



March - April 2005

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Diemaking & Diecutting Source & Resource

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The need for training: a vision of Frank Wagner

**Wagner Die Supply begins work on their
education center dedicated to Frank Wagner.**

Frank Wagner was a man whose ideas, whose innovations, and whose inventions are part of the foundation of the diemaking and the diecutting industry. First with Helmold and then with his own company in California, Frank Wagner & Son (Wagner Die Supply) in 1947. Frank's enthusiasm, his ingenuity, and his integrity built an industry leader, which set the standard for professional service.



*Frank Wagner - founder
of Frank Wagner & Son,
now known as Wagner
Die Supply.*

Frank and his son Robert, were men of vision. Frank was convinced our industry needed professional training and technical support to grow and to prosper. He shared his dreams and his hope for the future with his financial advisor at the time Ellsworth Knutson, now President and Owner of Wagner Die Supply. As Knutson adds, "Frank was an entrepreneur but he was also "hands-on", and he recognized that new technology and innovation, needed to be married to education and training. Frank's strategic plan was to establish a Technical Training Center, to teach diemaking, diecutting, and related converting disciplines. The team at Wagner Die Supply is delighted to be working on Frank's dream of a technical training center, and we are seeking ideas, suggestions, and assistance in creating an effective, hands-on education center for our industry."

**"Frank's strategic plan was
to establish a Technical
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disciplines."**

For more information about the Wagner Education & Resource Center call Greg Baker at 1-800-423-4478.



Wagner Die Supply[®]
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WHERE THE DREAM BEGAN - The original Frank Wagner & Son facility in Alhambra, California (circa 1947).

Wagner Education Brief: What are Center Bevel and Side Bevel Knives?

The standard cutting rule used in diecutting is Center Bevel Knife. This simply means the cutting edge of the blade is in the center of one end of the strip of steel, which makes up the body of the cutting rule. See illustration 1. Skiving or grinding the steel away on both sides of the central cutting edge, at a specific angle, generates the cutting edge. This machining creates two identical angled surfaces called the bevel faces of the steel rule. See illustration 2.

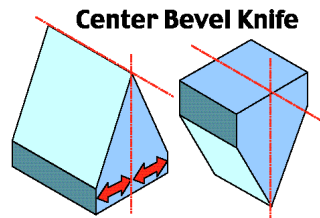


Illustration 1.

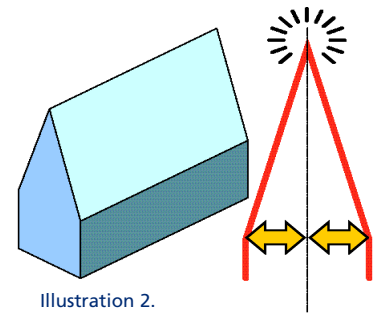


Illustration 2.

Steel rule diecutting is a displacement process. This simply means the material being diecut is primarily separated by the conversion of a vertical stamping or "pressing" force into a horizontal force, which displaces or pushes the material away from the centerline of the blade, to split the material apart. See illustration 3. This wedging of the material generates pressure ridges, which are temporary in a softer more ductile material, but become permanent features of the diecut edge in denser, tougher materials. See illustration 4.

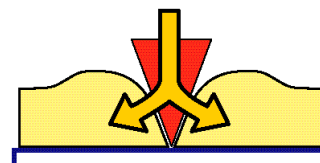


Illustration 3.

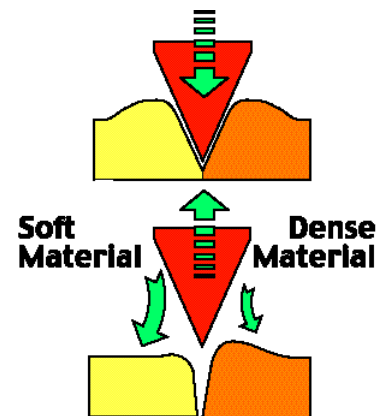


Illustration 4.

This potential problem in diecutting is solved by the use of Side Bevel Knife. See illustration 5. Note the cutting edge is offset to one side of the steel strip, and as a result one of the bevels is considerably larger than the support bevel on the other side of the blade. See illustration 6.

See illustration 6.

What is the primary advantage of side bevel knife?

This side bevel knife cuts the material similarly to center bevel knife, however, one side of the diecut edge the material has a far cleaner and more precise cutting profile, while the other side of the cut the material is more deformed, and delaminated, with a far larger pressure ridge. See illustration 7.

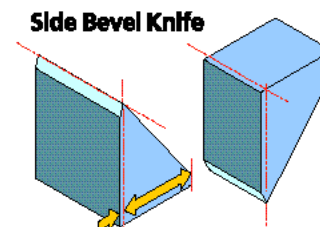


Illustration 5.

The primary advantage of side bevel knife is achieved by orienting the smaller bevel to the product side of the blade, and the larger bevel to the waste side of the blade. This results in a cleanly cut product, with minimal distortion to the cutting profile. See illustration 8.

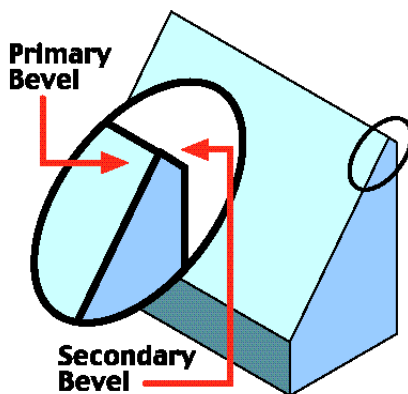


Illustration 6.

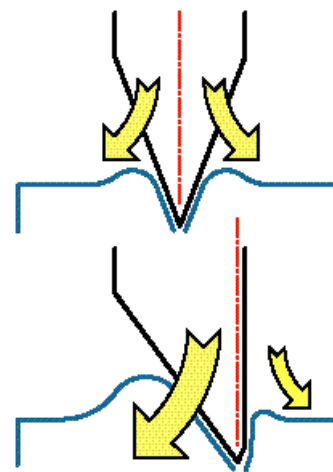


Illustration 7.

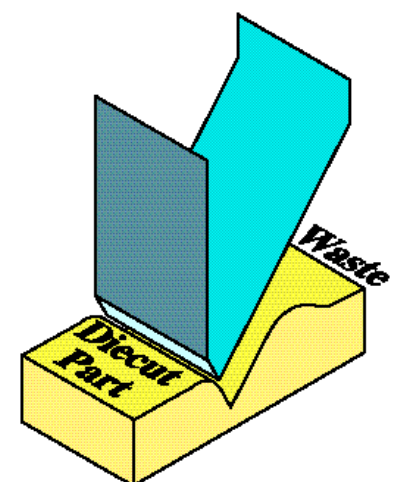


Illustration 8.

Wagner Extractor 2000 Rule Puller.

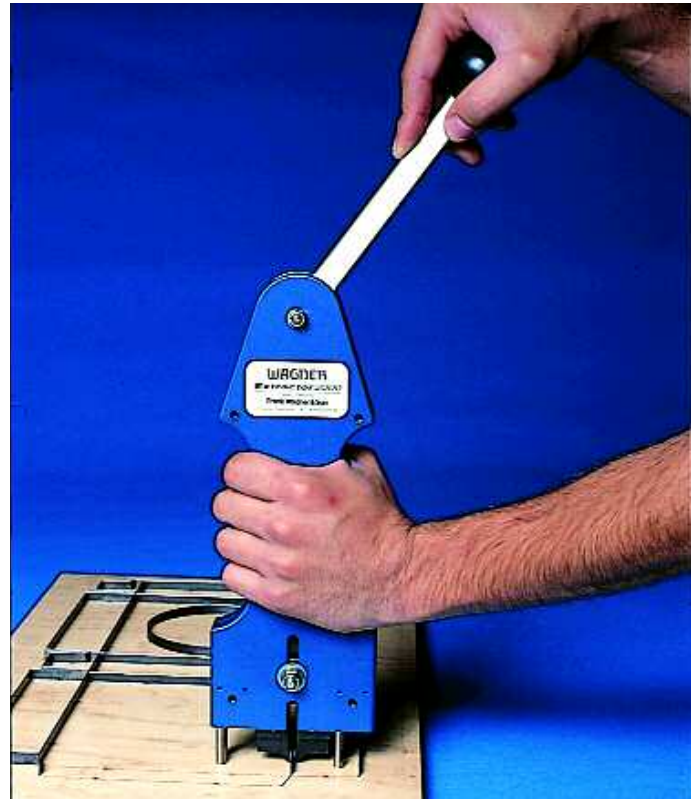
One of the most successful tools developed by the Wagner Team is the Extractor 2000 rule puller.

It is often necessary to pull a steel rule knife from a dieboard. This could be the result of on-press damage, it could be normal wear, or it could be a complete re-knife of the dieboard is required. The experienced steel rule diemaker has developed several skills to remove a knife, including the use of pliers and a steel lifter bar. See illustration 1. While this is effective, once you have the experience, it is not always easy, it is potentially hazardous, and the rule is leveraged out of the dieboard at such an acute angle, there is often delamination damage to the upper veneer of the dieboard. See illustration 2.

The advantage of the Wagner Extractor is by depressing the handle/lever, the jaws activate downward, they grip the knife securely, and because the proportions of the lever/handle are so effective, the knife is pulled vertically from the dieboard, with minimal effort. See illustration 3. This well designed diemaking tool provides several advantages in use. It is safe, it is easy to use, it is fast, it is effortless, and the dieboard and the rule removed are undamaged.

There are often situations where a concentration of knife makes it difficult to position the puller on the surface of the dieboard. To provide the necessary flexibility the feet can be repositioned, quickly and simply, see illustration 4, and/or a special pad/foot can be inserted, (see photo below), which is designed to allow the puller to sit on the edges of adjacent knives and rubber, as an individual knife is removed.

The Wagner Extractor 2000 has become the standard of choice for the professional diemaker, so if you have to remove rule from a steel rule die, this is the tool of choice! Where safety, speed, precision, and performance are important, the Wagner Extractor should be in every diemaking operation and on every press.



EXTRACTOR 2000 - For over 10 years, the Extractor has been a favorite of die industry pros. Its intelligent design allows for the easy pulling of rule, while hands and knuckles are kept safely away from sharp cutting rule edges.

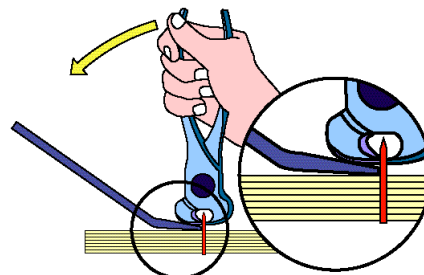


Illustration 1.

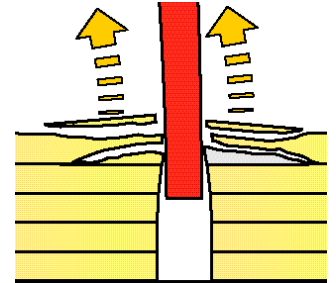


Illustration 2.

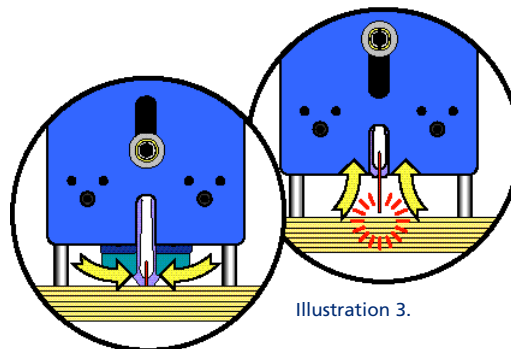


Illustration 3.

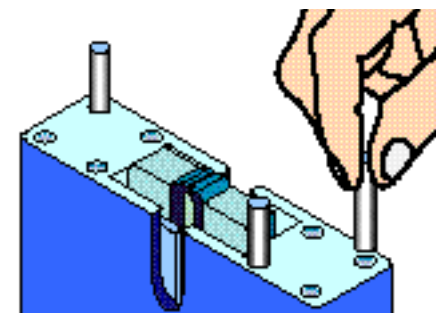
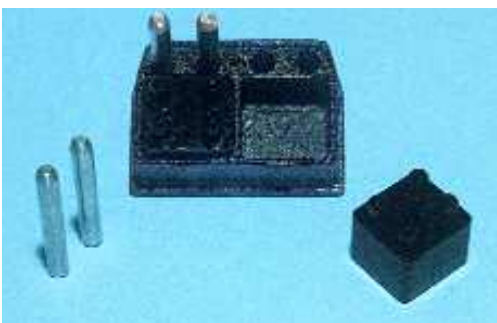


Illustration 4.



EXTRACTOR CADDY - Each new Extractor ships with this handy caddy and a full set of pins (left), and 2 urethane pads for use on intricate dies. The caddy has an adhesive backer allowing it to be placed directly on the Wagner Extractor 2000 or on the workbench.

Henderson Storage Systems: Storage of Phenolic Counters

The current focus of commercial diecutting is inventory supply, which means a great deal more press make-ready combined with short production runs. This means the complete tool set, from the steel rule die, to the patch-up sheet, to phenolic counters, to the stripping and blanking tools, must be stored to protect the tools, and to provide fast, simple access.

Of these the phenolic counter, *see illustration 1*, is the most challenging. When the counter is attached to the cutting plate. It is almost impossible to damage. However, when it is removed from the cutting plate, cleaned and prepared for storage, there is considerable danger in breaking or fracturing parts of this fragile tool. *See illustration 2*. Storage has always been both labor intensive and ineffective, as tools are frequently damaged, when they are retrieved for production.

One failsafe method is to use the Henderson Storage System to manage these key tools.

This involves using commercially available Pegboard, to make a 3-Pin storage tool holder. *See illustration 3*. This will slide in and out of the standard Henderson Fixed or Mobile Storage Unit. *See illustration 4*.

One of the more effective methods of storing counters is to fasten them together, using a standard brass clip, available from all office stores. *See illustration 5*.

The counters are simply stored on the suspended pegboard by fastening them in stacks directly to the board using the brass fastening clips. *See illustration 6*. This is fast, simple and effective. This approach to storing counters is excellent because storage and access are easy, and this method protects the counter from handling damage.



HENDERSON FLAT STORAGE UNITS - allow for a variety of storage possibilities, from dies to blanking and stripping tooling, and now even phenolic counters!

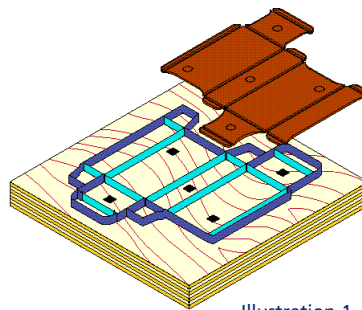


Illustration 1.

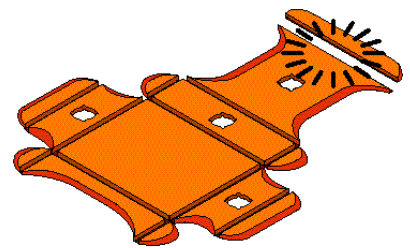


Illustration 2.

Wagner Die Supply®
Henderson Storage Systems

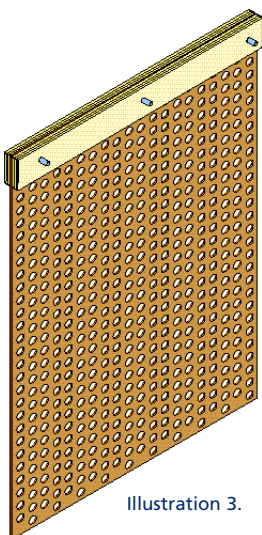


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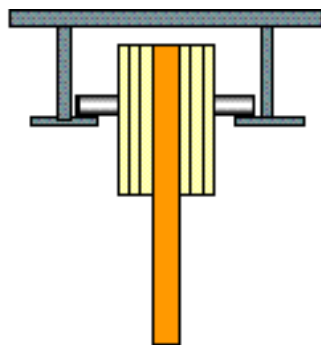


Illustration 4.

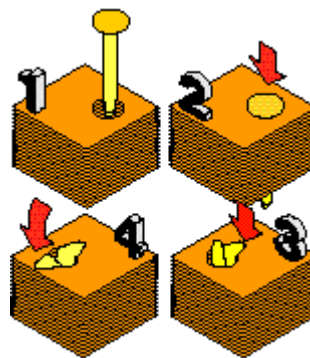


Illustration 5.

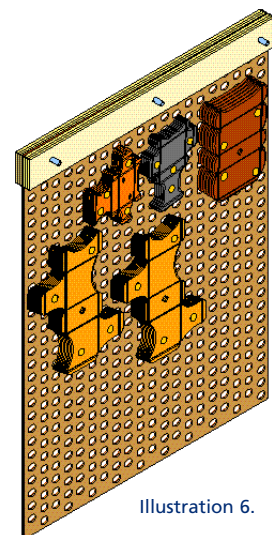


Illustration 6.

Wagner Punches Q&A:

Why do punches require "more" pressure to diecut?

If you examine well-used press cutting plates, you will often see the "pressure shadow" or even an indentation in the surface, formed by a steel punch. This is hardly a surprise, but it is useful to understand why this happens, and what if anything you can do to avoid this potential problem.

In diecutting we use a basic formulae for pre-calculating the pressure required to diecut. This states that for every 1-inch of knife, 300 pounds of pressure is required to diecut a material. However, what is intriguing about this pressure calculation is if the 1-inch of knife were bent into a "U" shape, the pressure to diecut the material has increased! See illustration 1.

Why is this?

We are seeing the result of a basic principle of diecutting called "Inside-Outside Pressure." The correct question to ask is, "Where does pressure come from in diecutting?" We know, for example, when diecutting that less than 30% of the pressure required is consumed by penetrating the surface of the material, but more than 70% of the pressure is required in splitting the material apart. See illustration 2. This is telling us that platen diecutting is a "displacement process," and the most important feature of the knife is the bevel angle of the blade, and we can control displacement by changing the bevel angle or the profile of the blade. See illustration 3.

What is happening?

As a blade is punched into and through a material, the knife/wedge pushes the material laterally away from the centerline of the knife, with sufficient force to split the material, generally before the tip of the knife strikes the cutting plate. See illustration 4. With the majority of the pressure expended in converting the vertical force of diecutting into a lateral splitting action, it is obvious that as two knife/wedges are brought closer together, the material between the blades must compress and absorb the two inside bevels of the blades. In practice what happens is the imbalance in lateral pressure, between the "inside" and the "outside" of the ruled shape, will force or deflect the top of the knives apart. See illustration 5.

(continued next page)

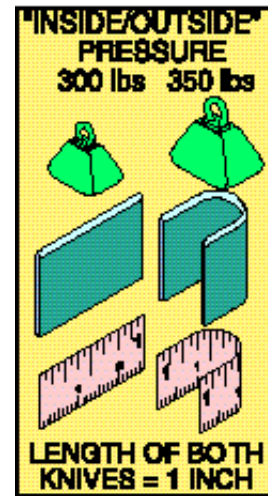


Illustration 1.

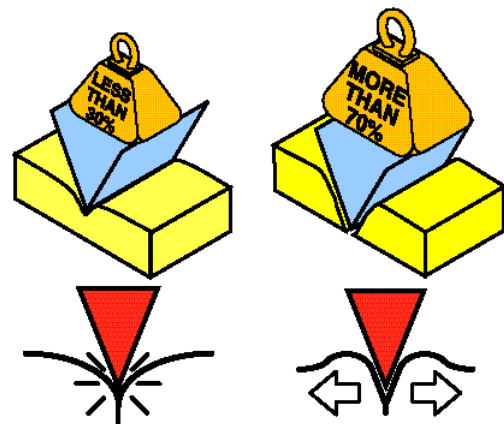


Illustration 2.

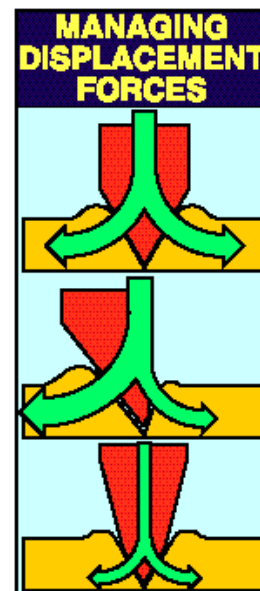


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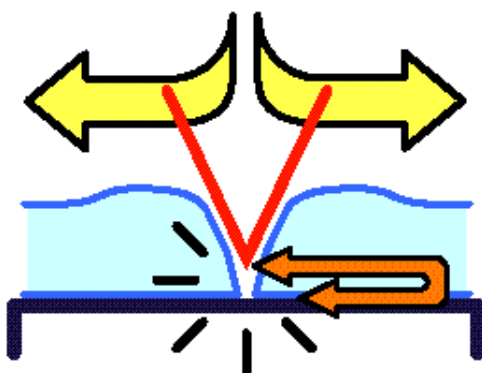


Illustration 4.

Wagner Punches Q&A:

Why do punches require "more" pressure to diecut?

(continued)

There is a limit to the ability of a material to absorb this much deflection, which means as the blades get closer together the pressure to diecut the knives gets higher and higher. See illustration 6. This is called Inside-Outside Pressure in diecutting, and it is why narrow slots are not only difficult to diecut, the blades will often flex apart and fracture. See illustration 7.

The punch is obviously the prime example of this type of pressure imbalance. It is almost impossible for the relatively small "inside" slug of waste material to laterally compress to absorb both "inside" levels of the punch. This classic imbalance between the inside displacement pressure and the outside displacement action of the punch beveled faces, causes the overall pressure to diecut, to climb dramatically. See illustration 8.

So how do we solve this pressure problem?

There are a multitude of bevel and cutting edge options when you examine the Wagner steel punch portfolio. And of course it makes a considerable difference if the cutting process is hard or soft anvil; if you are cutting single or multiple layers; the density and toughness of the material; the design and the concentration of punches; and the caliper and construction of the diecut material.

The impact of Inside-Outside pressure is an important factor in tool design and specification, and it is vital to choose the right punch, for the right material and the right application. To discuss these and other factors, it is an advantage to discuss your specific punch and diecutting needs with one of our team of technical experts.

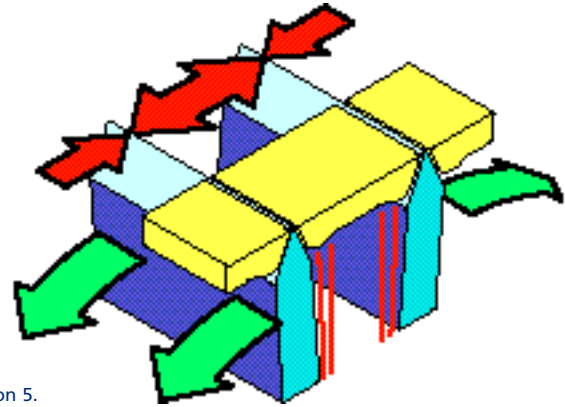


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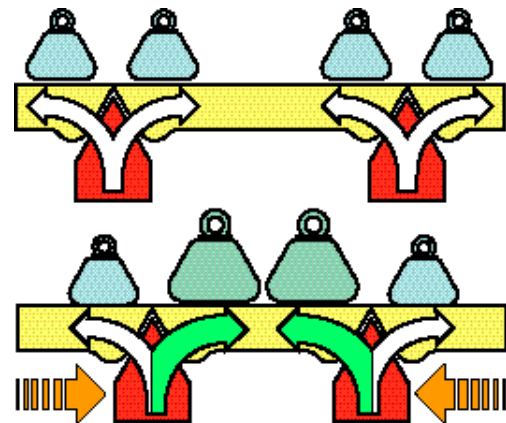


Illustration 6.

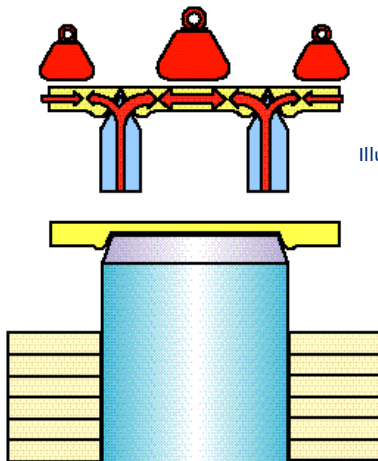


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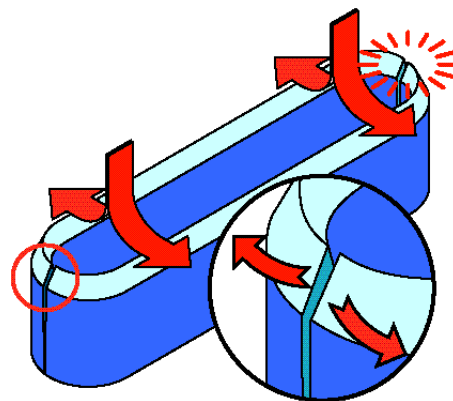


Illustration 7.



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