

## 1959

### **Step and repeat camera**

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In the invention of planar process type integrated circuit technology, a step-and-repeat camera was used for pattern formation by photolithography. It became the prototype of the photo repeater which appeared in the 1960's and the reduced projection exposure apparatus (stepper) which appeared in the latter half of the 1970 's.

In 1959, Fairchild Semiconductor invented a planar process type integrated circuit. Here, Fairchild's Jay Last and Robert Noyce made a step-and-repeat camera which repeatedly transferred the pattern of the integrated circuit chip to the photoresist on the wafer. As a result, a fundamental method of manufacturing integrated circuits has been established in which many identical chips are formed on a single silicon wafer. Based on the basic principle of this step-and-repeat camera, the photo repeater used for manufacturing photomasks was sold by David W. Mann division of GCA in 1961. Further, in 1978, a reduction projection exposure apparatus using this principle of the photo-repeater was developed and it further evolved to the current photolithography.

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