

# The Roller Frame Story

By Tamas Frecska



Don Newman and his invention.

*There are two kinds of inventions in screen printing — those which improve a product and place it in a new category of usefulness and those which are so unique and/or basic that they fundamentally change some aspect of the industry. There are numerous examples of the first one. Improved presses and drying equipment belong to this category. So do some of the improved versions of inks, screen fabrics and UV light sources, to name just a few.*

*For the second, the basic kinds of inventions, one can seldom find sufficient and satisfactory examples. The photosensitive, direct emulsion is perhaps one such example, although its origins and inventors are clouded in history. The high-speed, cylinder press, developed by James Black of General Research, is another. In our continuing effort to discover and highlight the innovative side of our industry, we have paid a visit to Don Newman of Stretch Devices Inc, in Philadelphia, PA. Don is the inventor of the self-tensioning, screen-printing frame, or as he likes to refer to it, the Newman Roller Frame. (This is the registered trade name of the device.) Whether his invention belongs to the first or second group of innovations will be left to the reader to decide.*

Visitors to Screen Print 81 may remember the soft-spoken young man at the booth of Stretch Devices Inc answering all the questions with slow deliberation. That man was Don Newman. As I found out during my visit to Philadelphia, Don's carefully selected words are just another aspect of his pensive, methodical approach to everything he does. He is not likely to give you a quick answer about anything unless he had time to think it over several times. He is not easily drawn into an argument, but once committed, he is a tough opponent with all the answers at his fingertips. After talking with him, it was evident to me that as an inventor and businessman, he has tried to exhaust all the possibilities to improve his product before he marketed it. Whether his Roller Frame is as close to perfection as possible is yet to be decided by his final judges, his customers. Don Newman thinks it is. Like I have said before, he does not make snap judgments.

**Screen Printing Magazine:** Don, everything I have learned about you so far suggests that being an inventor and manufacturer has always been one of your ambitions in life. In 1968, you left Penn State University, without graduating, to embark on an "inventing" career, which is said to offer less of a chance at success than a roulette table. Yet within two years, you invented and patented the "Tumble Gym," the playground equipment which eventually provided you with income and motivation to go on. Can you tell us what other inventions you have patented or are involved with currently?

**Don Newman:** Apart from the Roller Frame, I have invented and patented an Artists' Canvas Stretching Frame, and also patented a method of internally welding tubular metal sections. I have also been working on inventions regarding suspension systems, tensile roof structures, playground equipment and even low-horsepower solar motors.

**SP:** When and where did screen printing and the Roller Frame fit into all this activity?

**DN:** During the early 70s, I was doing research work on tensile structures and the tensioning of membranes for roof structures at the University of Pennsylvania. I became involved with various stretching and stressing problems. The Canvas Stretcher was one of the results of this involvement. The other one, though based on entirely different principles, was the Roller Frame. Here the problem was related to highly stressing different kinds of membranes and evaluating temporary and permanent effects. One day I happened to be in the engineering library at the university and picked up a copy of your magazine, SCREEN PRINTING. Although at this time I was doing research into the stress effects on blood rheology, I became interested in reading some articles about screen-fabric stretching. I knew very little about screen printing at that time, but I was amazed at the use of wooden frames on pieces of screen-printing equipment which looked quite sophisticated. I remember seeing a web-printing press with tiny, wooden frames on it.

After all my research, I knew enough about the stretching of various woven and non-woven materials, and about their viscoelastic properties, to realize that using wooden frames and adhering the fabric permanently to them was not the proper way to make screens. From what I could see, the sophistication of the printing presses has far surpassed the quality of the screens used in the process.

**SP:** Are you saying then, that the discovery or invention of the Roller Frame was — like so many other inventions in history — an accident related to something you were not really aware of like screen printing?

**DN:** Well, yes, to a certain extent. Most of my inventions came about because my interest was accidentally piqued, and I usually got involved in studying the problems. To this extent, anything that one ends up learning and concentrating on has a, certain "accidentalness" about it. What I really saw from the first moment on was an *opportunity*. It prompted me to get involved and find out more about the industry. I found, for example, that there already were self-tensioning metal frames on the market. These devices were heavy and expensive. While their screw-adjusted, floating-bar design was an improvement over wooden frames, they did not address all the problems encountered in screen stretching. They had a limited amount of travel and take-up, and the quality of tensioning left a lot to be desired. The more I researched this area, the more opportunities I saw. It (the research and development) took me four years to perfect a new system and design it for production.

**SP:** For those of our readers who are not familiar with the Newman Roller Frame, can you explain how your frame is different from those you have just described?

**DN:** Yes. There are some obvious differences like the reduced weight of the system, the lack of welded corners and the easy interchangeability of sizes. The significant differences, on the other hand, are the absolute uniformity of the tensioning of the fabric, the ability to stretch and re-stretch as needed and the extreme precision of being able to stretch within  $\pm .5$  Newton/cm tension. The fact that the frame is self-leveling, and that there is no limit to the amount of fabric take-up, are also advantages. I could go on about the various aspects of the frame, but it is not the singular differences, which are the most important. It is our systematic approach, on providing a technology for the whole process of screen making and addressing every problem, that makes the difference.

**SP:** You mentioned that it took you four years to develop this system. This would bring us up to about 1976. From 1968 to 1976 you have spent a lot of time and expense on inventing and patenting various ideas. I know how expensive all that can get. How were you able to support yourself and your inventions?

**DN:** When I left college, I worked for six years at the university, mostly in psycho-physiological research. I also got involved in steel fabricating and advertising. I held various jobs that interested me. Also, some time during this period, my first invention, the Tumble Gym, began to pay off, providing some income. I was able to utilize a portion of this money, as well as some capital from private sources, to develop both the Canvas Stretcher and the Roller Frame.

**SP:** Did you go ahead and manufacture and market both of these items?

**DN:** No. Market analysis has shown that the professional artists' market for the Canvas Stretcher was nowhere near as large as screen printing. So most of the resources went into developing and tooling up for the Roller Frame.

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**SP:** I am sure many of our readers would be interested to know what kind of investment it requires to develop an idea like this to the marketable stage. Are you at liberty to say?

**DN:** I don't see why not. We figure we have invested close to \$400,000, including tooling up, for production.

**SP:** Considering the size of the investment, what made you decide to go into manufacturing rather than licensing this product, like you have done for example, with your internal welding method? After all, your marketing analysis at this point has already shown that you have a viable product in your hand.

**DN:** There were several reasons. One of them was that licensing the internal-welding method to Dravo Corp began to provide a source of income which we could consider for investment. Another, much more important reason, was that at that particular time (mid 70s), I could think of no manufacturing company in the screen printing industry which could do the job. Focusing on the screen-making aspect of the process required devotion and a lot of development if the work was to be accomplished. As you have seen in our factory, we have 18 different models of frames to cover seven or eight different, major fields in screen printing.



**SP:** I see. So you did consider this possibility, but you could not come up with the right manufacturer?

**DN:** That's right. From my experience in both inventing and engineering a product for manufacturing, I have found that only those products, which are perfected and have a simple route from manufacturing to the market place can be licensed successfully. The route for this product is not simple. It is not a product that a company could mass-produce in one or two sizes to cover all the applications. For instance, if the market was so simple that there were only three sizes of presses in the industry and no difference in the requirements for the textile, bottle or electronics industry, then it would have been easy enough to manufacture and license it. That was not my assessment of the situation.

**SP:** So in part, it was the diversity of the industry that "forced" you, so to speak, into manufacturing.

**DN:** It was certainly an important criterion. I foresaw a slow growth for our product, and initially there were some objections to our new concept. Some of these features the customers objected to eventually turned-out to our advantage and became best-selling features. As I saw it, the industry was not really geared to accept technological improvement at a rapid pace. At the beginning of our marketing efforts, we found that screen-making was not viewed by the printers as an important part of the process. This attitude has changed significantly today. We realized from the beginning that it would take a great deal of pioneering effort on our part, which a licensee may not be able or willing to provide. If the product was to be a significant improvement for the screen printing industry, it had to be accepted on a wide basis, not only in some small segment of the industry. To achieve that, we had to conduct a certain amount of missionary work.

Correct me, if you think I am wrong Tamas, but in my opinion, the Roller Frame and the mechanical tension meter that came into general use during the last four or five years have quite significantly advanced the state-of-the-art and level of technical consciousness among printers. The mechanical tension meter, with a substantially lower cost than its electronic counterpart, has finally given us a general tool — a microscope for observing the screen during tensioning. It has now become possible to substantiate the fact that screens are not static printing plates. That they change throughout their entire useful life and that re-tensioning is a serious consideration for their extended use. You would be surprised to learn how many screen printers stretch their screens with their rule-of-thumb technique, never being aware that their stretched screen does not even measure one Newton/cm tension, much less the recommended 14 Newton/cm. With such a screen, it is nearly impossible to do a proper job. The screen will roll under the squeegee; it will not maintain proper off-contact with the substrate, and it will be out of register.

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