Hobson & Motzer; A History Of Excellence.....

Alfred H. Motzer's parents were German immigrants, and his father, who had been a cutler by trade, was an invalid. In Meriden, Connecticut AH's mother supported the family with a little store in the front room of their house where she sold milk, homemade doughnuts, and bread. In season, she also made sauerkraut, which AH's teenaged sister would peddle door-to-door from a hand-drawn wagon.

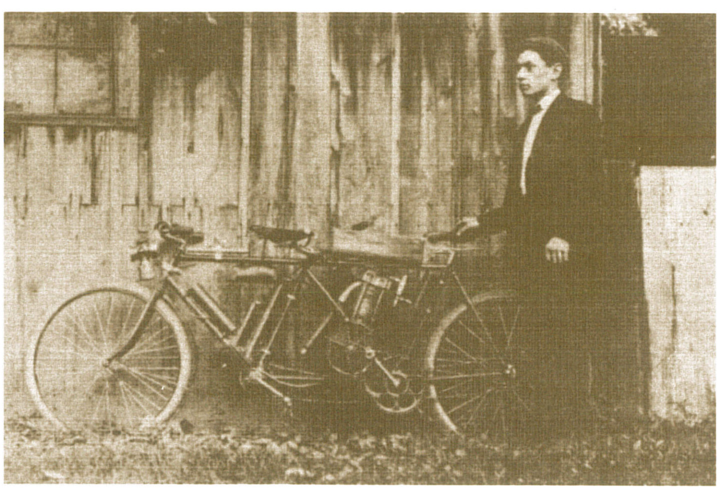
In 1893, a tool and die apprenticeship opportunity opened at International Silver Company in Meriden.

Tool and diemakers, then, as now, were considered the top of the manually skilled workforce. To complete an apprenticeship and qualify to wear the distinctive white apron with the flap micrometer pocket, was as close as most of the working class could get to guaranteed employment and good wages. A tool and die apprenticeship was truly the opportunity of a lifetime. Alfred H. Motzer left the eighth grade and went to work in the shop at International.

Although International Silver Company was considered about the best place anyone could work in Meriden, the work rules would seem intolerable by today's standards. A 60-hour week, 10 hours a day, six days a week, was normal. Premium pay for overtime was a long way off, and coffee breaks were unheard of. When the steam whistle blew at 7:00 a.m. and 1:00 p.m., the workers were at their benches with their aprons on. To insure this, the outer gates were closed five minutes before the hour. Those outside could not enter for that half day, and excessive absenteeism was grounds for dismissal.

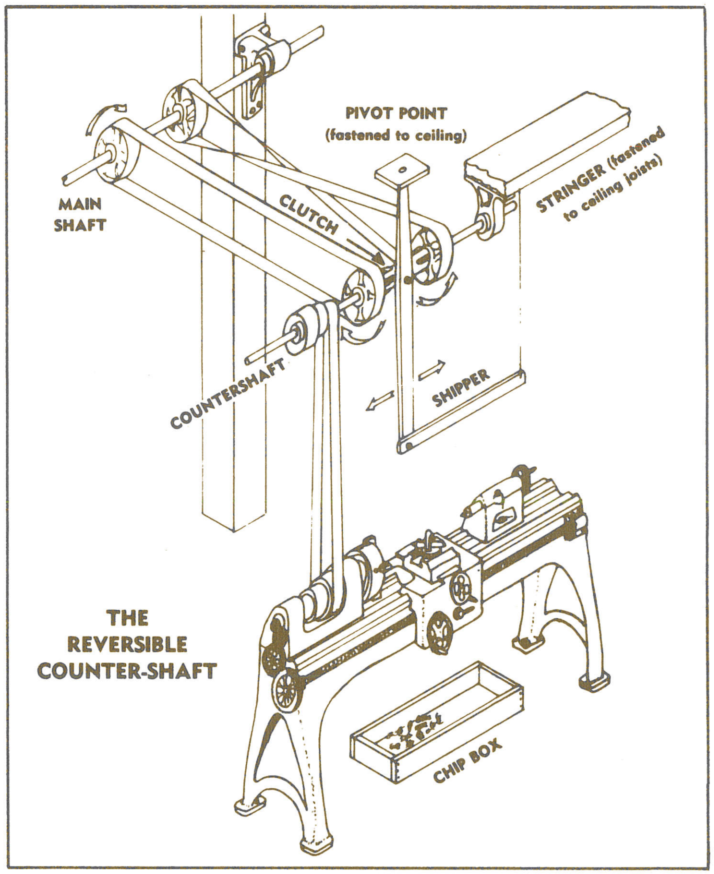
Since riding the electric trolley (recently converted from horse-drawn) to work everyday didn't fit the apprentice's budget, AH usually rode a bicycle or walked. Large companies were made up of many factories located on sites dispersed throughout the city, thus minimizing the working man's transportation problems.

In 1907, International Silver Company became interested in purchasing their first automobile and Steven-Duryea of Chicopee, Massachusetts, was very interested in selling them one. AH never forgot the day the presentation was made by Stevens. A car was driven down from the factory at Chicopee and parked on the lawn outside the main office. The sunlight sparkled on the spotless paint and nickel trim. A chauffeur in a violet uniform was at the wheel, and two pretty models in violet dresses of velvet were in the passenger seats.



Alfred H. Motzer and his twin cylinder motorcycle.

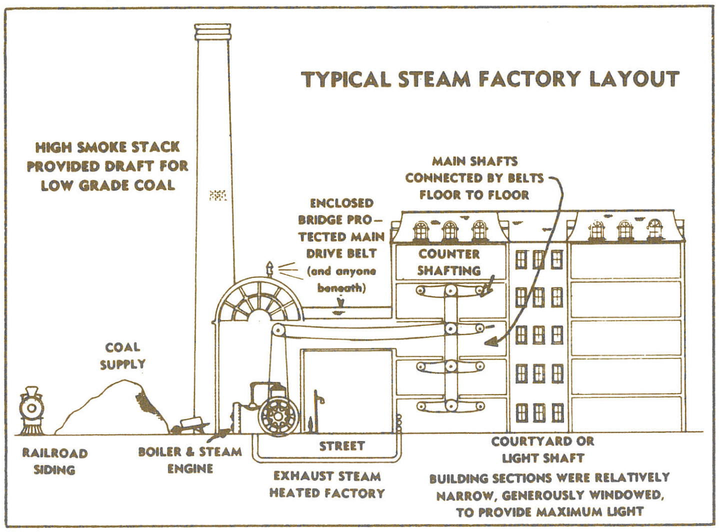
AH's fascination with a new phenomenon, the internal combustion engine, had been growing since the beginning of the new century. He had built the first twin cylinder motorcycle in Connecticut. He also knew and corresponded with another motorcycle enthusiast. Glen Curtiss, who had just started in the motorcycle business and was later to found an airplane company that would evolve into Curtiss-Wright. A.H. Motzer's reputation for coaxing life out of those recalcitrant internal combustion engines made him the natural choice for company driver and mechanic. He received two weeks training at the Stevens-Duryea plant to learn the operation and maintenance of the vehicle.



During the last few years he was to remain at International Silver Company, it was a common occurrence for the big boss to come out to the die room and say, "Allie, hang up your apron and put on your chauffeur suit. We got a big buyer comin' in from the Midwest." Long-range transportation at that time was limited to the railroad, and refrigeration to ice, so the delicious seafood of the coastal areas was not available to Midwesterners. A.H. and the Stevens-Duryea made many trips to Savin Rock, a huge amusement park on the West Haven shore at Wilcox's Pier, which was reputed to be the finest seafood restaurant in the state. AH was always allowed a lobster dinner, which he had to eat in the kitchen.

At International Silver, each machine in the die room, like machines in other departments, was driven by a leather belt from a pulley on a countershaft overhead. Each machine had its own countershaft and it, in turn, was driven by a leather belt from a pulley on the mainshaft which ran the length of the room. If a machine was required to run in both rotations, such as a lathe, another set of belts and pulleys were added and the belts criss-crossed so that the countershaft pulley counter-rotated. A clutch between the two was shifted by means of a descending wooden lever called a "shipper."

Machines that were required to run only in one rotation, such as a drill press, had the operating device right on the machine. This was a shifting lever with a fork that merely slid the belt from an idler pulley over onto a drive pulley. This arrangement could be located directly under a double-width driving pulley on the main shaft. All of the pulleys, bearings, and hangers on the main shaft were made in two halves so that they could be installed or removed without disturbing the shaft.



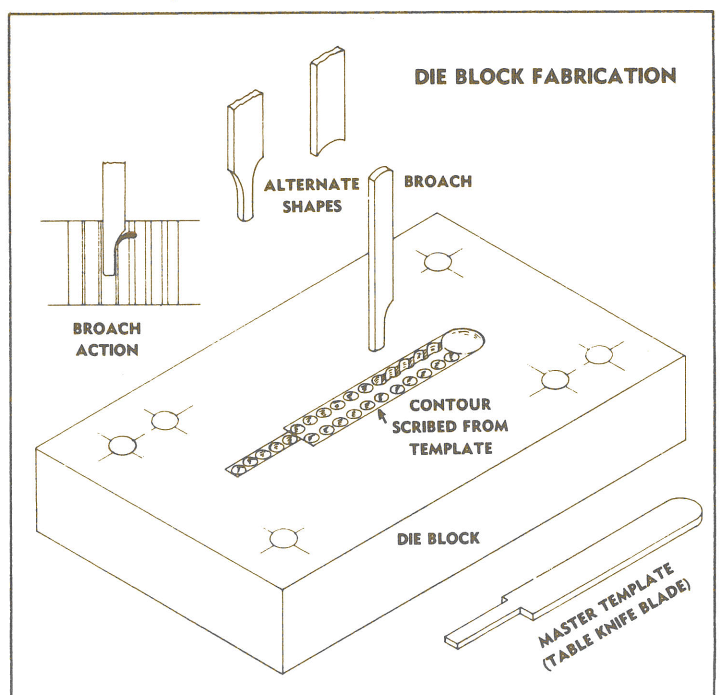
Drive belts passed through the floors and ceiling, connecting the mainshafts on each floor. All of this was driven by a four-foot wide belt which entered the third floor from the building across the street where the steam engine and boiler were housed.

Lathes, shapers, planers, horizontal millers, drill presses and pedestal grinders comprised the basic die room machinery. Dies were built without the aid of vertical millers, band saws, surface grinders, jig borers, or jig grinders. The punches and dies, as well as all of the cutting tools used to make them, were constructed from the same water-hardening carbon steel. Because the cutting edges of the tools began to lose hardness above 400°F, it was essential for the machines to run slowly, and lard oil was always applied generously to the cut to extend the tool life.

By today's standards, the accuracy of assembly and containment was limited, and die blocks were rarely split since they would "breathe" under blanking pressures. The metal-cutting band saw was still in the future, waiting for the development of a blade hard enough to cut tool steel and flexible enough to continuously travel around the band saw wheels. Cutting the blanking hole through a solid die block was accomplished by drilling a row of nearly tangent holes around the inside of the pattern, removing most of the remaining web with a hand broach and hammer, and finally driving out the slug. Removal of the resulting scallops and final fitting to a master template, was done with chisels and files. The dropout clearance in modern dies cut by wire discharge or grinding is ¼° or about .004" per inch. This would have been inadequate for filed dies and they were usually cut to 1° or 1-½°. Although there was always a straight portion for about 1/8", the die opening quickly became larger as the die was sharpened. Consequently, the die maker was expected to make the die opening to the small side of the part tolerances. The die block was then brought to the blacksmith shop to be hardened and tempered. The blacksmith shop was important in the diemaking process. The typical piercing or blanking punch had a generous flange at its base for screw and dowel holes as well as stability. Such skirted punches were impractical to machine from a solid block because of the slow machining speeds and wasted material, the diemaker would present the blacksmith, a cantankerous man whose fur was easily rubbed the wrong way, with a sketch of the desired shape. If the smitty didn't like the diemaker (and he often did not), he didn't take kindly to advice. If an unfavored diemaker indicated how he wanted it done, the smith would say, "Ther-r-re's the taungs 'n ther-r-e's the farge, do it yerself!" The old smith at International Silver took a liking to young AH and forged his punches surprisingly close to his requirements, leaving little material for AH to file away. The less fortunate would generally find they had to remove a generous amount of material with a hammer and chisel before they could begin to file.

While AH had great admiration for the smith's ability to forge a shape, he was less impressed with the smith's heat-treating abilities. Sometimes the annealed forging was so hard he could barely get a file to bite into it. However, he knew better than to return it to the smith with any criticism. The first step in fitting the punch to the hardened die was to transfer the shape of the die opening to the face of the punch. This was usually done by painting the punch face with blue vitriol (copper sulfate) in an acid solution that turned the steel a copper color and provided contrast for scribed lines. The rough forged punch was clamped against the face of the die opening so the die opening could be traced onto the punch by careful scribing.

Occasionally the die was too thick and the opening too



small to use the scribing method. In this case, the punch face was tinned with soft solder and the punch was forced against the die opening. This process embossed the die outline into the soft solder.

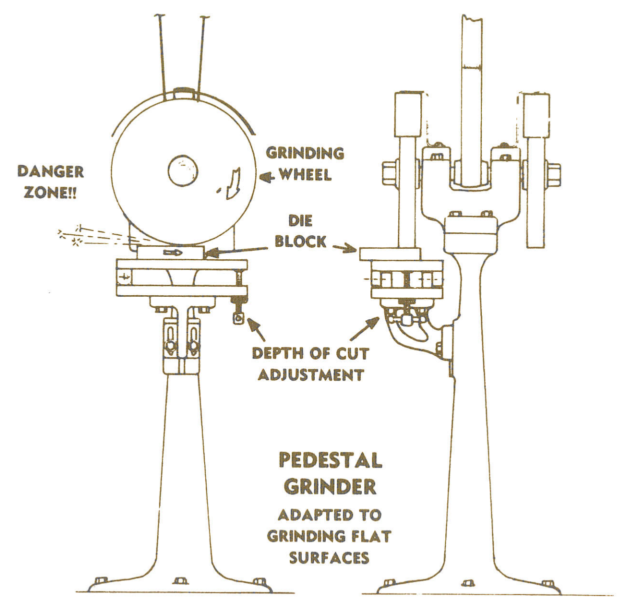
Areas having too much material to file were cut away with hammer and chisel, and the punch was filed to the line. It should be mentioned at this point that precisely shaped and sharpened chisels, together with properly shaped and balanced hammer, in the hands of a craftsman are something to behold and should not be confused with a garage mechanic's chopping off a bolt on your exhaust system. Keeping the filed surface perpendicular to the punch face was difficult because the skirt limited the file stroke and bearing. When the punch was within a few thousandths (.001s) of entering the die opening, a slight lead was filed on the edge of the soft punch allowing it to be forced into the hardened die in a screw press. This was called "shearing in." The shear marks were removed with files until the punch could be inserted by hand. Then, using a fine file, the clearance required for the particular material to be punched was filed on all punch surfaces. This was commonly measured by inserting the punch into the die opening and sighting through from the bottom against a good light. A good light was considered northern daylight, and the diemakers' benches were located along the north wall of the plant. Sometimes the clearance between punch and die was a judgment call, and other times it could be checked by shims.

After soft fitting, the punch was brought to the blacksmith for hardening. It was put into the coal fire of the forge, and when the steel reached the critical temperature, it conveniently lost its magnetic properties. So as the steel turned cherry red the smith would repeatedly test it with a rocker bar magnet pivoted on the end of a brass rod. When the magnet no longer responded, he removed the punch and quenched it in a tank of water. AH recalled that the smith hod a panache for this quenching operation, which ended by screwing the part into the water, and AH claimed that everything the smith ever heat treated had a resultant twist in it.

After hardening, the brittle punch was immediately tempered. This required raising its temperature very slowly to insure uniform temperature to the core. As a carbon steel passes through the 400° range, it loses increments of hardness as it gains increments of toughness. It also exhibits a color change from light straw to blue. The diamond penetration system of hardness measurement was not to appear on the scene for a long time and so, as the smith determined that he had achieved maximum hardness after the initial quenching by his inability to mark the surface with a file, he drew the steel to the color that best compromised its hardness/toughness ratio to suit its application. Although quenching after tempering is not necessary, it was the only assurance he had that, after removing the part from the fire, critical areas of the part would not overheat conductively from hotter areas.

Jessop water-hardening, the steel that was used for all tools, cutting tools, dies and punches alike, was not known for its non-deforming qualities. So when the punch came back to the die room, it was no surprise to the diemaker that it no longer fit into the die opening. And so it was attacked with honing stones and re-fitted with occasional necessary compromises.

The limitation of the die maker in creating a filed surface in the die and its subsequent distortion of heat-treating determined the accuracy of the blanked part, and his ability to fit the hardened punch with the proper punch/die clearance determined the quality of the cut edge of the part. Of course, dies and punches had to be sharpened by grinding them on their faces. However they had no surface grinders as we know them, and no account of this period of die making would be complete without a description of how they did it.



PEDESTAL GRINDER

ADAPTED TO GRINDING FLAT SURFACES

The pedestal grinder was the forerunner of the present off-hand bench grinder. It consisted of a horizontal spindle at waist level, supported by a heavy cast-iron post with a large flange at the base that was lagged to the wooden floor. The spindle, which usually swung a pair of 14" or 16" coarse and fine "emery wheels," was driven from an overhead belt. In this manner, it was normally used in an off-hand fashion for sharpening drills and cutters. The surface grinding attachment consisted of an iron or steel plate below the six o'clock position of the wheel. The plate was supported by a bracket that was bolted to the pedestal. The rear edge of the plate was hinged, and the front edge was adjusted up or down with an elevating screw. The diemaker placed his work on the plate and slid it under the wheels by hand! AH recalled that diemakers always made certain that no one was standing in the line of fire, since occasionally the wheel would grab the work and send it across the die room in the form of a lethal projectile.

During his years at International Silver, AH accumulated a few items of used machinery that he kept in a carriage barn. His shafting was driven by a small stationary gasoline engine. With this equipment, he was able to take small machining jobs he did at night or on Sundays. In 1909, at age 23, he decided to take the plunge and start on his own full time. When the old smith learned that AH was leaving, he reminded him that he couldn't make tools and dies without a blacksmith. AH should get a forge, the smith counseled and he, the blacksmith, would forge his tools on nights and Sundays. AH was flattered.

He invited another die maker, Harold C. Hobson, to join

Patsy O'Connell's Barn

him. Hobson was married and concerned that he might not be able to earn a living. They agreed that if the venture took hold, Hobson would join him. The large local companies, such as International Silver Company, The Charles Parker Company, and Bradley and Hubbard, were self-sufficient and did not subcontract any work. However, there were others who had printing presses, gasoline engines, etc., whose broken parts had to be replaced or repaired. Work was scarce and AH never refused a job if he could possibly do it. He recalled dismantling a stationary gasoline engine, making a part for it and getting it running again. It was mid-winter, the engine was in a field and he had to shovel the snow away to work on it. For this job he was paid 50 cents.

By 1912, the business seemed secure, and Hobson left International Silver Company to form Hobson & Motzer, a partnership that was to last all of his working life. The new partners rented Patsy O'Connell's barn on North Avenue in Meriden and nailed up their sign.

By that time, AH had designed and built a large engine capable of running more machinery. Off-the-shelf engine parts were non-existent so wooden patterns were made and the iron parts were cast. The piston rings were machined from a tubular casting, turned on the inside and outside diameters, cut off and split.

A notable point about the installation of this engine was the muffler. The exhaust was piped through the wall of the building into a deep hole that AH had filled with stones. He recalled that this was so effective that it could hardly be determined whether or not the engine was running. The engine, long retired, is still in existence.

Circa 1918 • Hobson In Doorway
Motzer In Shop Coat In Front Of Hobson

The first significant subcontract from a large company came just before World War I, when they made gauges for Martin Fire Arms. Although the complement of machinery had increased only modestly, they were able to increase the employment temporarily to 28 people, most of whom were doing hand lapping or other bench work.

During these early years, high-speed steel appeared on the metal-working scene and, looking back, AH regarded this as the greatest technological advance in his entire career. Machining speeds increased dramatically, and it became practical to cut parts from solid tool steel bars, negating the need for the blacksmith's forgings.

In the early twenties, a young lad named Carl Schott served his apprenticeship under AH. Carl later went to G & O Manufacturing Company in New Haven where he eventually became plant manager. Knowing Hobson & Motzer from the inside, he thought very highly of the firm and often described AH as the most clever tool and diemaker he had ever known. He and AH worked out the design and building of much special machinery for making auto radiator air fins and water tubes. The relationship between Hobson & Motzer and G & 0 Manufacturing has endured to the present, even though the original parties are long gone.

The Depression began in 1929 and worsened until 1933. AH said that he and Hobson spent the days looking at each other and swatting flies. I asked why they didn't recondition some of the machinery, and he explained that they couldn't afford to run the motor, and didn't know what day they would have to call the junkman to haul the equipment away. Occasionally, some company would have a major breakdown, and they could get a repair job if they worked through the night.

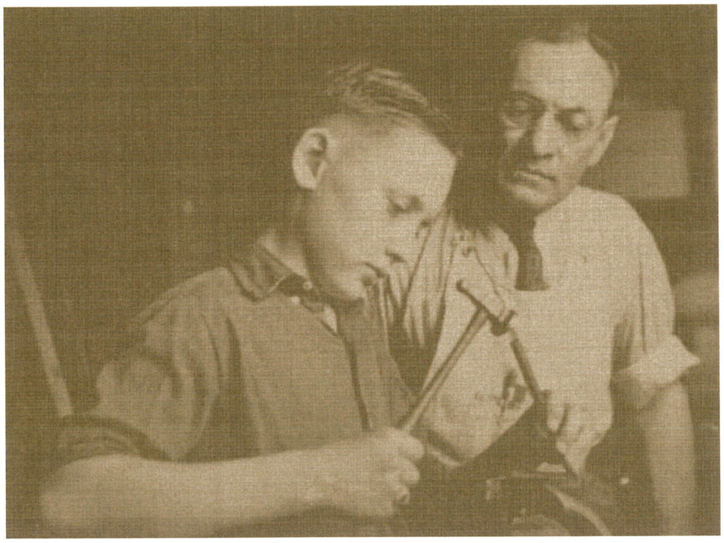
In 1935, they moved Hobson & Motzer to the Monroe Building at West Main and Capitol Avenue. The gasoline engine had been replaced by a seven horsepower electric motor mounted overhead. In those days, a motor of that

Alfred H. Motzer - Circa 1938

horsepower was larger than a half keg of beer.

Mr. Church, of Church and Morse, where they bought their mill supplies, told AH he could have anything they had in stock and pay for it when they got back on their feet. AH never forgot that, and Church and Morse remained a favored source throughout his administration and mine.

By 1934, AH and Harry Hobson were able to hang up their fly swatters, somehow having survived the Great Depression. The shop was within a few blocks of Lincoln Junior High School, and very handy for a thirteen-year-old boy to visit after school to begin to learn the trade. I still remember my delight and fascination when my father set a toolbit in a small Hardinge bench lathe, gave me a rod of cold drawn steel, and let me convert it to chips.



Alfred E. Motzer And Alfred H. Motzer - Circa 1938

Other than one motorized power hack-saw, all of the machinery was still driven from overhead shafting. The two shapers and a small planer seemed continuously busy. We didn't have ground flat stock in large sizes, so all of the blocks were machined from hot-rolled tool steel bars on the small planer and two shapers. The machines had automatic cross feeds so, on larger work, one could set the cut and go do something else while the toolbit crept its way across. However, there was no automatic stop for the feed so if one's attention was otherwise occupied, the shaper would threaten self-destruction while it tried to push its vise and table off onto the floor. I used to put a tin can on the ways that would get pushed off and provide an audible alarm.

Jig borers came along in the thirties, although few companies owned one. Hole patterns having critical location tolerances were either subcontracted to a jig boring source or bored the old way, to wit; "jig buttons." The buttons were merely bushings, about 3/8" diameter x 3/8" long, that were accurately ground with identical diameters and square ends. The desired hole pattern was laid out with a combination square and scriber. At each location, a hole was drilled and tapped, and a button screwed on. Then, with the aid of a surface plate and a vernier height gauge, each button was lightly tapped into the required location. This done, the work was mounted on a lathe face plate and each button was trued, removed, and the hole bored in place.

I graduated from high school in 1943; I had just turned seventeen and went to work full-time. Arriving shortly after me was a Mod ML (½ HP) Bridgeport vertical miller. It was the first new machine that I had ever seen, and like a new car, it had a nice smell. Although we had mounted a Bridgeport head on an old Brown & Sharpe miller and had tasted the advantages of vertical milling, this new machine was to be our jig borer. The jig borer kit consisted of a set of end measures, X and Y table troughs to hold them, and a dial indicator for both coordinates. I became the exclusive operator of this marvelous piece of equipment and had every confidence in its absolute accuracy. Within a few months, I was a qualified authority on why a Bridgeport wasn't a jig borer and never would be.

Alfred H. Motzer, Left, And H. Hobson - Circa 1938

World War II was on the front burner and shortly Hobson & Motzer was deprived of my talents, which were volunteered to the U.S. Army Air Corps (an event that, somehow, did not prevent our winning the war). It was during this time that Hobson's health failed and AH was faced with either selling the business or buying Hobson's share and getting me back as soon as possible. The decision became mine—college or the shop. I came home to start tool and diemaking in earnest, and stuff what college I could get into the evenings.

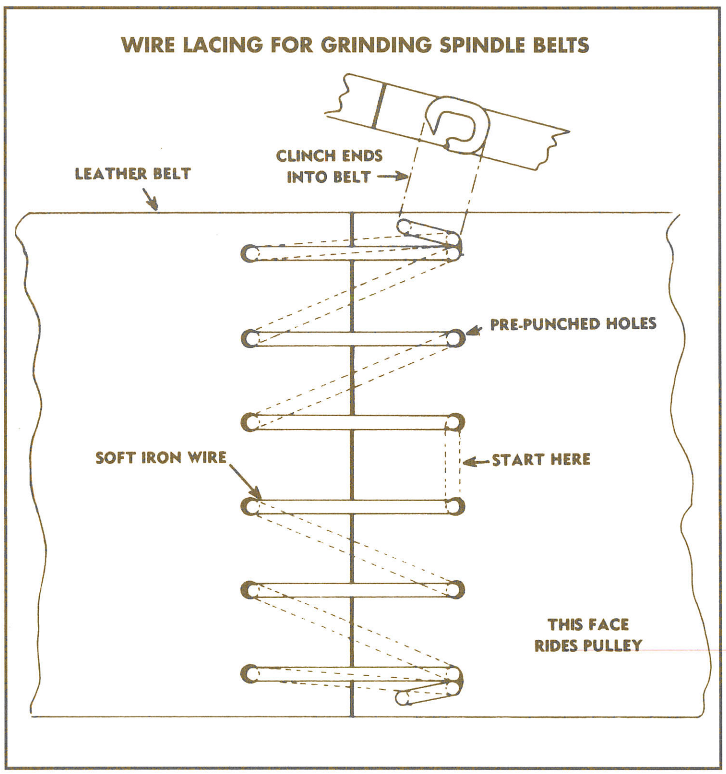
Naturally, being the boss's son, I received special treatment. On one occasion, I had just finished a small pierce and blank die, which up to that time was the pinnacle of my achievements. I had polished the stripper, neatly rounded all offending corners, and the breakline on the blank showed a perfect fit between the punch and die. I presented it proudly to AH. He opened the die set and examined each half carefully. He slipped on his jeweler's eye loop and inspected the blank. Then he measured it with his micrometer. "That's alright," he said, "I've got another job for you!" I said, "Wait

New Plant 1948 • Alfred E. Motzer, Second From Left - Alfred H. Motzer, Third From Left

a minute, I think I did a good job on that die." "That's what you're getting paid for, he said. "Anything less than that is barely acceptable."

By 1948, I was the unofficial foreman and my take-home pay was $41.00 a week, shamefully low even for that time. From this, I had to pay my father $12.00 a week for room and board. I passed out paychecks while he was on vacation and learned that I was the lowest paid employee. When he returned, I told him that it was about time he paid me what I was worth. "I'd like to, m'boy," he said, "but I don't think you could get along on it."

Since 1940, we had been located on the second floor of a factory loft building at 555 Center St. in Meriden. However, Connecticut Telephone and Electric bought the building and we had to move again. We built a 40' x 80' building on the present North Colony Road site in Wallingford. The machinery, with few exceptions, was still driven by overhead belts, and we put up a line shaft that ran almost the full length of the building. This required "mill construction," typical of older factories, with beams and joists capable of withstanding the forces generated by the shafting. Eight feet was the limit that the shafting could run without a bearing, so the building was framed with posts that supported the bearing hangers on eight-foot centers.

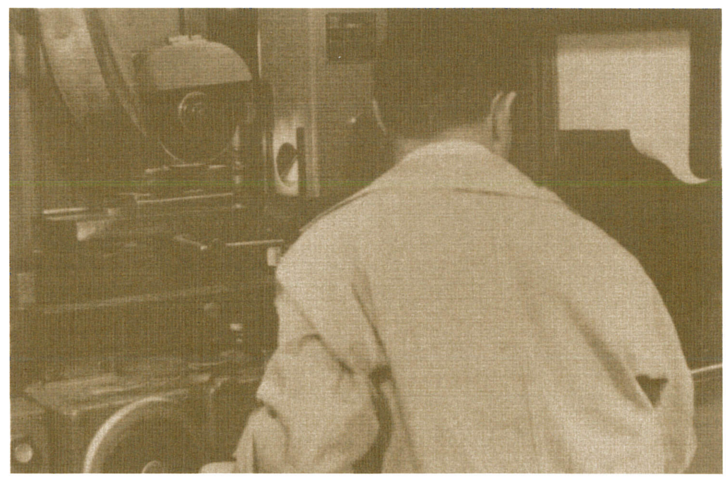


Leather belting was stocked by the roll in various widths. For normal applications, it was joined by a "clipper" lacing that was quick and strong. However, this type of lacing made a slight bump when it passed over the spindle pulley, and this was unacceptable for driving a grinding spindle because it would cause marks on the workpiece. An application of this type required glueing the joint or sewing it with soft iron wire. There was a definite pattern for sewing so that the wire would never cross itself. Crossing wires gradually abraded each other until the joint failed.

At wash-up time every noon and evening, someone would shout, "All off!" This meant to throw your "shipper" to disengage the countershaft on your machine, thus removing the load for re-starting the motor. A reply of "Finish cut!" meant "don't throw the switch now or you'll ruin my work." Someone would generally add that "you can't make up for lost time now!" Over the next eight or ten years, the main shaft came down, eight feet at a time, and the machinery was replaced by individually powered equipment, occasionally new but mostly used.

In the mid-fifties, I made an observation that became a turning point for the company. Like most "job shops " we were existing mostly on overflow from customers who had in-house capability. In a quiet economy, much of the subcontracting dried up. Most of our competitors had no internal cost information and frequently won orders for unrealistic prices. I determined that we must develop capabilities that were above and beyond, that we would begin the pursuit of excellence. The overhead driven equipment had mostly been replaced with updated, motorized used machinery; now it would be replaced with new.

I ordered our first Visual Grinder, a machine embodying the marriage of a surface grinder and an optical comparator. We began building replaceable section tooling with total dimensional control from the drafting board. For the first six months, it appeared that I had made an expensive mistake, but ultimately, we began to smooth out the process. As optically formed ground parts became the core of our diemaking technique, the die room machinery and measuring equipment were gradually replaced with the best quality available.

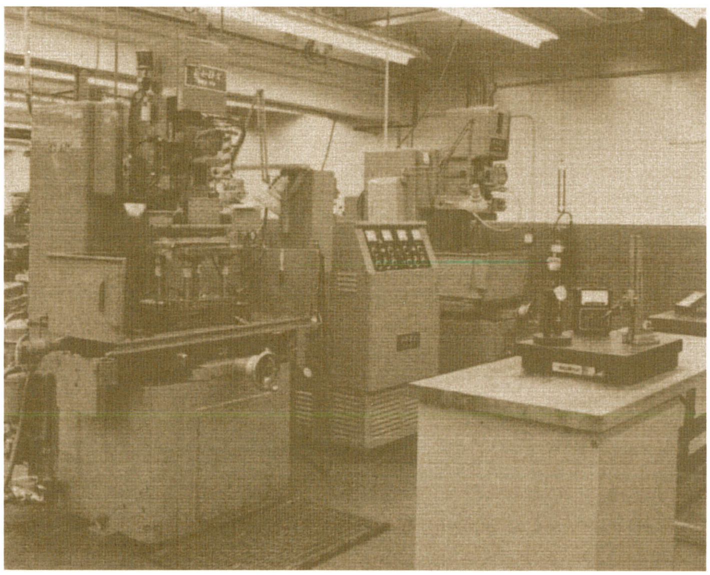


Visual Grinder

During the next decade, the most critical ingredient was the employees. The new approach to die building required teamwork. Previously, each die was built completely by one individual. Some individuals refused to have anyone else involved in their project. There were those who would respond to the slightest suggestion or criticism by a reminder that "the handle is UP on my toolbox," meaning that they were ready to take it and themselves out the door instantly. Most of the employees gradually accepted the transformation, while a few picked up the handle. The system required intelligent, cooperative people who would work together toward a common goal. Hobson & Motzer was no longer a home for the prima donna.

Meanwhile, one of our top diemakers had to become the director of the tool and die program at the H.C. Wilcox Regional Vocational Technical School. He was fascinated with the direction we had taken and recognized it as the diemaking of the future. He tried to place at least one of his top graduates with us each year. Over the years, this connection with the technical school combined with a growing "esprit de corps" at Hobson & Motzer enabled us to attract people who were not only talented but who were also enthusiastic about what we were doing and their part in it.

At the same time, a new machining process was emerging that would eventually make the most dramatic change in the history of diemaking. This was the zero-force, spark erosion phenomenon. Electrical Discharge Machining. Despite the claims, the early machines were unable to produce quality work in a reasonable time. It was about ten years before they could perform the feats claimed by their manufacturers. I ordered an Elox and went off to the factory school in Detroit to learn all I could about the machine and the process. When we received delivery, I became the operator for the first six months. Back in those days, "drilling" a hole through a file at 45° with a brass tube bordered on the sleight-of-hand, but the challenge was integrating this new capability with our expertise in form grinding. We could grind very precise electrodes, and shortly, were able to wring the last drop of precision from the EDM machine.

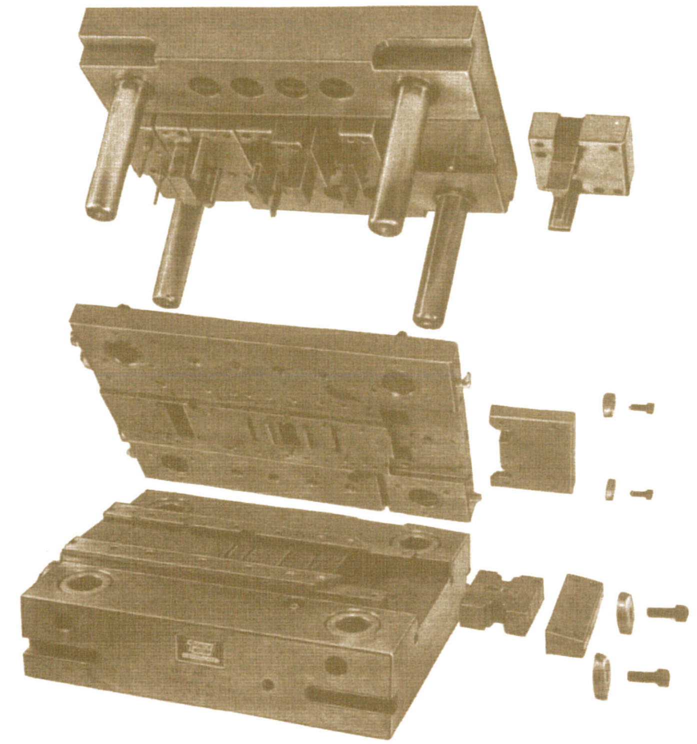


Early EDM Machine

As medium-carbon tool steels had given way to high carbon-high chrome and its various alloys, so did the latter, in turn, resign to tungsten carbide for high production applications. Although the material and machining costs were higher, the stamping performance increased ten-fold. As our library of diamond grinding wheels increased and more electrical discharge equipment was added, machining this material in its extremely hard state became everyday fare.

Our die construction now embodied split-ground tungsten carbide sections retained in relatively massive Meehanite die sets. The punches were solid carbide. We were designing and building for ultra-high production applications. Our philosophy was simple—only the best we could build was good enough. Cost-saving quality compromises were out the question.

Our entry into the stamping business was quite sudden and unexpected. One of our customers had serious problems in trying to produce parts internally, closing down a production line. Since we had built many of their dies, we were called upon to help. After a successful trial period of running the troublesome part in our plant, they closed down their pressroom, sold us their presses, and shipped us the dies. It

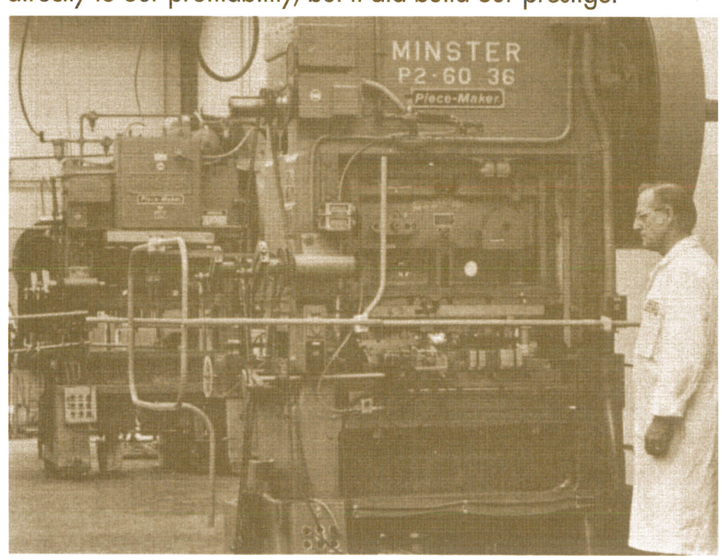


REPLACEABLE SECTION TOOLING

was the birth of a new department whose sales volume would eventually rival that of our progressive die building operation.

Although the parts we produced were small, they were complex. The design of the dies, and the many stations of progression, created relatively long dies with low force perforations on one end and high force forming on the other. The "C" frame presses allowed racking at the bottom of the stroke since the punch-holding areas frequently overhung the ram. We began buying straight-sided, double crank Minsters.

Over the years, we designed, tooled and produced some seemingly impossible parts. Occasionally engineering and purchasing people would visit our plant with suspicion and concern because we were the only company who thought their part could be made complete in a progressive die. Conquering these technical challenges didn't always contribute directly to our profitability, but it did build our prestige.

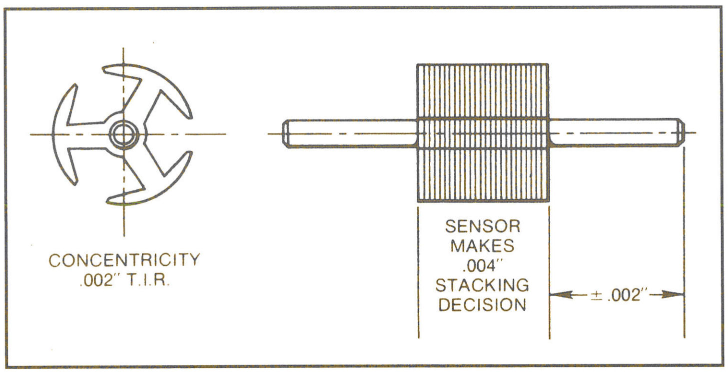


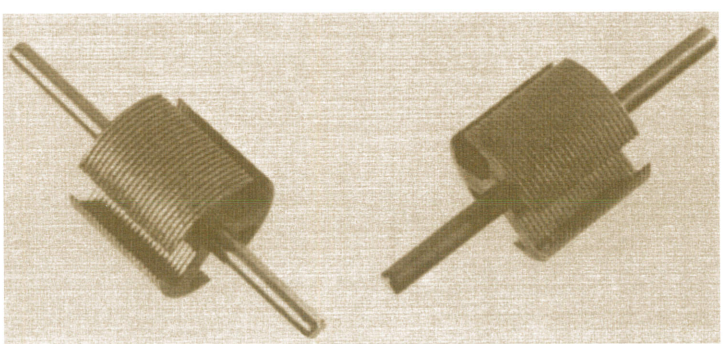
New Press Room In Wallingford - Circa 1973

An example of such a program was producing a rotor for a small DC motor to be manufactured by North American Philips. It would be touted in the trade journals as a state-of-the-art accomplishment. Because of the unusual performance requirements for the little motor, the tolerances had to be held comparatively tight. The rotor consisted of measured stacks of laminations mounted precisely on a ground shaft. Depending on the material thickness tolerance range, the number of laminations varied between 23 and 27. The volume would be high and they were looking for someone to make it for less than five cents. It was flattering that they approached Hobson & Motzer on the basis of recommendations from one of our competitors. He told them that for the conceptual engineering and accuracy required of the project, we were the only people he knew who could handle it. Our reputation was growing, and this scenario was to repeat several times.

We built a carbide progressive die and a belt of recirculating chucks mounted on a roller chain. The die blanked four laminations each stroke and stacked them on four chucks. When a sensor determined that the stack height was correct, the chain advanced. It first passed under an assembly station where a shaft was hydraulically pressed into each stack, and finally under a rectifying station where the shaft extension from the stack was qualified to a .002" tolerance requirement.

We had been in production for about a month when our

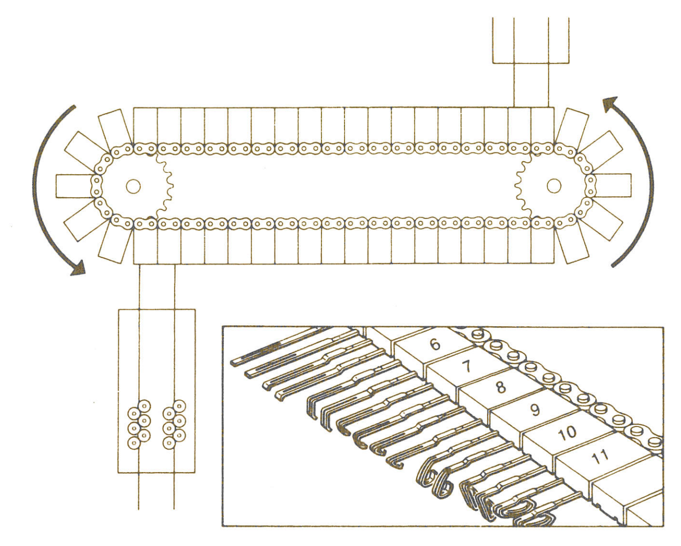




North American Philips Rotor

customer finally told us that the little motor was the drive for the Polaroid SX-70, a project that had been a closely guarded industrial secret. The rotor manufacturing mechanism was fascinating to watch because of the difference between the tempo of the press strokes, and the assembly belt, with four completed rotors tumbling out about every twenty-five strokes, or about twenty-four assemblies per minute. One observer from an electric shaver company said that he had visited every major D.C. motor manufacturer in Japan and had never seen any rotor process as sophisticated. Further, he said, if his company could have made rotors as efficiently, they might still be making their own motors instead of buying them from Japan. Never the less, after a few years, the Japanese appeared on the scene with a nearly exact copy of the North American Philips motors with a lower price, and the job went to Japan.

Our most outstanding effort and the one that was rewarded with the longest production run began with a visit to Winchester Electronics on another matter. Their people casually showed me a bellows type, wire-wrap contact that they were buying from wire-form companies on the West Coast. They



RECIRCULATING CHAIN DRIVEN FIXTURES

explained to me that they could not find a supplier in the East that could even approach holding all of the tolerances required. Too bad we didn't have multislide equipment, they said, because they were buying a half-million a week at $4.57 per thousand. I told them we were interested in looking at it. On the drive back from Winchester, I decided we certainly would not make a part in this volume one-at-a-time in a multislide machine. We would have to tool this so that parts would come out like rain. By the time I arrived at Wallingford, I envisioned a large progressive die with a belt of recirculating chain-driven fixtures, being fed with cutoff wire blanks, indexing in precise progression, making four of the contacts at once.

Excitedly, I discussed the concept with Henry Zollinger, our General Manager at that time. He enthusiastically endorsed the idea, recalling that he had considered using a similar concept in the past on another job. I went home and settled in at the drafting board. During the design phase, I tried to imagine every possible pitfall and build in alternatives. The drawings showed several "JIC" symbols, my personal notations for "just in case." Henry and I spent many hours working on the design. We budgeted $50,000 to build it and offered Winchester contacts at $3.57 per thousand, an even dollar lower than market. Anxious for the $25,000 per year saving, and to show their good faith, Winchester gave us an order for five million contacts.

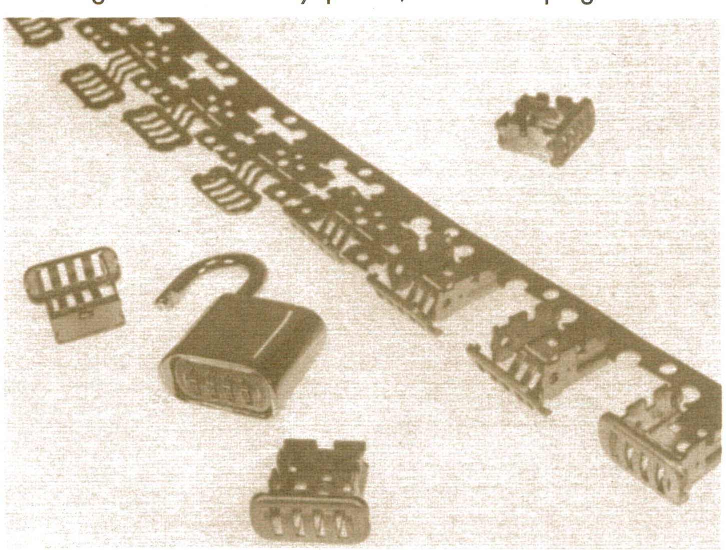
Building the tool was one thing, but getting it to run acceptable parts was quite another. The costs had well exceeded $100,000 when I began to wonder if I have created a tool that couldn't run. A one-in-a-million chance of failure on each of the hundreds of functioning parts meant that the tool wouldn't run much more than an hour. The components had to be perfect. As the cost nudged $150,000, we made it so. Adorned with 28 electrical safety interlocks, nestled in a 60-ton, straight-sided, double-crank Minster press, and protected with a couple of patents, the die came on line. it was the most intricate progressive die that any who observed it had ever seen. It ran for several years, at one point cresting at two million contacts per week. The savings to Winchester were phenomenal,and after amortizing the cost, it was for a time the most profitable job in our pressroom.

The sophistication of our design and building capabilities had caught the attention of the Minster Press Company, and they recommended us to The Stanley Works. Stanley people came to us for a turn-key operation to make "Surform" blades. The blades were being made in Sheffield, England, by relatively primitive methods, and Stanley wanted a first-class package that would produce better blades much faster. At that time, the delivery on Minster presses was running about two years. The tooling was ready long before. We installed it in one of our Minsters. The tooling was an impressive success, and Stanley executives from Australia, France, and England as well as from New Britain, came in to watch it stamping out blades by the mile, attended by only its black box and blinking lights. We made blades for about a year before the Stanley press was delivered and the production was moved to New Britain. It was while the job was at our plant that I worked with Frank Dworak, an engineer with The Stanley Works.

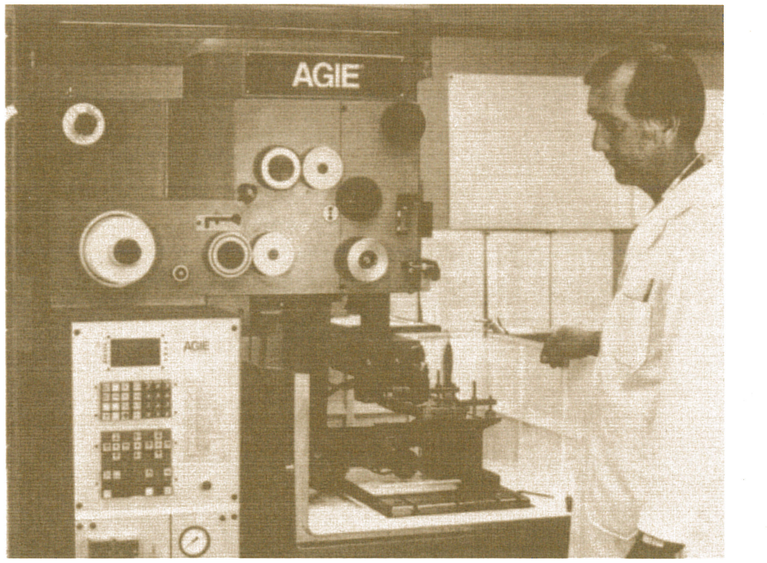
I was impressed with Frank. He had served a tool and die apprenticeship, worked "on the bench," and had a masters degree in engineering and industrial administration from Renssalaer, a striking combination of experience and education. I judged him as intelligent, ambitious and most important of all, honest. I saw in him a professionalism that could lead Hobson & Motzer into a successful future.

Phil Gumprecht, manager of the die room, and George Mahoney, manager of the press room, had been with me virtually since technical school. They were capable, loyal, and dedicated. All three were interested in the possibility of eventually owning the company. With this goal in mind, Frank joined Hobson & Motzer and, after a few years of a "small company" apprenticeship, began taking over management responsibilities.

During one recessionary period, when stamping orders for



Emhart Lock Frame



Wire EDM Machine

new parts were in the doldrums, Frank visited Emhart. He learned that they were making the frame for their premium combination lock in five operations: stamping two parts, brazing the assembly, wire brushing to clean up the brazed area, and counterboring one hole. The assembly was expensive, and the brazing operation introduced distortion that rendered many of the frames unusable.

Working with his contacts, Frank Russo and Nick Russo, Emhart's product design engineers, as well as Hobson & Motzer's die design people, Frank was able to make a proposal for manufacturing a redesigned lock frame in a progressive die complete in one operation. This would drastically reduce the cost and virtually eliminate rejects. The program was an outstanding success. The new lock frame made the cover of **Metal Stamping Magazine,** and Hobson & Motzer walked off with first place in the Higgins Design Award national competition. Frank donated the $1,000 prize to H.C. Wilcox Regional Vocational Technical School.

It was apparent to me that we had a viable team. Finally, on April 1, 1985, the sale was consummated and Frank, Phil, and George became the new owners.

There have been many changes since Frank took over the day-to-day management, changes that have left me feeling part of a passing generation. The computers are now on center stage, not only doing office tasks and producing financial data, but also guiding sophisticated machinery. The contours that were so carefully filed to .002" tolerance, and were never really straight and true, are now generated with extraordinary accuracy by an electronic band saw called a Wire Electrical Discharge Machine. At the end of my career, this machine marks another milestone; this one, in my opinion, the most significant advance in the history of diemaking.

Of course, the equipment is available to anyone with the financial capability to pay for it. The thing that sets Hobson & Motzer apart most of all is the people. It has taken many years to assemble the talent that is represented here, and this is the company's real strength. Frank, Phil, and George guide this elite force into the future, where their established goal is not merely to survive, but to excel. I am truly proud of all the Hobson & Motzer people, and wish them Godspeed in their pursuit of excellence.