Letters

Patent Assignment

Deborah Shapley's comment about Harold A. Rosen in her report "The Presidential Prize caper" (News and Comment, 8 Mar., p. 938) is somewhat ambiguous. She states that Rosen invented the synchronous satellite but "like most industry inventors, holds no patent on it." If she means that Rosen did not apply for or receive a patent, her statement is incorrect. Many patents have been issued in Rosen's name, quite a number of which are in the satellite field, including one applied for in 1959 on features of the synchronous communication satellite.

If Shapley means that, because Rosen is an industry inventor, his U.S. patent No. 3,396,920 (1968) pertaining to the synchronous communication satellite is assigned to his employer, who therefore "holds" it, that is not quite correct either. Although the patent application was initially assigned to the Hughes Aircraft Company, NASA took the patent under the National Aeronautics and Space Act of 1958 and now "holds" it on the grounds that the operability of the invention had not been successfully demonstrated until the Syncom satellite was operated in space under NASA contract.

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Applied Mathematics

With the financial support of the National Science Foundation, the National Council of Teachers of Mathematics and the Mathematical Association of America, through its Committee on the Undergraduate Program in Mathematics (CUPM), are engaged in producing resource materials for all the various applications of mathematics suitable for use by both teacher and student in mathematics instruction for grades 7 through 12, that is, the last 6 years of secondary school. Applications of arithmetic, elementary and advanced algebra, geometry, computing, and other more advanced topics are being worked on. In addition to the uses of mathematics in other disciplines, applications of mathematics in daily life and to skilled trades will be especially emphasized. Through hobbies or previous employment, readers may be familiar with special applications that might otherwise escape notice. We would appreciate suggestions regarding this project—sample problems, references, or any other suitable materials ranging from simple exercises to extended model building and mathematical development. Correspondence should be addressed to CUPM, Post Office Box 1024, Berkeley, California 94701.

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Fuel Economy and Emission Controls

Robert J. Naumann's letter (15 Feb., p. 595) on the consequences for fuel economy of auto emission standards is misleading on several points. He suggests, for example, that the approximately 30 percent increase in fuel consumption in recent model cars is due to emission controls. Widely reported data from the Environmental Protection Agency (*1*) indicate that only one-fourth to one-third of the increase is due to emission controls, while most of the rest is due to increased automobile weight (convenience and safety devices).

It is true that the Honda stratified charge engine has lower fuel economy than standard engines, but it should be mentioned that the Texaco version of this concept shows greater-than-standard efficiency. And to say that the automobile is "responsible for less than half of the pollution" may be true with today's emission controls, but prior to such improvements, the automobile was responsible in many areas for more than 90 percent of air pollution. To require large improvements in so gross a polluter hardly seems "arbitrary" or "disproportionate."

Finally, although I share Naumann's view that mass transit would be a step forward in urban areas, I do not share his optimism that money unspent by automobile buyers for emission controls could be used to finance mass transit. Nor do I believe that the dollar cost of lowered fuel economy cannot be weighed against the esthetic, physical, and health consequences of air pollution.

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References

1. Office of Mobile Source Air Pollution Control, Office of Air and Water Programs, *A Report on Automotive Fuel Economy* (Government Printing Office, Washington, D.C., 1974).

Naumann makes some surprising statements in the course of his argument that emission standards should be subordinate to fuel economy considerations.

First, he states that 1973 emission standards resulted in a average 30 percent increase in fuel consumption. I have seen lower estimates. Second, he assumes that a family-sized car weighs 4500 to 5500 pounds. However, the combined weight of our two "family-sized" automobiles, an Opel station wagon and a Volkswagen bus, is less than Naumann's minimum figure for one vehicle, and both average more than 20 miles to the gallon. Fuel consumption and vehicle weight are directly correlated; other things being equal, a 5000-pound car uses twice as much fuel as a 2500-pound car. Further, automatic transmissions and air conditioners on automobiles probably waste as much fuel as emission control devices (*1*). Third, Naumann makes the undocumented assertion that the automobile is "responsible for less than half of the pollution." He does not say what kind of pollution, nor does he define its domain; but in the next sentence he refers to Los Angeles. The auto is responsible for much more than half of the air pollution in Los Angeles; the Air Pollution Control District, County of Los Angeles, sets the figure at 90 percent (*2*).

The chief goals for automotive transportation at this point should be high