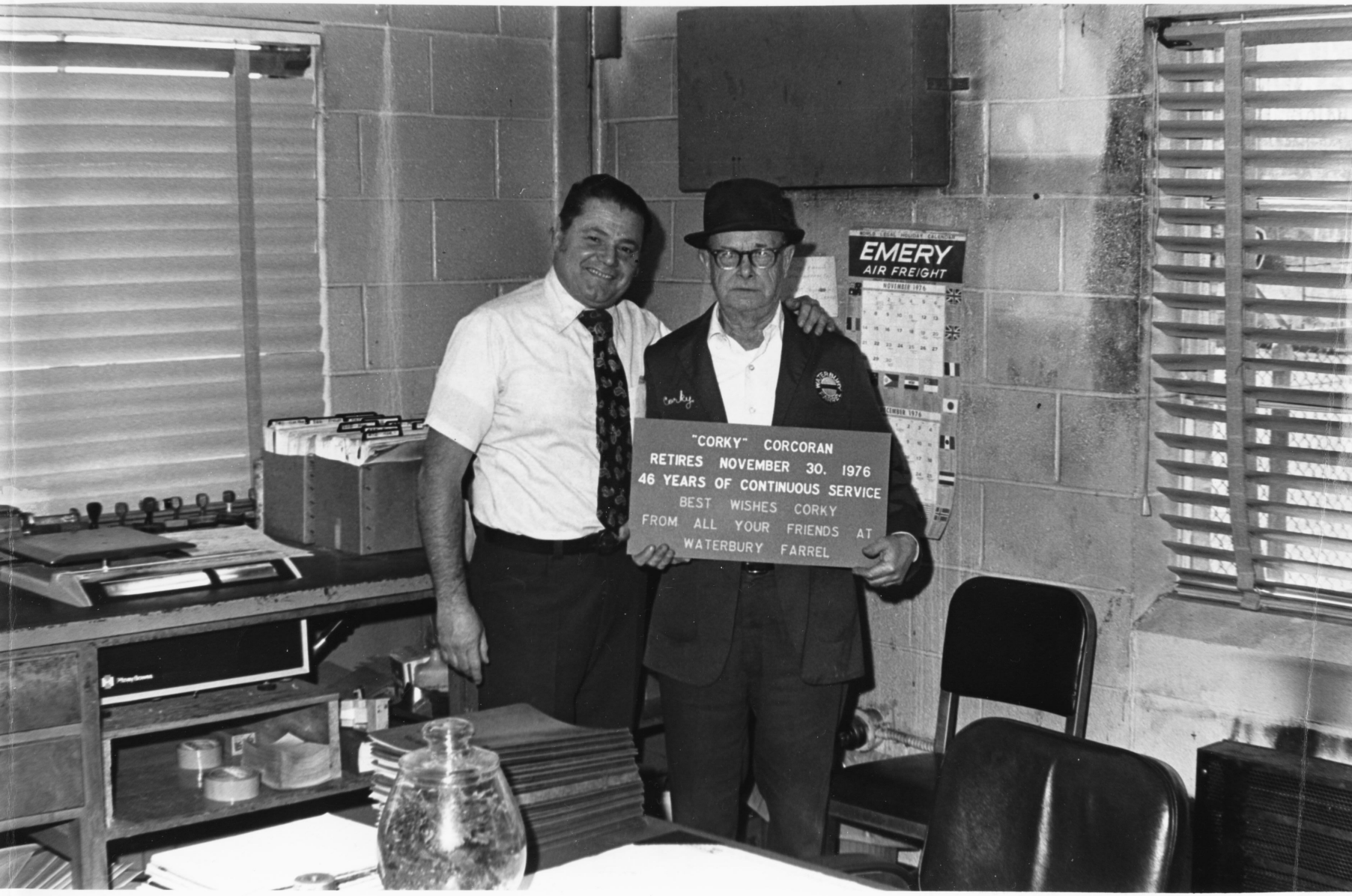
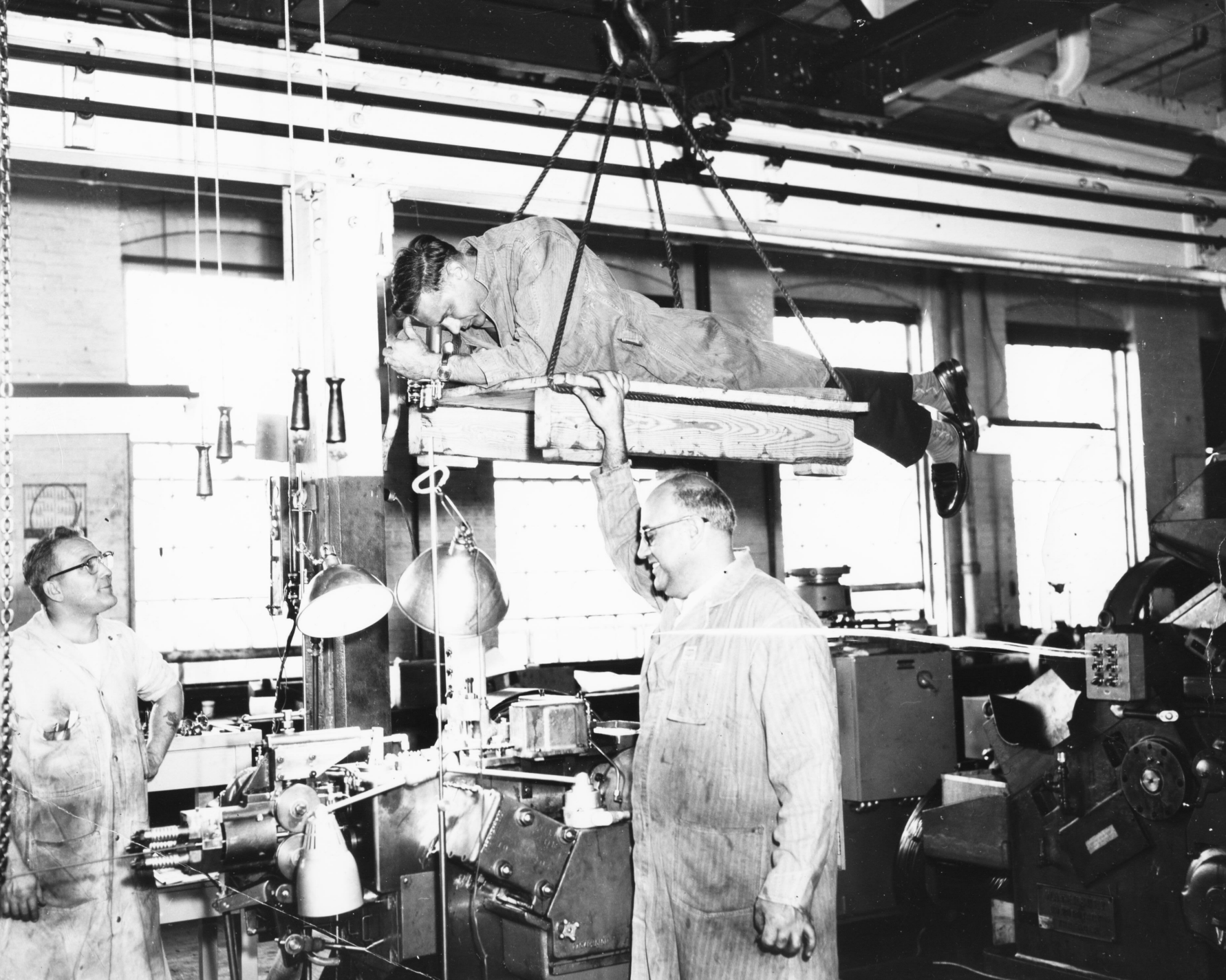
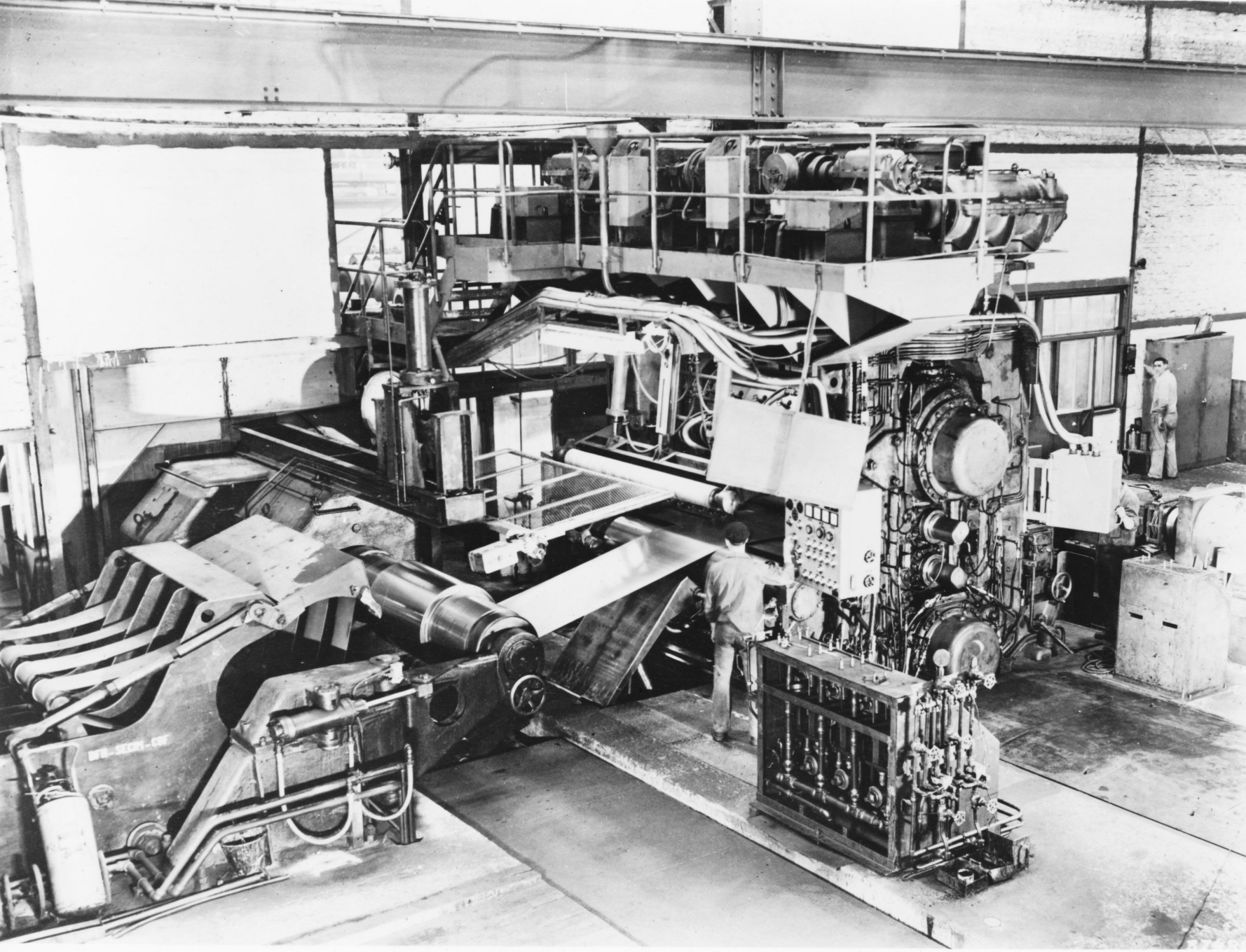

FARREL
FARREL
FARREL
FARREL
FARREL


EMERY
AIR FREIGHT
"CORKY" CORCORAN
RETIRES NOVEMBER 30. 1976
46 YEARS OF CONTINUOUS SERVICE
BEST WISHES CORKY
FROM ALL YOUR FRIENDS AT
WATERBURY FARREL




THOMPSON
THOMPSON


1½ TON



Châtillon-Isbergues laminoir ZR 22-80

FEB 1 1 1956


ARMY
NAVY

2001 DISABLED AMERICAN VETERANS

COMMANDERS CLUB

In Grateful Appreciation to

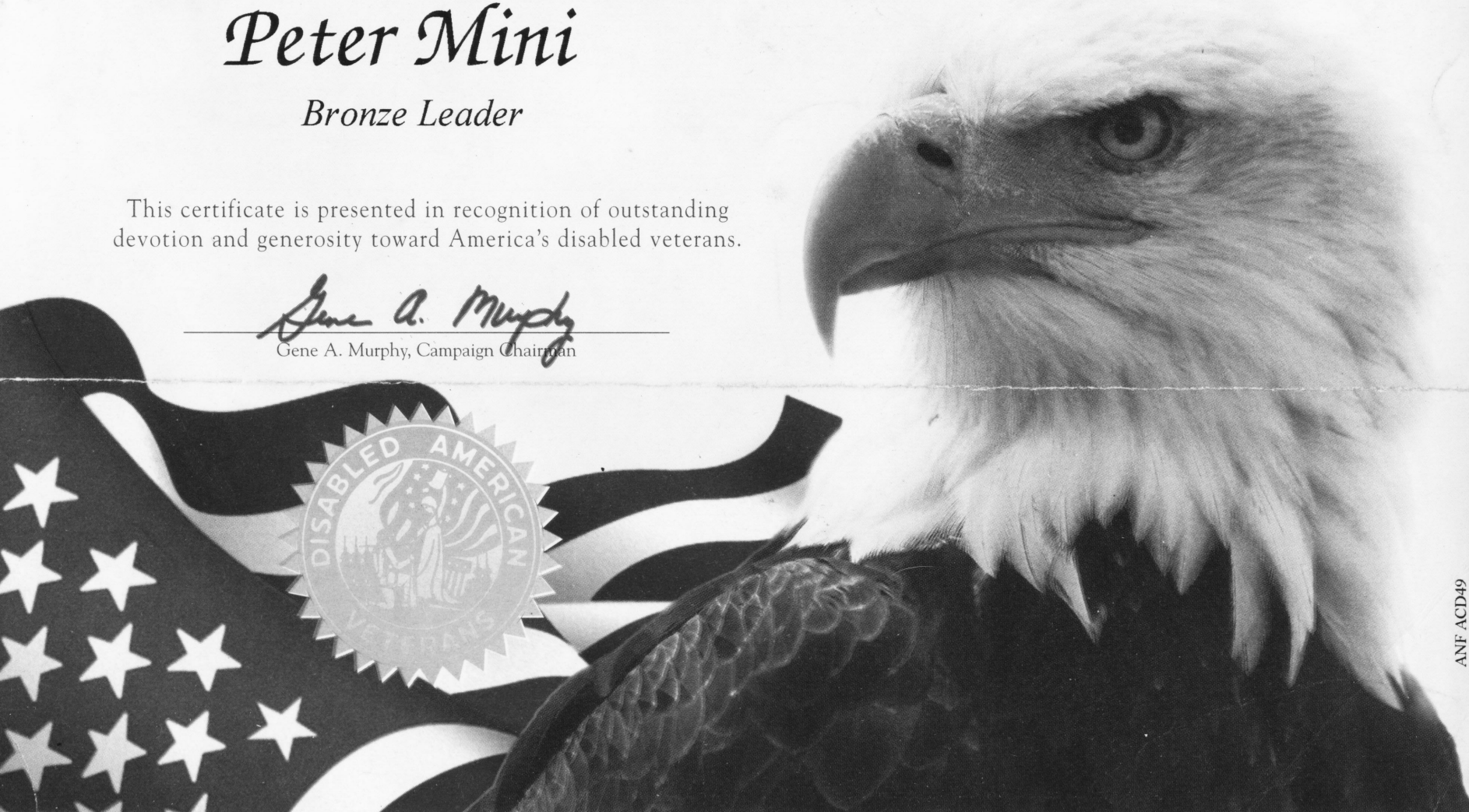
Peter Mini

Bronze Leader

This certificate is presented in recognition of outstanding devotion and generosity toward America's disabled veterans.

Gene A. Murphy

Gene A. Murphy, Campaign Chairman



ANF ACD49

Randolph & Clowes sports arena at Bank and Meadow Streets; old Farrel Foundry in background.


WATERBURY-FARREL
1106

WATERBURY 1851 FARREL

FARRELITE

VOL. 3, No. 12 WATERBURY, CONN. JANUARY, 1952

Visit With A Farrelite Family -

SECOND PRIZE WINNERS IN LETTER CONTEST

We are very happy to present this month the second prize winners in the letter contest we sponsored for Farrel boys and girls from 12 to 16 who attended our Open House Day. (First prize winners were presented in the December issue.)

These second prizes, consisting of Agfa Ansco Camera sets complete with attachments, film, auxiliary lens and carrying cases, went to Irene Derouin, aged 12, daughter of Billy Derouin, molder, and to Robert St. Germaine, aged 13, son of Armand St. Germaine, Department 3 helper.

Second Prize Girls

One of the things that I found interesting on the tour through the Farrel Foundry was the Foundry itself.

We passed through the Drawing Room, Blue Print Room, Accounting Room, Checking Room, and the Pattern Shop before we reached the Foundry.

We arrived just in time to see them pour the iron into the molds and when the ladle was empty, the crane carried it to the cupola to be refilled. It was also interesting to see the molders working at the molds. At the further end of the Foundry, we stopped and watched the Slinger fill up the molds and in no time the mold was full.

Then Mr. Anderson, our guide, took us through the Hardening Department and then through the Blacksmith Shop which I also found interesting. Mr. Anderson explained to us about the hammer weighing 3,000 lbs. and we also saw the hammer in action. At the farther end of the Blacksmith Shop we saw the Anneal Furnace annealing castings.

From the Blacksmith Shop we went to the Supply Shop and then to the First Aid Room which we all thought was very well equipped.

Mr. Anderson then took us through the Grinding Room to the Multiple Eyelet Machine. Its chief use is to make ball bearing races.

After that we went to Department "nine" for refreshments. After touring the shop the refreshments sure were inviting. I also thought that the coffee, doughnuts, and rolls were very good.

I thought Mr. Anderson was very cooperative in answering our questions.

I also want to thank the Company for giving the guests such a wonderful opportunity to tour the different parts and departments of the Farrel Foundry.

By Irene Derouin, Age 12

Second Prize Boys

I'm writing a few words about the plant. I was very happy to see the way they make blue prints. For instance, the article on the drawing board, which is sort of a ruler, could level at any angle on the board.

When I went downstairs there was a machine, number thirty calibre unit, operating. It was a very interesting machine.

They had a press which was helped to run by air, and it weighed forty tons.

The plant was very neat and clean. I'm hoping that when I am older I may be a member of the Farrel Foundry.

By Robert St. Germaine, Age 13

Robert St. Germaine, winner 2nd prize for boys.

Irene Derouin, winner 2nd prize for girls.

SHOP TALK

Armand St. Germaine's son won second prize in the essay contest held in connection with our Open House. Armand's chest was really swelled up and "That's my boy!" was his slogan for a while.

THE STORY OF THE EYELET MACHINE

How It Developed And What It Will Do

WE continue this month our series of articles on Waterbury Farrel products by attempting to give you a description of our Eyelet Machines and the products they make. We say "attempting" because whole books can and have been written on this subject. And we would be the first to admit that the possibilities of the machine have not been exhausted; some new use may be discovered tomorrow.

The background and development of the eyelet machine make an interesting story, in which the Naugatuck Valley and Waterbury play an important part. Starting from a crude design, veiled in secrecy and restricted in use, the eyelet machine in time attained a high degree of efficiency and wide-spread application in the metal-working industry. It is now one of our oldest and most popular products, although strange as it seems its name is somewhat misleading since it is rarely used any more to produce eyelets, the thing for which the machine was originally designed. Its principle has been developed and expanded by our engineers until it now includes a very complete line of multiple plunger machinery.

HOW IT WAS INVENTED

Back in France in 1827, a doctor in the French Army was experiencing considerable difficulty in the use and application of certain types of bandages. He would tear a hole in the bandage, pass the end or tape through it in order to bind it tightly, but when this was done, the hole would usually tear out and the bandage would come off. The doctor pondered the problem and remembered that he had a relative who manufactured metal articles. They got their heads together and invented a metal ring that could be crimped into the bandage, thus preventing any tearing when the bandage was applied. They called this metal ring an "eyelet."

Thirty-five years later, in 1862, we find that the first mention of commercially made eyelets in America was in the Waterbury Almanac—a simple statement that eyelets had been added to the list of products produced by the American Flask and Cap Company of Waterbury.

A look at the history of this company may be of interest, because there may be some of you who can recall the names and places referred to.

ITS EARLY MANUFACTURE

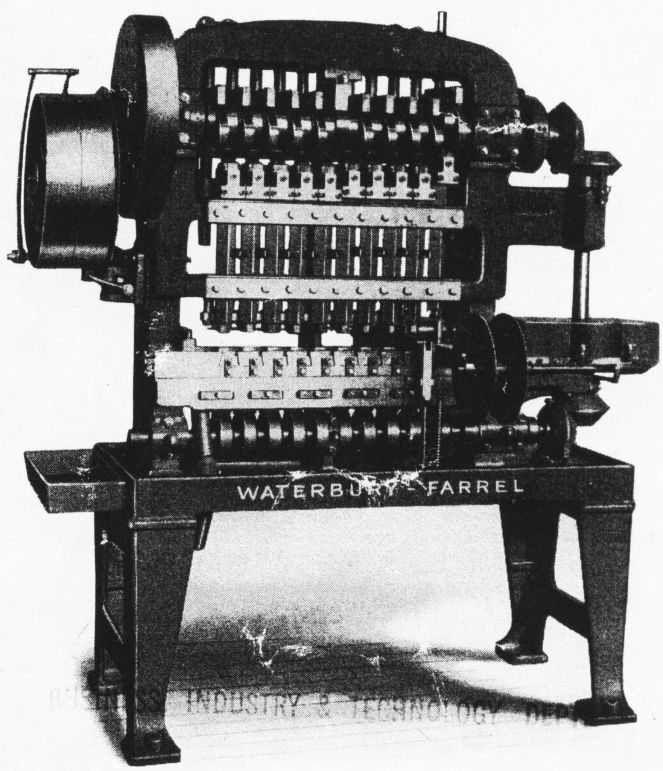
A group of men connected with the Waterbury Brass Company formed a new Company known as the American Flask and Cap Company. They purchased the good will and machinery of the American Powder Flask Company of Meriden, and the Walter Hicks Percussion Cap Company of Haverstraw, New York. The machinery was moved to Waterbury and set up in the Manhan Manufacturing Company building, owned by a family who had manufactured woolens but were closing out their business. (It was this family for which the Manhan Canal was named.)

In 1865, the Waterbury Brass Company acquired the control of the American Flask and Cap Company. Perhaps some of you heard of the times the powder house blew up. They made percussion caps, and used fulminate of mercury. They mixed this explosive in the powder house—it was and still is a very tricky job.

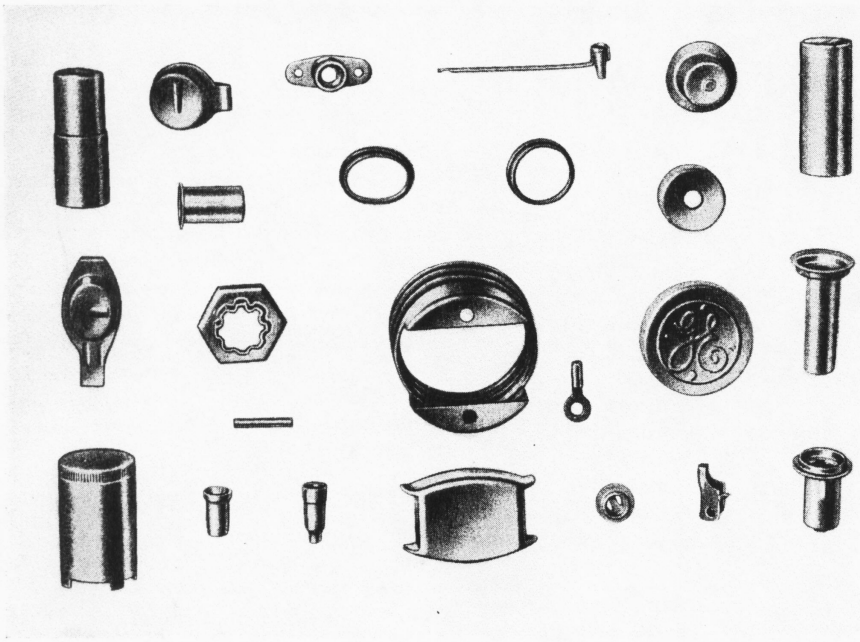
The Brass Company operated the Flask Company for many years and it was in this company that eyelet manufacturing developed and grew. When Waterbury Brass Company became the American Brass Company, the Flask Company was sold to the Winchester Repeating Arms Company of New Haven. However, the American Brass Company retained the growing and prosperous eyelet business. The Waterbury Brass Goods was the operating division which took over this part of the business. This branch is still in existence and many Waterbury Farrel eyelet machines are working on the various jobs assigned to them. Rumor has it that the Brass Goods still operate some of the original American Flask Company machines!

But to return to the early days, it was Mr. Robert Cairns who was first called upon to develop the eyelet machinery. Mr. Cairns had been hired by the Waterbury Brass Company in 1857, and was the man for the job when the American Flask and Cap Company was acquired. Incidentally, this same Mr. Cairns was the father of the man by the same name who was our City Engineer for so many years and who had sufficient foresight to develop the present water supply of the City of Waterbury. Both father and son contributed materially to the development of our city.

ONE OF OUR CAM EYELET MACHINES



A FEW PRODUCTS MADE ON OUR EYELET MACHINES



Note the Wrist Watch Case in lower center. Can you name the others?

There is a record in 1860 crediting Mr. Cairns with building the first two-plunger machine having a transfer slide for carrying the work. This machine is credited with making percussion caps used in Army rifles in the early part of the War between the States.

Meanwhile the manufacture of eyelets was a closely guarded secret. No record can be found of any patents taken out by Mr. Cairns on the process. It would seem rather that the first manufacturers preferred to carry on the process behind locked doors. The old Manhan building had a peep hole cut in the door and the door stayed locked at all times except when employees were entering or leaving the building. Every order, any information, came or went via the peep hole.

However, it was not long before a competitor was successful in gathering enough information to reproduce the machine and get into the eyelet business. This competitor attempted the same secrecy methods as had the Flask Company, but to keep such information under cover is very difficult, and soon still another competitor picked up the secret information. This man was of a different calibre. He built himself some machines, then he proceeded to build them for anyone who wanted to buy them, thus letting the cat completely out of the bag.

WE GET IN THE PICTURE

The Waterbury Machine Company, which has become our present Plant B, was in business about this time and of course it was not long before many of the brass companies in town were coming to it with requests to have their eyelet machines built. Later, the Waterbury Machine Company acquired the Manville Company, which had first let down the barriers on the secret of the eyelet machine. (This company is not to be confused with the E. J. Manville Machine Company of our day.)

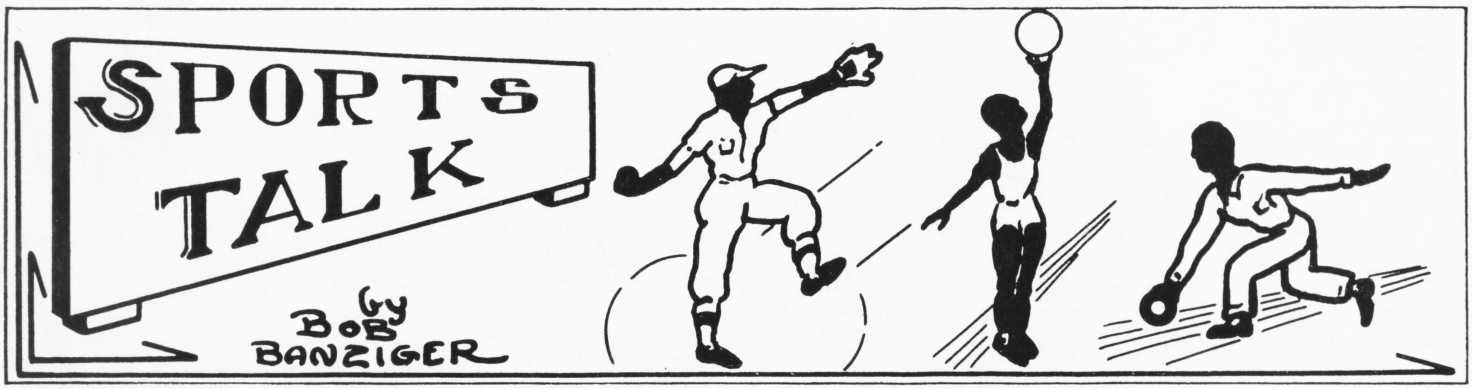
At one time, there were three builders of eyelet machines in Waterbury—Blake and Johnson Company, the E. J. Manville Company, and ourselves. But today, so far as we know, Waterbury Farrel is the only company still building this type of machine, still sending it all over the world. Our machines are found not only in all sorts of metal cutting plants in the United States, but they have gained a wide distribution in Canada, England, Holland, France, Australia, China, Japan, and Argentina.

MODERN DEVELOPMENT

It is true that the eyelet machine primarily grew from a desire to make eyelets such as the French doctor used. Such eyelets were found later to be vastly useful for shoes, corsets, and many other articles. As demand grew, the need intensified for increased production, and other methods were developed to mass produce the eyelet itself more economically. Eventually the need arose to investigate other items adapted to the abilities of the eyelet machine,—a feat not particularly difficult because the machine is exceedingly versatile. In fact today it makes almost any other small gadget you

(Continued on page 12)

The assembly gang, Department 23, pose before an eyelet machine. L. to R., standing: R. Longo, L. Volpi, J. Montvillo, R. Dow, M. King, C. Lehman, P. Pomponio; kneeling: J. Chernauskas, C. Sciullo, Jr., G. Korner, S. Nabozny, C. Rizzo.



SOFTBALL REPORT

The Farrel softball team came into its own and broke into the win column against U.S. Rubber by the score of 5 to 1. U.S. Rubber drew first blood in the opening inning by virtue of a single by Fortin, the leadoff man. The runner was sacrificed to second and advanced to third on a foul fly. He then scored on a single by Walker for the only run of the game for U.S. Rubber. Farrel loaded the bases in the third on a single by Cavanaugh, a walk to Murphy and an infield hit by Burlenski. The potential rally died there as the next two batters flied out to end the inning.

Red Wallin opened the fourth for Farrel with a long triple to left field and successive walks to Meier, Marinara, Blansfield and Cavanaugh forced in two runs. Murphy then lofted a high fly to short left field and Marinara scored after the catch. Burlenski walked to load the bases again and Matusevice went down swinging.

McCartney walked to force in the fourth run and Cavanaugh stole home on a delayed steal for the fifth and final run of the frame. Wallin batting for the second time in this inning then flied out to end the fiasco. A fast double play Murphy to Wallin wiped out the U.S. Rubber threat in the seventh inning, thus ending the game.

Farrel tangled with Somers Brass on May 23rd and Somers broke the ice with a single tally in the first inning. Farrel evened the count in the last half of the first on a single by Blansfield and a double by Murphy; but Somers immediately came back with another tally in the second inning.

The fourth inning saw Somers tally four runs on two hits and three errors, Farrel came back to score two runs in the last half of the fourth by virtue of a double by Matusevice and consecutive singles by Wallin, Meier and Marinara. The score stood at 6 to 3 going into the last half of the seventh inning when Marinara opened with a double and Ciarlo batting for Blansfield flied to the outfield and the fielder dropped the ball.

Ciarlo was forced at second on a ground ball by Cavanaugh with Marinara scoring. Cavanaugh stole second and scored on an infield error on a play on Murphy. Butch Burlenski came to bat with the score at 6 to 5 and hit a tremendous blast over the right fielders head to score the tying and winning runs with the four base wallop.

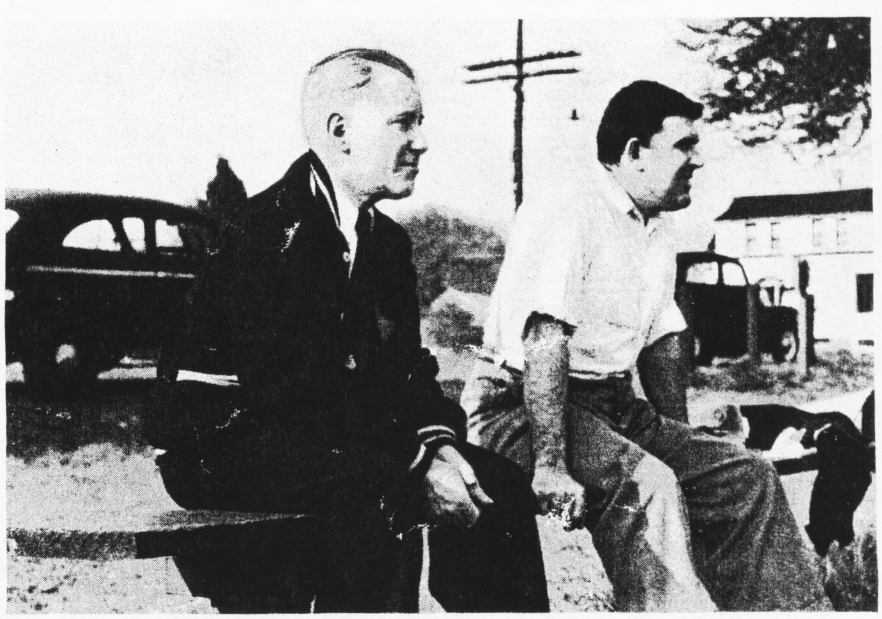
A four week layoff did Farrel no good in the game with Chase and Farrel fell victim to the tune of 6 to 1. Farrel drew first blood on a walk to Red Meier who moved to second on a sacrifice fly by Marinara. Red scored on a slashing single by Tommy Ciarlo who moved to second on a fielders choice and died there. In the fifth by virtue of a walk, an error and two fielder's choices Chase managed to score two runs and were never headed. In the sixth Chase added two more with a triple, fielders choice and an error.

Insult was added to injury in the seventh with two more for Chase on a walk, error, fielder's choice and a single. Farrel threatened in the sixth with a walk to Burlenski and a single by Murphy, but could not manage to profit by it. Chase obtained six runs on four hits and Farrel scored once having only two hits.

At this date the Farrel team shows a record of two wins and two losses and are practically out of the running for the first round bunting but everyone feels that better things are in store for the second round when it is felt that the team will find itself and show the way to the other teams of the league.

GOLF NOTES

The golf season is now in full swing with Farrel golfers working hard to improve their game for the coming club championships. Clem Labutis won the club championship at the Chase Country Club the year before last and was the runner-up last year. Clem has been hitting them good this year and hopes to clinch the championship again. George Kennedy and Clem are teaming to play in the



L. Brennan and R. Banziger watch a soft-ball work-out

FARRELITE

WATERBURY FARREL FOUNDRY & MACHINE CO.
Publication Address, 453 Bank St., Waterbury, Conn.

Return postage guaranteed on undelivered copies.

Sec. 562, P. L. & R.
U. S. POSTAGE
Paid
WATERBURY, CONN.
Permit No. 1034

Member-Guest 4 Ball Tourney at the Waterbury Country Club and are given a good chance to come through in spite of the potential threats of the Bill Bannon and Henry Griggs combines. George is hitting in the low 80's with Henry in the middle 80's and Bill Bannon in the high 80's.

Eddie Labutis and Eddie Pudim are also contenders at Chase averaging in the high 70's but occasionally come through with good scores and could possibly upset the applecart. Maurice "Red" Dowling, a mid-80 man, is hustling around at the Watertown Club and really hits a long ball. The other day he hit one so hard that he broke his driver and the people of Litchfield sent in reports about "Flying Discs" in the sky. We still don't know where his drive landed unless the size 13's were covering it. "Slamming Joe" McKenna is working hard at East Mountain hitting in the low 70's; that is, for the front nine only.

Roy Card is getting his exercise at the Chippanee Golf Course in Bristol and is rumored to be playing well. Frank Hardy, Dick Dubauskas, Jim Bowey, Bob Solocius and Fran Costello may be seen quite often at East Mountain, but fail to turn in scores for comment. John Gute is at Watertown four nights a week and all week-end working hard to break 90.

EYELET MACHINE—*(Cont.)*

can name *except* an eyelet—it makes few of those any more, at least not what one would call true eyelets.

For an example of what the machine will do today, take the problem of a shell. Our eyelet machine had been so successfully adapted to multiple station work that its field was limited only by the thickness of the metal used and the depth to which the shell could be redrawn. The power of the machine and the depth to which it could redraw a shell was limited only by the cam action transferred to the individual plungers. These limitations were overcome by our engineers who first developed a Multiple Plunger Press for doing longer and heavier work.

Later came a different type of eyelet machine called the Crank Eyelet Machine. This machine derived its power from a crank shaft instead of cams and at the same time retained all the features of cam eyelet machine tooling. It could, however, work on much heavier or thicker metal.

Our latest development is the Horizontal Redrawing Press which re-draws from a cup produced on another type of machine. This newest equipment can produce a much longer shell than the first three types we have talked about.

The crank eyelet machine has been tooled for such items as metal radio tube shells, the motor case for a famous electric clock, and the outer race for needle bearings. The Multiple Plunger Press has been tooled for a two-piece metal door knob.

The Horizontal Redrawing Press has been tooled for metal flashlight cases, detonator tubes, lipsticks, and pencil shells.

But we can mention only a few of the products produced by this line of machines. Today, so many articles are made on them that it would be safe to say none of us can spend twenty-four hours without coming into close contact with one.

We have always been rather proud of the old saying "Waterbury has something on everyone." It's pretty nearly true. Penny blanks, nickel blanks, grippers, lipsticks, flashlights, ball point pen tops, wooden pencil ferrules, overall buttons, watch cases, suspender and belt buckles, —all are made on our machines being operated right here in our own city by our customers.

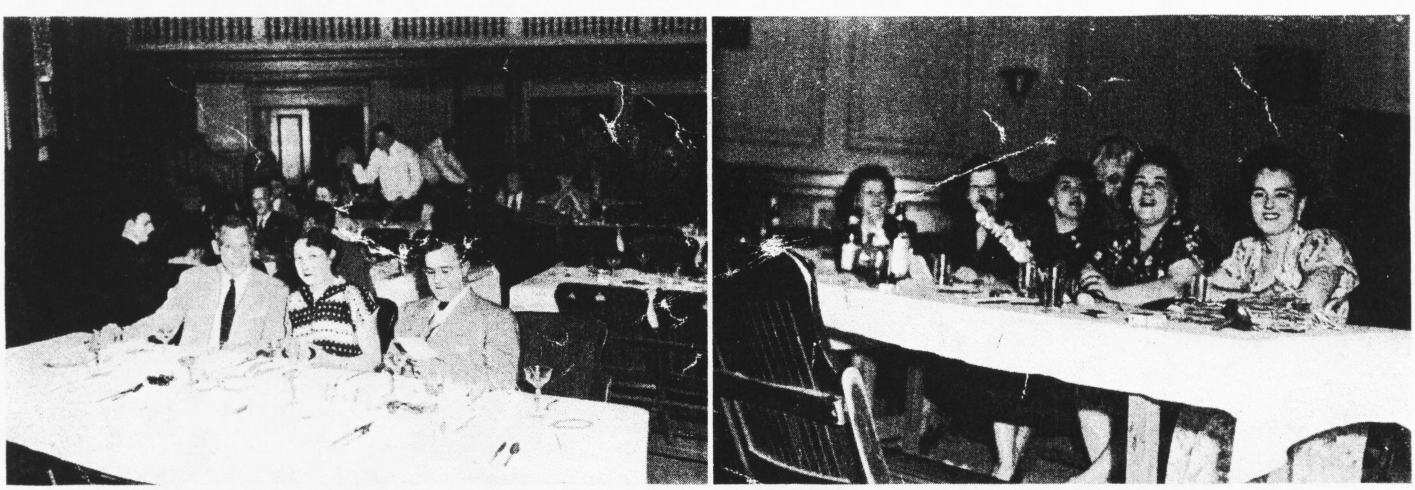
Classified:
For Sale or Exchange

FOR SALE: White porcelain, two burner oil or coal stove in good condition. For further particulars see Walter Meier, Dept. 1.

FOR SALE: Canoe in excellent condition. For particulars see James Bowey, Dept. 3.

FOR SALE: In Bethlehem. Five room house, 2 up and 3 down; hardwood floors, beautiful heat-a-lator fire-place, and oil burner. The garage is attached to the house. Two acres of land. If interested please get in touch with J. Czerkiewicz, Dept. 22.

THE MEN'S BOWLING LEAGUE BANQUET



Herewith scenes of festivity from the Bowling League Banquet held this May: Reading left to right, Asa Isbell, Laura Hungerford, Norman Beril; Mrs. Charles Wujcik, Mrs. John Joyce, Mrs. Charles Spiotti, Mr. Leno Castaldo, Mrs. Domenic Berardi, Mrs. Pasquale Ciarleglio.


BUILDERS
WATERBURY
FARREL FOUNDRY &
MACH. CO.
U.S.A.
AMERICAN
TRADING CO.
AGENTS


CHINESE GOVERNMENT MINT
SHANGHAI
CHINA
1922

Agreement of Apprenticeship

between

Waterbury Farrel Foundry and Machine Co. Waterbury, Conn.

and

Daniel Ralph Alessio

Apprentice

Made January 9, *19*50

Terminated .....*19*.....
by completion of apprenticeship

WATERBURY FARREL FOUNDRY
AND MACHINE CO.

By .....

The Waterbury Farrel Foundry and Machine Company

Agreement of Apprenticeship

This Agreement is made this 9th day of January 19 50 between THE WATERBURY FARREL FOUNDRY & MACHINE COMPANY doing business in Waterbury, Connecticut, hereinafter known as "Company" and

Daniel Ralph Alessio of Waterbury, Conn.

hereinafter known as "Apprentice," and .....

of ..... hereinafter known as "Guardian," whose relationship to the Apprentice is that of..... .

For the purpose of acquiring the Art or Trade of .....

MOLDER

said Daniel Ralph Alessio hereby becomes an Apprentice to the Company and the Company hereby accepts him subject to the terms below stated:

The Apprentice and his Guardian hereby promise that the Apprentice shall conform to and abide by all the provisions of this agreement, and shall faithfully serve the Company during the full period of time named in this agreement.

The Apprentice agrees during the period of his apprenticeship to do all in his power to learn said art or trade and to promote the interests of the Company. He also agrees to pursue classroom studies when they are required and arranged for by the Company and in that case to do a reasonable amount of home-study in preparation therefor.

It is agreed by the Apprentice and his Guardian that the Company shall have the right at any time to annul and cancel this agreement and to discharge the Apprentice for inaptitude for his work, disobedience of the rules and regulations of the Company or improper conduct in or out of working hours, and should the state of the Company's business demand it, change the working time and rates of compensation specified below.

The Company agrees adequately to train and instruct the Apprentice in the principal operations of said art or trade.

The Apprentice shall receive from the Company during the period of his apprenticeship (comprising the periods listed below) the following compensation unless either or both are altered as heretofore provided.

1.04	cents per hour for the first	period of 300 hours	(probation)
1.095	cents per hour for the second	period of 900 hours	
1.128	cents per hour for the third	period of 1200 hours	
1.161	cents per hour for the fourth	period of 1200 hours	
1.194	cents per hour for the fifth	period of 1200 hours	
1.227	cents per hour for the sixth	period of 1200 hours	
1.260	cents per hour for the seventh	period of 1200 hours	

The Company agrees to pay to the Apprentice when he shall have remained in its service for the full time of his apprenticeship and shall have complied with the terms of this agreement, a bonus of $100.00 and present him with a certificate of apprenticeship signed by an official of the Company.

This Agreement is made this 9th day of January 19 50 between THE WATERBURY FARREL FOUNDRY & MACHINE COMPANY doing business in Waterbury, Connecticut, hereinafter known as "Company" and

Daniel Ralph Alessio of Waterbury, Conn.

hereinafter known as "Apprentice," and

of ..... hereinafter known as "Guardian," whose relationship to the Apprentice is that of ..... .

For the purpose of acquiring the Art or Trade of

MOLDER

said Daniel Ralph Alessio hereby becomes an Apprentice to the Company and the Company hereby accepts him subject to the terms below stated:

The Apprentice and his Guardian hereby promise that the Apprentice shall conform to and abide by all the provisions of this agreement, and shall faithfully serve the Company during the full period of time named in this agreement.

The Apprentice agrees during the period of his apprenticeship to do all in his power to learn said art or trade and to promote the interests of the Company. He also agrees to pursue classroom studies when they are required and arranged for by the Company and in that case to do a reasonable amount of home-study in preparation therefor.

It is agreed by the Apprentice and his Guardian that the Company shall have the right at any time to annul and cancel this agreement and to discharge the Apprentice for inaptitude for his work, disobedience of the rules and regulations of the Company or improper conduct in or out of working hours, and should the state of the Company's business demand it, change the working time and rates of compensation specified below.

The Company agrees adequately to train and instruct the Apprentice in the principal operations of said art or trade.

The Apprentice shall receive from the Company during the period of his apprenticeship (comprising the periods listed below) the following compensation unless either or both are altered as heretofore provided.

1.04	cents per hour for the first	period of 300 hours (probation)
1.095	cents per hour for the second	period of 900 hours
1.128	cents per hour for the third	period of 1200 hours
1.161	cents per hour for the fourth	period of 1200 hours
1.194	cents per hour for the fifth	period of 1200 hours
1.227	cents per hour for the sixth	period of 1200 hours
1.260	cents per hour for the seventh	period of 1200 hours

The Company agrees to pay to the Apprentice when he shall have remained in its service for the full time of his apprenticeship and shall have complied with the terms of this agreement, a bonus of $100.00 and present him with a certificate of apprenticeship signed by an official of the Company.

In Witness Whereof, the said parties have hereunto set their hands and seal this 14 day of March 19 50 .

WATERBURY FARREL FOUNDRY
AND MACHINE COMPANY

By W. T. Bannon L.S.

Daniel R. Alessio L.S.
Apprentice

..... L.S.
Guardian

A molder at Waterbury Ferrell foundry 1950 to 1952.

I began as an apprentice January 1950. I worked alongside Willie Dereuin, my tutor. Within three months, I was a full fledged molder, thanks to Willie. He was one of three brothers, Willie and Joe were molders, and Teddy was a metallurgist.
A day's work began with foreman John Lovell bringing our wooden model to our work station. When moulds were completed, they were baked in the ovens. They then would remove them and separated into two pieces. They then spray painted them with liquid lead. This was one of the Conner's brothers, a black man who wore glasses but no mask. Around 2.30 PM, the copula furnace would begin pouring vaulted metal into 7 and 9 ton ladles'. The ladles' were carried by two cranes to begin pouring metal into the baked moles. The air was filled with smoking and gases from the coke and molted steel.

Castings that were poured the day before were put on a vibrator, 12' x 12', shaken loose. This would fill the floor area with black dust. Filling the air around us and going up 75 feet to the roof where there was one single exhaust fan.

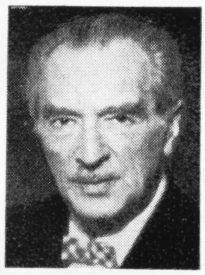
The molders would all go to the toilets to escape the black cloud of dust. I being a rookie kept working alongside the vibrator steel platform with Jimmie the operator who wore no mask.(No OSHA) Lovell would come out of his office, his shelter. He then would tell me to go and get all the molders to come back out to work, this was a daily event. At the end of our eight hours we went upstairs to the lockers and showers. We were all black faced like Earl and Ted Connors, who said we were all black brothers together. But the joke was when we showered we were all white but Earl would still be black. We really were like brothers especially when we learned that two old molders died with black dust in their lungs. The two-week shutdown in July for me was going up on a ladder with Ron and Jim Fraser. This was 70 feet in the air and I shimmed along the rafters with long hoses from a vacuum cleaner. There was 2 inches of black dust on the beams.

I quit when I began coughing up black saliva and black dust on my Handkerchiefs.

Dan Alessi

Mold Creating Tool

Reprinted from "Light Metals and Metal Industry", January, 1965



We asked Mr. T. Sendzimir of Sendzimir Inc. U.S.A. for his views on the impact of continuous casting on rolling technology.

ROLLING

The rolling mill industry has been watching with keen interest the development of continuous casting in anticipation that it will open entirely new horizons in the technology of producing rolled articles such as plates, sheets, bars (wire and others), and will lead to better quality, closer specifications, better yields and much lower costs.

The natural limits in producing continuously cast shapes such as slabs have indicated that the Planetary Mill is perhaps the only mill that can be considered as a logical tool to be used in tandem with such casting units, to hot roll them to final shape without reheating.

The above applies specifically to steel and everybody will understand that each metal has its own problems. Nobody has yet devised a continuous casting unit that could cast any metal from lead right up to tungsten. Certain methods work very well with aluminium but could not be used with steel.

Limiting myself thus to this narrow but very promising circle of mild steel, stainless steel, silicon steel, medium and high carbon steels and various alloy steels, I would venture to predict that the way the problem is now attacked all over the world, the way various difficulties and problems are solved in connection with both the continuous casting and the Planetary Mill, in 10 years from now the bulk of the tonnage of all steels will be produced on continuous casting units coupled in tandem with Planetary hot rolling mills. Interruptions in production of continuous casting units in modern and carefully operated works of today are not even a small fraction of what they used to be, say, five years ago. The same applies to Planetary Mills. If they are well maintained and judiciously operated, there is hardly a single involuntary stoppage in a day.

On the contrary, when this is achieved, other features of Planetary Mill rolling may come into prominence, such as its ability to produce a scale-free strip if a secondary oxidation after rolling is prevented. This could lead to continuous chilling of the Planetary-rolled strip, say in a suitable metal or other bath, then cold rolling it continuously to the desired gauge and again continuously annealing in a special atmosphere to be followed by tinning or galvanizing. Thus we would have, in a sheet of galvanized steel, a piece of metal that half an hour before was still molten steel in a ladle.

I do not believe that we are too far from this dream becoming a reality.

The continuous casting process presents the slab for rolling at relatively low speeds. The continuous slab can be cut up, allowed to cool, and stored prior to reheating for subsequent rolling to strip. The heavy heating costs involved in this procedure make it desirable to convert this slab to strip continuously as it emerges from the casting plant. This is not possible with conventional rolling equipment but there now exists a mill, known as a Planetary Mill, which is ideally suited.

The Planetary Mill concept has been a far-sighted departure from the conventional idea of rolling flat products. The rolling mill machinery is radically different in design, and in operation the Planetary Mill reduces slab to strip in one pass.

The reducing instrumentality consists of two back-up rolls surrounded by a number of small work rolls which are held in "cages" at their extremities. These cages are synchronized by outside means so that each pair of work rolls will pass through the vertical centreline of the mill at precisely the same time. These rolls are also synchronized so that their axes are always parallel to the axes of the back-up rolls.

The direction of rotation of the back-up rolls in relation to the travel of the material being rolled is the same as that in a conventional 2-High mill, as illustrated.

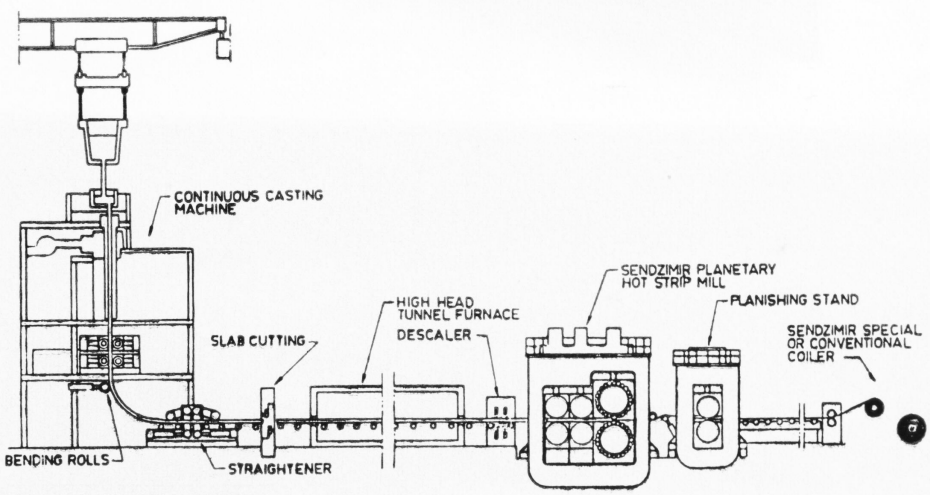
As the cages, which carry the work rolls in their orbital path around the back-up roll, are rotating at approximately half the speed of the back-up rolls and in the same direction, the work rolls must always rotate about their own axes in the opposite direction. The work rolls are, therefore, rotating on their own axes in the opposite direction to conventional rolling practice and rolling in the roll bite like a wheel rolls on an inclined plane.

Power is supplied by the backing rolls which turn the work rolls as well as propel them forward by their frictional contact along the common generants such as "A". For each pair of work rolls passing through the bite, the slab is fed (by feed rolls) a small distance represented as "f". After reduction, this slab length is transferred into a length "F" of the strip.

While in the zone of plastic deformation, the metal is subject to two opposing effects, the relative influence of which, together with their magnitude, should be carefully evaluated. One is the temperature rise of the metal due to the energy of plastic deformation, which averages 40 kWH per ton for steel and should be capable theoretically of increasing the temperature of the metal by several hundred degrees. At the same time, however, heat is abstracted from the surface of the metal within this zone by contact with the rapidly passing (about 3,000 pairs a minute), and relatively cold, work rolls.

The temperature of the strip is higher at the exit of the Planetary Mill than the temperature of the slab at its entrance. This is in contradistinction to rolling on continuous, semi-continuous, or reversing hot strip mills where, during hot rolling, the metal itself will suffer some serious loss in temperature unless the speed of rolling and reductions involved are great, and considerable heat will be imparted to the rolls.

The main controlling factor in this important feature of the Planetary Mill is the feed per work roll and can be varied within the designed limits by adjusting the feeding rate or the back-up roll speed. The ability to take advantage of this heat input to the roll bite makes the Planetary Mill unique in its capability to roll hard materials having a high resistance to plastic deformation.

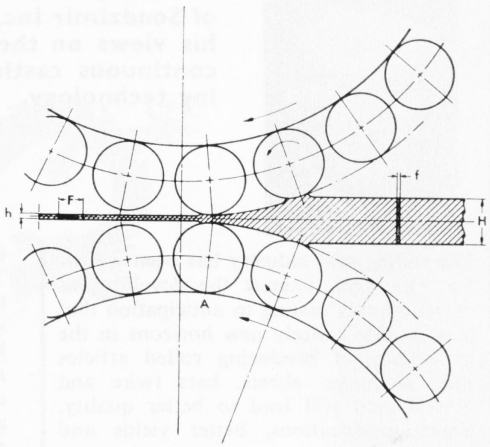


It also plays a significant part in the ability of the Planetary Mill to roll continuous large coils at a low throughput speed compared with conventional rolling. This feature not only makes the Planetary Mill ideally suited to the needs of smaller companies who require large coils for cold rolling efficiency, and have insufficient overall tonnage to justify the high capital cost of a conventional strip mill, but it also makes the Planetary Mill the only type of mill capable of linking up with a continuous casting plant to make possible the completely continuous production of strip from molten metal.

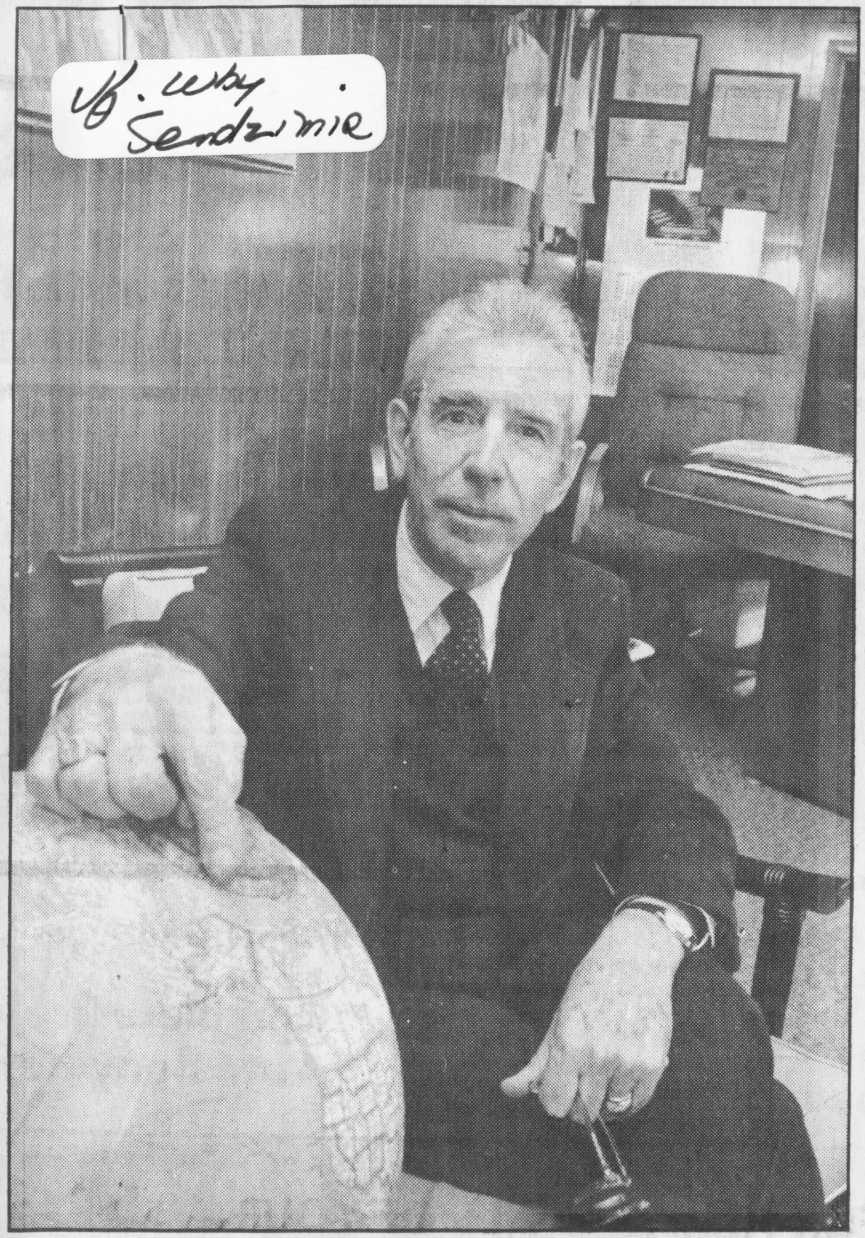
Advantages claimed for the Planetary Mill are:—

(i) Lower capital cost than other equipment.
(ii) Large reduction in floor space.
(iii) Lower cost of operation.
(iv) Increased yield and smaller scale loss.
(v) Lower conversion cost of the material.
(vi) Wide versatility and high efficiency.
(vii) The ability to produce coils of unlimited size and weight with an excellent metallurgical structure and high degree of tolerance.

The same general principle employed in the Sendzimir Planetary Mill can now be used to reduce a square billet as it emerges from a continuous casting machine. In this application the mill is known as the Sendzimir Universal Planetary Mill and consists of a vertical and horizontal roll configuration which is designed to give alternative vertical and horizontal passes in the same reducing zone.



Printed in England by Temple Press Printers Limited, Bowling Green Lane, London, E.C.1 1000—65



Margaret DeMarino

Michael Sendzimir, head of T. Senzimir Inc.

Rolling out rolling mills

Waterbury's T. Sendzimir enjoying a big year

By MARGARET DeMARINO

T. Sendzimir Inc., which has its world headquarters in Waterbury and employs 22 people here, is having a boom year with orders for 17 rolling mills worth $195 million dollars.

Sendzimir mills are used to roll about 90 percent of all stainless steel made in the world, about half of all the silicon steel and half of the thin-gauge brass produced worldwide.

Michael Sendzimir, son of founder T. Sendzimir, 94, who developed the first Senzimir mill in 1931 in Poland, is optimistic about the firm's future. His assessment is fueled by trends toward thinner-gauge materials and by increasing Third World participation in the industry.

Both signal demand for the huge hot and cold rolling mills, machines that reduce the thickness of ferrous and non-ferrous metals under pressure as high as 200 tons per square inch. As the demand for more accurate material grows, Sendzimir machines become more sophisticated, supported by ancillary equipment such as computers, said Sendzimir.

"I grew up in the business," said Sendzimir, who celebrated 40 years with the company this year. "To me it was always interesting, always fascinating. I was mesmerized by the novelty of it, by the order of development. There was always something new going on. The atmosphere was electrified."

Sendzimer went on to receive a bachelor of science degree in industrial engineering and ultimately his Ph.D. His upbringing was international — he lived in China, Manchuria, Poland, Switzerland and France — and today is able to do business in five languages.

"It's very helpful. It helps you understand the mentality of the people, the way they think. It gives you a much better understanding of what they are after and how to approach them."

Sendzimir, the company, is also international.

PROFILE

"As of up until a minute ago, we have mills in 34 countries."

All mills are custom made and the largest among them weighs about 135 tons and is capable of rolling some 100,000 tons of finished stainless steel per year. They each cost between $35 million and $38 million.

Materials rolled on Sendzimir mills are used to produce everything from the bonnets and boots of Rolls Royces to shoe eyelets.

With demand growing for increased accuracy and thinner gauges, "we have to keep up our technical excellence," Sendzimir said. "It is absolutely necessary. In our business, we are working on the brink of technology and we must develop new improvements to our process, which we then patent and apply."

The company has dozens of patents, several held by Sendzimir himself.

"Usually, the inventor works on the 'brink of knowledge' in their field, a vantage point from which they can readily see the need for this type of improvement. This is important because, ultimately, it is the propensity for consumption that must govern the conversion of an invention into a useful product utilized by the masses. We must recognize and eliminate inventions that are made purely for their own sake, but that do not have any useful application with the society.

"A useful inventor usually sees a logical solution and he opens the way to something, or through something, new."

Sendzimir's legacy from his father includes a continuous coating process that was considered revolutionary. When the elder Sendzimir found that no rolling mills existed in Poland, he invented one that used his process.

(See Page C2, ROLLING MILLS)

Rolling mills

(From Page C1)

Originally working in China and then expanding to several other countries, his father sold his galvanizing continous coating process patents to ARMCO, one of the biggest producers of steel. In 1946, he opened ARMZEN Co., with ARMCO as a partner. That company was sold to Waterbury Farrell in 1956. T. Sendzimir Inc. was started two years prior to that.

partner. That company was sold to Waterbury Farrell in 1956. T. Sendzimir Inc. was started two years prior to that.

Today the firm has divisions in Paris, Switzerland and Tokyo. There are some 400 multi-roll Sendzimir mills in operation worldwide.

This has been a good year, Sendzimir said. "There has been a very big increase. It's difficult to put in terms of a percentage, but when you compare it to the fact that in recent years we've had to live on spare parts, it is really quite substantial."

Sendzimir said he feels that behind the success is the fact "that the world is modernizing. There is a tendency to go to thinner-gauge material, to stainless, silicon steels, brass and copper for the electronics and automotive industries in particular. Parts are becoming lighter, more technically sophisticated.

"The Third World is becoming increasingly industrialized. The Arabic countries, Korea, Taiwan, Indonesia, Singapore, Malaysia, even India and Pakistan. I see a growing market for rolling mills in these countries as more and more steel plants are built."

Sendzimir mills are primarily purchased by steel plants, re-rolling plants and warehouses, where material is stored and then cut to size.

Mills are most often used for carbon steels, stainless, silicon steel, brass and aluminum, although a wide variety of lesser known materials, such as stellite, tantalum and molybdenum, can be rolled on Zendzimir mills.

The cold rolling mills differ fundamentally from both conventional rolling mills and other cluster type mills, in that their design permits extremely close gauge tolerances across the full width of the material being rolled.

The Sendzimir planetary hot rolling mills differ from conventional rolling mills in that they are the only true continuous mill, with the slabs actually butting end to end and pushing each other through the mill.

With such quality products to offer, Sendzimir sees good times ahead for his company. "The next two or three years look very good. I see no reason that the company wouldn't be able to survive and prosper."

In recent years, steel producers have cut back capacity, but they "have started to expand again." With his business so tightly tied to the industry, this is indeed good news.

"When the steel industry grows is when the company grows. With the growth of the steel industry, we can see growth in terms of thousands of percentage points. But if the steel industry even goes down 1 percent, we go down to zero."

When rough times come, he said, "my response is more research and development."

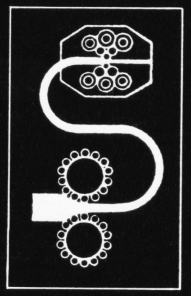
Currently, the company is building 17 mills either as a prime contractor or through the firm's licensed builders. Early on, the company built parts in a plant behind its current location at 269 Brookside Road.

Quality, he said, is critical. "The most important thing is your name. We want to be sure we produce quality and we give service to our clients."

As for his staff, he said, "I look after my own people, the people who are working for me, the subcontractors, the clients. I consider the employees as my partners. When times are bad, we share our 'misery.' If we make money, we distribute a substantial portion of the profits."

T. Sendzimir employs some 60 people worldwide, and perhaps the most devoted among them is the 64-year-old Sendzimir, who said that he "thinks about retirement at least once a day. But I always come back to work the next morning."

Margaret DeMarino is a free-lance writer living in New Haven.



SENDZIMIR

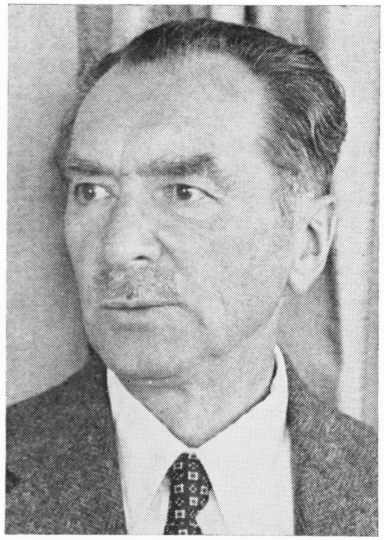
world-wide organization serving ferrous and non-ferrous industries with 332 mills in operation on all continents

HOT AND COLD
STRIP MILLS

METAL COATING
PROCESSES

MODERN EQUIPMENT
FOR SMALL AND
LARGE PRODUCERS

unique – versatile – adaptable – economic



MR. T. SENDZIMIR

Mr. T. Sendzimir was born in Poland in 1894 and studied at the Technical University in Lwow. At the end of the first world war he went to Shanghai and founded a wire and nail works which was the first of its kind in China. Then, in the years that followed, he began to develop his new galvanizing process.

In 1929, he went to the United States of America, then to France and finally, in 1930, he went back to Poland. There he worked on his galvanizing process and a new method for the cold reduction of steel. The first SENDZIMIR Cold Strip Mill and a Galvanizing plant were installed in Poland in 1931. Mr. T. Sendzimir is responsible for the revolutionary introduction of the hydrogen annealing of steel strip in strand form (not coiled). Sendzimir's cold strip mill was also a radical departure from conventional mills. It was a known fact that very small work rolls could roll metal better, with less effort and save anneals. But Sendzimir has succeeded in providing a suitable backing for them and used an ultra rigid one-piece housing. The SENDZIMIR mill is very accurate and can roll hardest alloy steels.

One of his other inventions, the Planetary Mill, has a pair of large rolls, each surrounded by a group of small satellite work rolls that reduce a heavy hot steel slab in one pass to strip gauges.

Mr. T. Sendzimir is an American citizen and lives in Woodbury, Connecticut, U.S.A.

MILESTONES IN THE HISTORY OF SENDZIMIR MILLS

1931 FIRST Continuous Galvanizing Line put into operation at Kostuchna, Poland. Today, close to 6,000,000 tons/year are produced on Sendzimir lines.

1932 FIRST Z-mill put into operation for rolling low carbon strip at Nowy, Bytom, Poland.
Today, there are 332 Sendzimir units in operation.

1936 FIRST Galvanizing Line started in U.S.A. at Armco's Works in Butler, Pennsylvania.

1939 FIRST Z-mill in U.S.A.

1945 FIRST Planetary Mill rolled hot strip at Signode in Chicago.

1953 FIRST production Planetary Mill started in England.

1956 FIRST Z-Mill in Japan.

1966 FIRST production Planetary Mill started in Japan for 57 inch (1550 mm) wide stainless steel.

1968 FIRST Sendzimir Tandem Mill at the Shunan Works of Nisshin Steel.

1971 FIRST Rocker Mill order for Sheffield Smelting, England.

1972 FIRST Z-Trol AGC system, also first cross-tensiometer in operation.

RESEARCH

New equipment, processes and ideas:
Design, develop and put into practical application,
(a) On our own,
(b) Together with a user.
World-wide Patent Structure.

DEVELOPMENT WORK

Improving existing equipment in connection with operations in the field.
Ancillary units (improving and/or creating).
Examples: Z-Trol – A.G.C. – Fast Response Screw-down – Cross-tensiometer.

OFFICES

Headquarters
T. Sendzimir, Inc.
269 Brookside Road
WATERBURY, Conn. 06720. U.S.A.
Tel : Waterbury (203) 756-4617
Cables : SENDZIMIR WATERBURY.
(Research, Engineering, Service, Sales, Accounting, Planning.)

Paris
Procedes Sendzimir S.A.R.L.
11 Quai du President Paul Doumer
92 Courbevoie (Hauts-de-Seine)
FRANCE.
Tel : Defense (333) 7170/1/2/3
Cables : SENDZIMIR PARIS.
Telex : 21 550 SYSTELE PARIS 26 Sendzimir.
(Engineering, Service and Sales.)

London
Sendzimir Limited
33 Bruton Street
LONDON W1X 7DD, England.
Tel : 01-629 4234/5
Cables : SENDZIMIR LONDON.

Tokyo
Sendzimir Japan Limited
P.O. Box 284
2-2, 2-Chome Honcho Nihonbashi
Chuo-ku, TOKYO.
Tel : 663 3666/8
Cables : SENDZIMIR TOKYO
(Engineering, Service and Sales.)

Lausanne
Sendzimir Metallurgique S.A.

AGENTS

India
ABMTM Private Limited
P.O. Box 2050
21 Camac Street, Grosvenor House
CALCUTTA 16, India.
Tel : 44-6751
Cables : BRITOOLMAK CALCUTTA
Telex : 597 METALORE.

Japan
Nissho Iwai Co., Ltd.
Nissho Iwai Building
4-5, 2-Chome, Akasaka, Minato-Ku
TOKYO 107, Japan.
Tel : (03) 588 2111
Cables : NISSHOIWAI TOKYO
Telex : TK 2233.

Scandinavia
Nickels & Todsen A.B.
Karlavagen 5, Postbox 19080
STOCKHOLM 19, Sweden.
Tel : 104884
Cables : NICKELTO STOCKHOLM.

New Zealand
Hooper Allan & Morrow Limited
417 Remuera Road
P.O. Box 28-057, Remeura
AUCKLAND 5, New Zealand.
Tel : 542 273 & 542 674.

United Kingdom
Associated British Machine Tool Makers Ltd.
20 Park Street, London W1Y 4NA
England.
Tel : 01-492-1161/6
Cables : BRITOOLMAK
LONDON W1
Telex : 21611.

WHO'S WHO

U.S.A.

Mr. T. Sendzimir	Chairman
Mr. Michael G. Sendzimir	President
Mrs. B. M. Sendzimir	Vice President Public Relations
Mr. L. R. Seeling	Vice President Engineering
Mr. Rodney DeLeon	Vice President & Treasurer
Mrs. G. McWeeney	Executive Assistant to the President
Mr. John W. Turley	Chief Engineer

France

Mr. M. Sevrin	Managing Director
Mr. A. J. Mitko	General Manager–Europe Sales
Mr. M. Ziegler	Director–Technical

United Kingdom

Miss B. M. Powell	Director
Mr. John S. Halbert	Adviser to the President

Japan

Mr. T. Imamura	Director

New Zealand

Mr. Russ Hooper	Managing Director

Sweden

Mr. Gunnar Berg	Managing Director

COLD MILLS

Width	From 4 inch min. to 100 inch max. (100 to 2540 mm) existing, 144 inch (3675 mm) projected.
Gauges	Finished 0·000065 inch min. (0·00165 mm). Cold rolled 1 inch (25 mm) thick stainless plate.
Material	All known ferrous and non-ferrous alloys were rolled. Moreover, plastic strip was rolled experimentally.
Configuration	1–2 (6 hi); 1–2–3 (12 hi) and 1–2–3–4 (20 hi).
Speeds	Up to 3500 FPM (built) – higher speeds projected.

ADVANTAGES

Extreme accuracy of gauge (across and lengthwise).

Highest standard of surface finish.

Shape instantly adjustable.

No practical limitation as to width of strip.

Minimum number of passes.

Elimination of intermediate annealing.

Quick and easy roll changes without large overhead crane.

Small work rolls make use of tungsten carbide rolls economical.

Freedom from camber and edge cracking.

Compact design.

Low foundation costs.

Smaller roll grinder.

Economy in maintenance.

PLANETARY HOT MILLS

Concept	Slab to strip production in ONE pass.
No Limit	in slab length or coil size.
Ideal	for combination with continuous casting.
Width	11 inch min. to 57 inch max. (280 to 1550 mm) actually operating. 80 inch (2030 mm) on drawing board.
Thickness	6 inch (150 mm) slab to 0·150 inch (3·81 mm) strip on 18/8 at 2200°F (example).
Production	15 tons/hr on 15 inch (380 mm) wide L.C. to 190 tons/hr on 50 inch (1270 mm) stainless (example).

NEW DEVELOPMENTS

ROCKER MILLS	for single pass reduction of continuously cast non-ferrous metals to strip.
DOUBLE 3-Hi	for special hot or cold rolling application where investment costs are critical.
SKINPASS MILL	for most difficult skinpass applications including coated products, shape control and quick exchange of work rolls are main features.
TURRET MILL	ultra fast exchange of work roll to get new roll surface, different camber, different diameter or different length.
CAROUSEL COILER or PAY-OFF	two mandrels on one unit save space and provide continuous operation.
SPIRAL LOOPER	for continuous process lines can accumulate material for entire shift.

SENDZIMIR HOT AND COLD MILLS