Spin Welding: A rapid, efficient fabricating method for production welds.

Spin welding thermoplastic parts has come a long way since the first commercial efforts of the 1940's. Now, the engineering is so sophisticated that a circular section of a part can be aligned and welded simultaneously. Welds can be hermetically sealed and made to resist the same pressures as the original material. High production speeds can be achieved and monitored with programmable controllers. Equipment can be custom designed with a range of controls to meet your specific needs.

The technology of spin welding is greatly advanced but the concept itself has not changed. Spin weld joints are formed by rotating one section of a part against another section which is held stationary. Frictional heat melts the two surfaces. When the material melts enough to form a bond, the rotation is stopped. Clamp pressure is maintained while the plastic cures. The entire process is rapid. The timing varies according to each type of part, but 360 welds per hour are common on manually loaded equipment.

Olsen Manufacturing Company, one of the early developers of machinery for spin welding, is a recognized leader in the field. The patented "Spin-Hed" engages the part to be welded with a rotational coupling. This allows the tool to impart both circular inertial and downward pressure to melt the plastic and effect a weld. Pressure can be maintained for a predetermined time, allowing the weld to cure. Because of the unique design, two units may be run from one motor and perform two welds independent of each other.

All of these functions are accomplished to meet the requirements of specific applications. Olsen technology is provided to make adaptations that will result in the most efficient operation and the maximum speed.

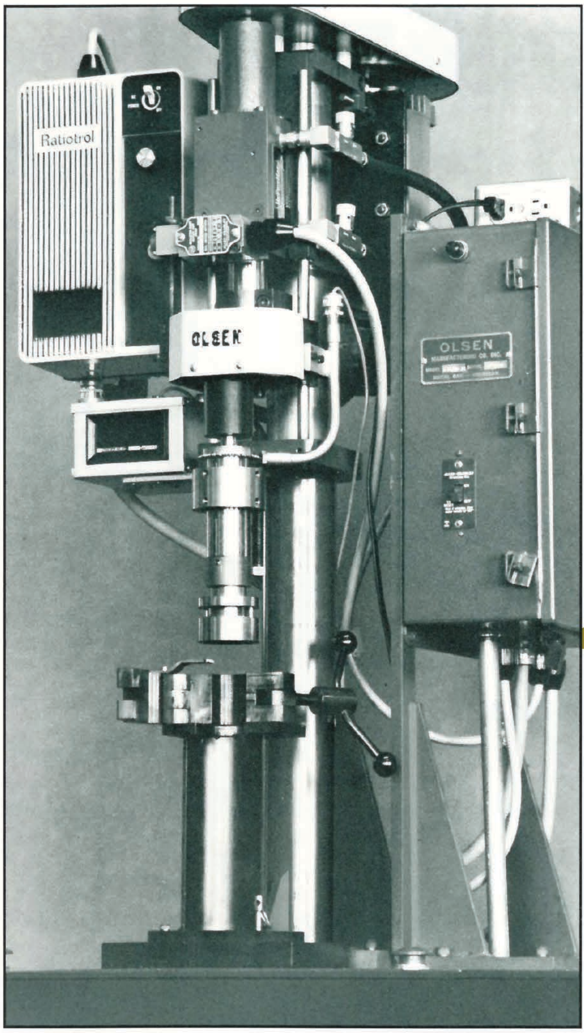


Figure 1:
Shown above is an Olsen Model SPW-1 modified for a specific customer need. This model, like the SPW-2, can be used as a bench mount, hand load unit. It can also be incorporated into automated equipment.

Spinning

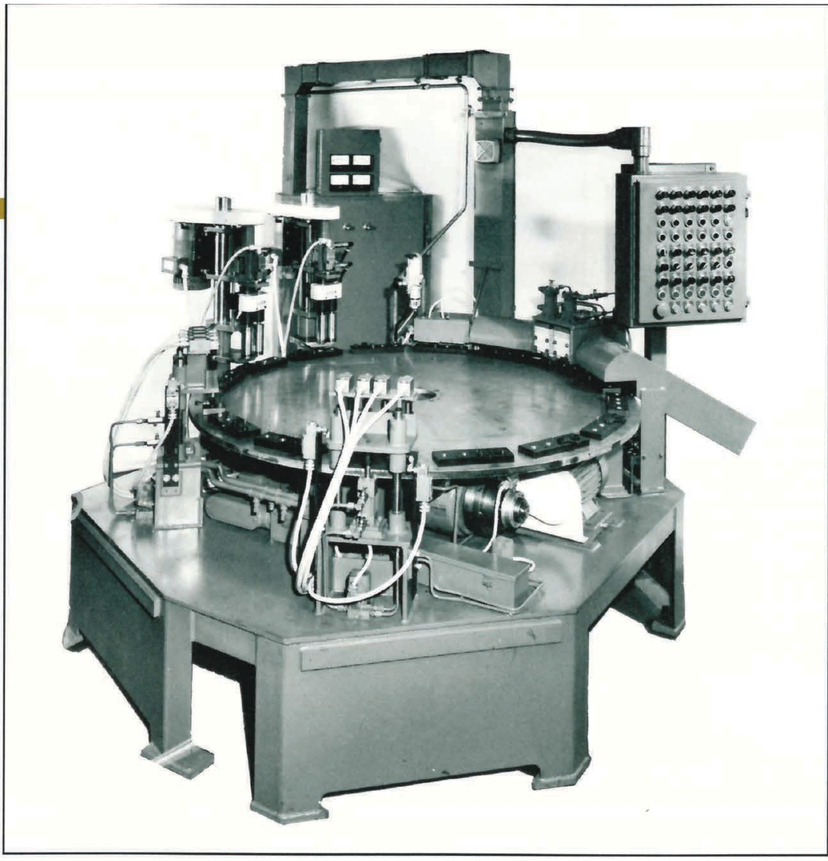


Figure 2:
Model SPW-2. In this unit, two SPW-2 SPIN-HED'S are used in a machine that loads, probes for the presence of a part, simultaneously performs four welds, inspects and unloads the welded assembly.

Olsen engineers and manufactures Specific Part Tooling to be integrated into your spin-weld machine, that will help you make assemblies that are consistent and to your specifications.

Special tooling that will align parts as they are welded, weld them in a vacuum, while pressurized, or filled is available.

Parts feeders and automatic ejection equipment are also often built into Olsen's spin-weld machinery.

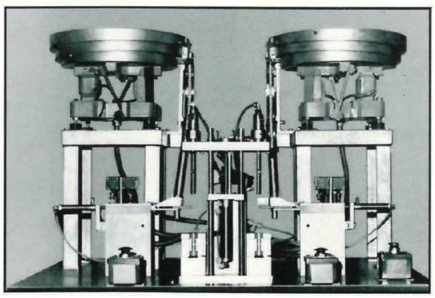


Figure 3:
A semi-automatic, dual head spin welding unit designed by Olsen to fabricate assemblies. The parts to be welded are pre-assembled by specially designed bowl feeders and escapements. Ejection of the welded assemblies is automatic.

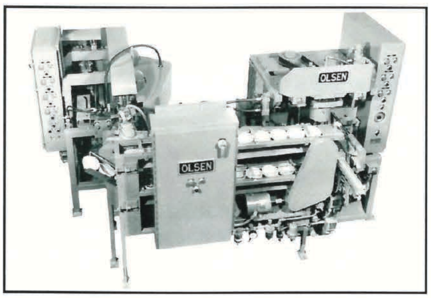


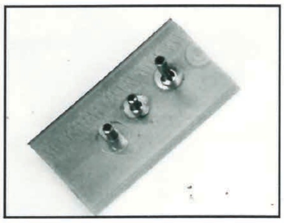
Figure 4:
Olsen has the capability to engineer and build complete automatic assembly systems. Part placement, joint weld, vacuum chamber weld, function test, joint test, inspection identification, part sort are just a few of the operations that have been incorporated in the design of special machines.

Figure 5:
This powerful Olsen spin welder welds parts to withstand extreme conditions and yet remain sound and sealed throughout the product's life.

The Olsen SPIN-HED can weld virtually any thermoplastic part.

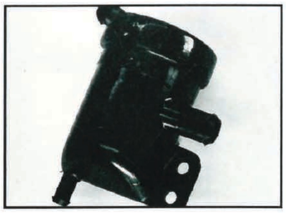
Children's toys, hardware items, shock-resistant sporting goods and many others.

The SPIN-HED can weld large items, as well as small–including this large diameter plastic pipe coupling.



Unusual applications include staking and dowelling. Here, steel studs are welded onto a plastic auto trim.

Many automotive parts, once fabricated from steel components, are now manufactured by spin welding plastic.



Aligning and welding can be accomplished simultaneously, as in this air/oil filter for turbo charged automobile engines.

Parts can be both welded and sealed to form an airtight and watertight joint.

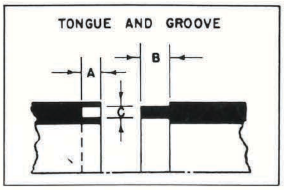
Joint Geometry: A major factor

Joints should provide maximum weld area while minimizing surface velocity differential. Weld area may be increased by using step, tongue-and-groove, or taper joints. The limitation on weld area is usually wall thickness or drag created by the increased surface.

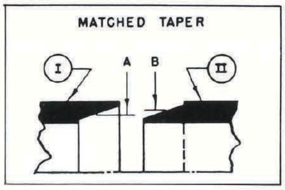
Velocity differential may be decreased by removing the center-most section of the weld area (where surface velocity approaches zero). Weld strength may be improved in small sections even if weld area is not increased to compensate for the center removal. The effect of velocity differential may also be compensated for by crowning the central area so that it melts and disperses first.

Alignment is improved with taper or tongue-and-groove joints. These joints also reduce wobble, which is critical in thin walled sections (e.g. aerosol bottles).

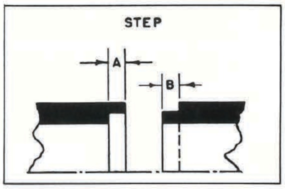
If two compositions of a single material have slightly dissimilar melt points, flash produced in welding them may be directed internally or externally. A tapered joint on a hollow cylinder will usually flash externally and not internally if the male section is of the higher melting material.



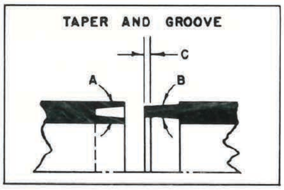
Tongue "B" longer than groove "A". Width "C" large as possible, slip fit between "A" and "B".



Mid point radius "B" greater than mid point radius "A". Sections I and II of different melt points for flash direction.



Slip fit between "A" and "B". Extension of "A" or "B" for initial flash direction. Width of longest step greatest.



Included angle "A" slightly greater than angle "B". Small straight extension "C" on tongue "B". Tongue width large as possible.