. B. R. asks: Since in an ordinary electric railway system with an overhead trolley wire the circuit is completed through the rails, why is there not the same danger from contact with them as from the third rail in the three-rail system? A. The third rail in an electric system is insulated from the earth, and if one comes in contact with it while he is still in contact with the ground, he will receive the shock due to the current which passes through him from the rail to the earth, just as he would if he could make contact between the trolley wire and the ground, the trolley wire carrying a current of the same voltage as the third rail. Now with reference to the other part of your inquiry: There is not the same danger of a shock by coming in contact with the rails of the track while standing upon the earth, as you must know, because everyone is continually stepping upon the rails as they cross the tracks of an electric line. The reason is not far to seek. The rails are bound together by strips of metal to furnish an easy path for the current back to the power house, and are also in contact with the earth during the whole of the distance; therefore, if one who is standing upon the earth steps upon the rail also, both the earth and the rail must be at the same voltage, since they are in contact with each other, and no current can flow from one point to another when both points are at the same voltage, any more than water can flow from one point to another when both points are at the same level. This is the reason why no shock can be received by a person who is standing upon the ground, and who touches the rails of the track through which at the moment the current may be returning to the power house.

**INDEX OF INVENTIONS**  
For which Letters Patent of the United States were Issued for the Week Ending May 3, 1904.

AND EACH BEARING THAT DATE [See note at end of list about copies of these patents.]

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