

# The "Secret Weapon" that Helped to Win the Battle of Production

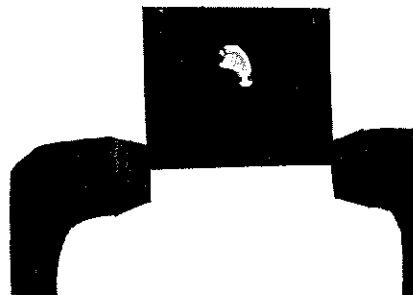
Small parts cut from profile shaped rod, developed by A. B. & J. Rathbone of Palmer, pioneer specialists in their field, aided many of America's largest producers of arms and munitions to meet production schedules that seemed impossible at the time.



WINSTON Churchill's profound tribute to the RAF in the dark days of 1940, "Never before have so many owed so much to so few," might well apply to a family of metalworkers in Palmer, Massachusetts.

When the mass production of small arms and munitions started to get under way at the beginning of the Defense Program, industry was up against plenty of snags. Billions upon billions of small parts were needed for a multiplicity of applications in other parts and components. Parts which had to be machined to very close tolerances were essential to the finished product, and arsenals and war plants embarked on tremendous programs found themselves up against dangerous bottlenecks. To machine these parts from metal blanks was a job that time would not allow if prompt

Drawing a special shaped rod. This is the beginning of the operation. Shown below is the die, itself, held between the jaws of a clamp. The rod is cold drawn through this die, emerging in the corresponding shape of the hole in the die.



delivery schedules were to be met, and furthermore there were not enough machine tools in existence to handle them, let alone skilled operators.

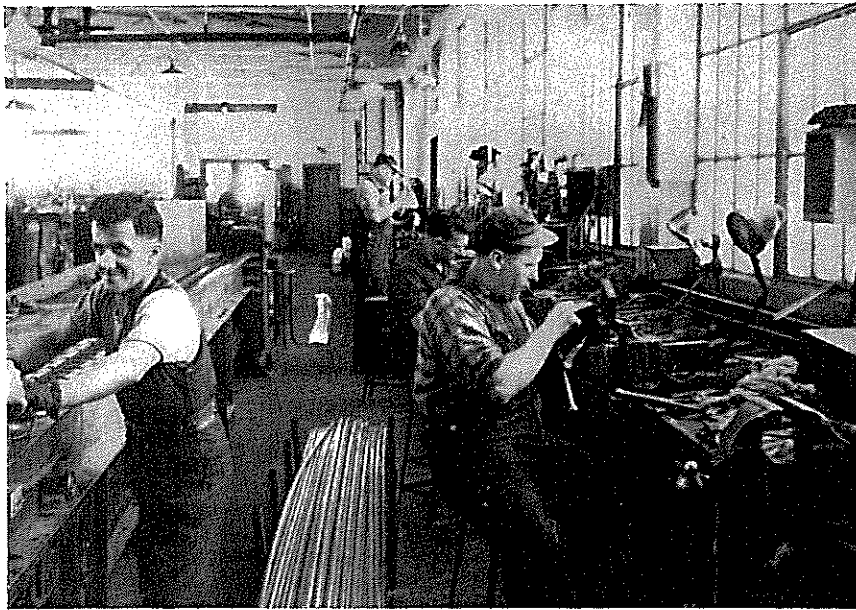
This is where the firm of A. B. & J. Rathbone, of Palmer came in.

The Rathbones had an idea. The Rathbone plant makes cold drawn shapes and pinion rod. Pinion rod, as most readers of INDUSTRY know, is used for making pinions or the intermediary drives between two small gears. To manufacture pinion rod that will stand up on the job calls for accurate, highly skilled, experienced workmanship. The metal wire or rod is cold drawn through dies, or a series of dies and when the operation is finished it must match exactly the shape and dimension specified. The Rathbone shop draws hundreds of standard and special made-to-order shapes of profile and pinion rod in steel, brass, bronze, nickel silver, stainless steel, monel metal, pure nickel and other special alloys to specification for various purposes. Some of these shapes are shown on page 25. The Rathbone family, in fact, was the pioneer manufacturer of this specialty in the United States from the time their business was started in Palmer forty years ago in 1905.

To get back to the main point of the story, the Rathbones saw in their product the immediate answer to an urgent production problem. Prior to the war for several years they had been furnishing specially shaped drawn sections to some of the largest manufacturers in the country of electric alarm clocks, electric meters, water meters, switches, typewriters, adding machines, cigarette lighters and toys. These and many other customers had learned to rely upon the Rathbone product, and through its use had effected appreciable savings in materials and labor costs.

If small parts made from drawn rod served so well and dependably in these peacetime products, reasoned the Rathbones, why wouldn't they fit just as well into the production of precision-made small arms, munitions components, and other vital war assemblies?

Strange as it may seem, many of the prime contractors to whom the use of parts made from cold drawn rod was suggested, were not receptive to the idea at first. Fearful that parts made from cold drawn rod would not meet the



Another view of pinion rod cold drawing. On the right a skilled Rathbone worker is engaged in a die making operation. The Rathbone shop makes all its own dies.

close tolerances and performances required by Army and Navy specifications they were hesitant about using it.

Andrew B. Rathbone went to these contractors and showed them how it could be done. Why, he asked, should they stick to the old costly and time-consuming methods of machining the part out of a metal blank, when slicing the required part to the necessary thickness out of a standard ten or twelve-foot length of metal, previously shaped to the exact contour would serve just as well?

He had five good arguments in his favor.

First, he proved to them that the use of drawn rod would eliminate the need of costly machines for milling these small parts, as well as the upkeep of these machines and the operators to run them.

Secondly, that they could save large quantities of war-scarce metal which would otherwise result in scrap.

The fact that Andrew Rathbone made his point is eloquently attested by the numerous testimonials, some of which are cited further on in this story, he has received from scores of the largest and most important industries executing war contracts throughout the country.

The Rathbones are exceedingly modest in taking credit for their important contribution. In connection with small arms production all they say is, "Regarding our work for war requirements, in June, 1932, we were called in by John Garand, the in-

**BELOW**

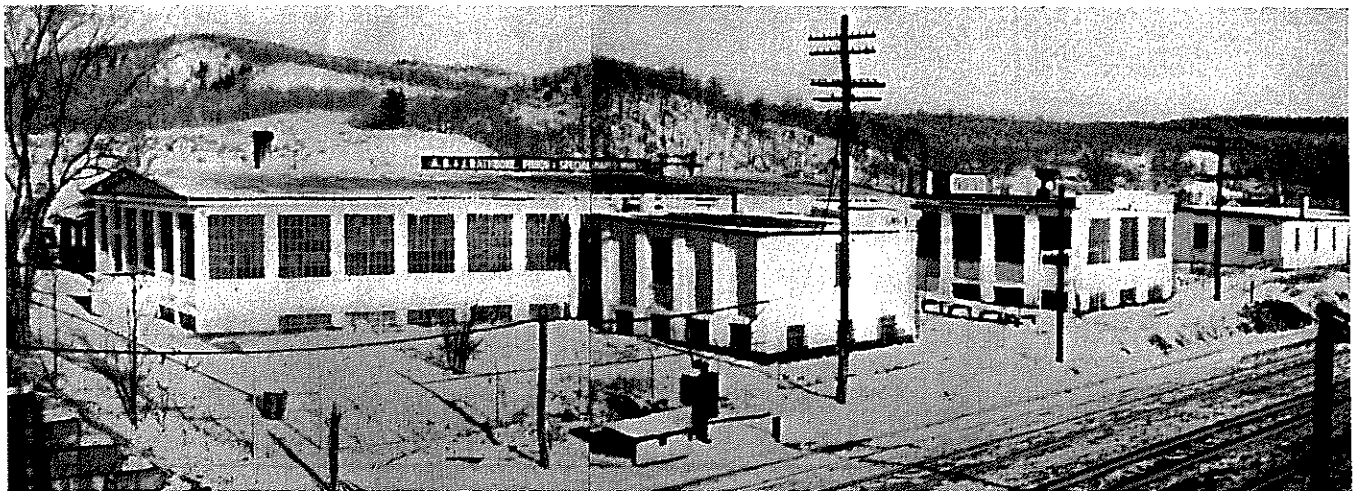
A general view of the plant of A. B. & J. Rathbone in Palmer.

ventor of the Garand rifle, to cooperate with him in working out special sections in steel from which parts for his rifle could be made without the need of costly machinery which would otherwise have been necessary for milling these shapes out of regular sections such as round, squares and flats. We were successful in our efforts and after several trials we received our first bulk order from Springfield Armory June 11, 1935. Since the war commenced, we have been called upon to furnish special sections for the Garand carbine M-30, the Enfield rifle, the Thompson, the Browning and the Bren gun. In fact the demand for our products in these items has been so great that we have had to turn down substantial business to our great regret."

The Rathbones are true Scots. They are thrifty on words, but the performance of their product speaks for itself

Here is some of their history. They are a family of steelmakers who have specialized in a field that few shops have succeeded in.

The Rathbone Company was started about 1905 by Andrew B. Rathbone. He was joined in 1906 by his brother, James and fourteen years later by two other brothers, Percy and Frank. In 1936 Elbridge H., son of Andrew B., became a partner. Andrew B. gained his initial experience in the cold drawing of steel in the mills of William Smith & Sons, Warrington, Eng., one of the leading manufacturers of high grade steel wire. He came to this country originally to supervise the erection of a type of what they called a "patenting" furnace designed and introduced by his father. After the initial furnace was built in the plant of the Hazard Manufacturing Com-





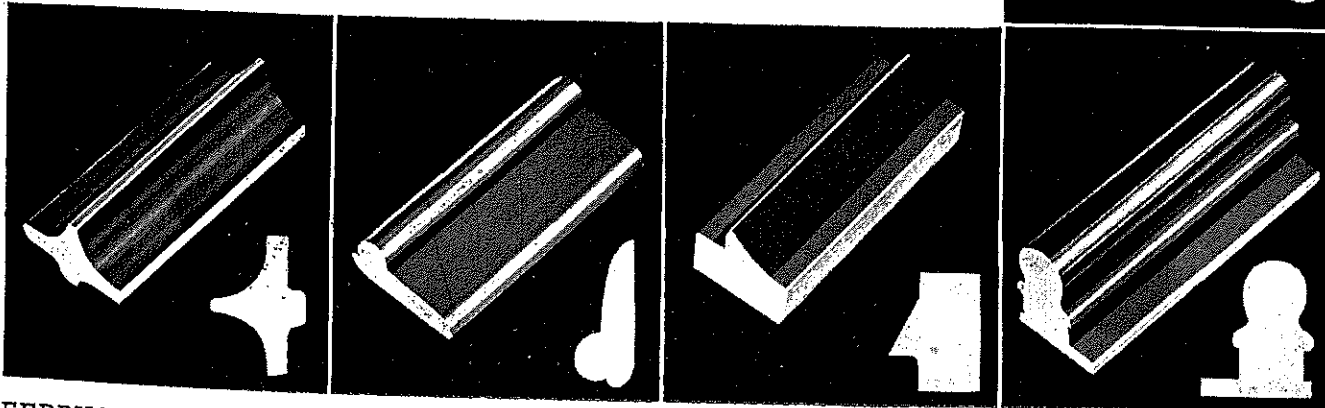
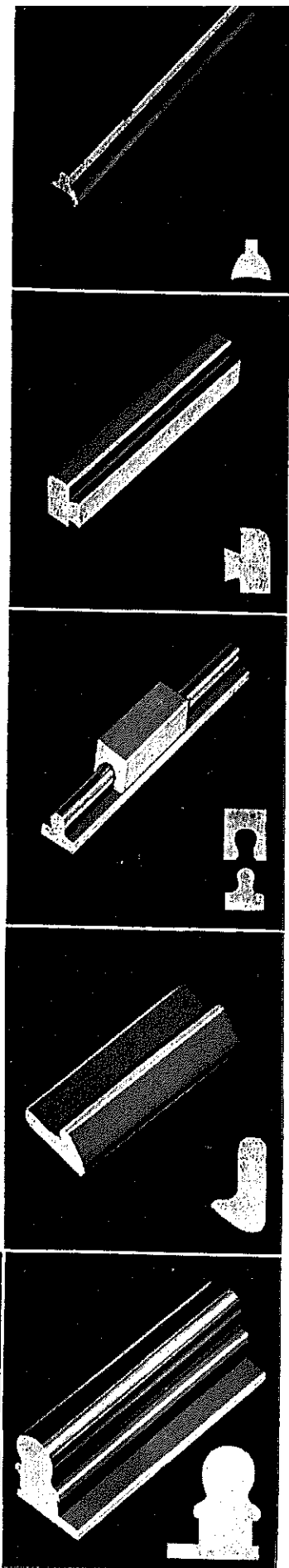
Inspecting pinion rod prior to shipment.

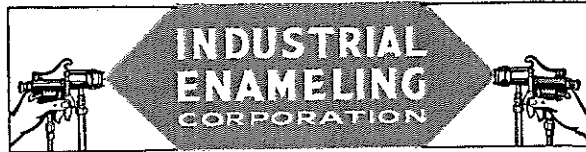
pany, Wilkes Barre, Pennsylvania, he superintended its operation, and later the erection and operation of other furnaces at that plant. After four years he returned to England where he worked on the development of improved methods of manufacturing pinion rod and allied processes. Afterwards he came back to the United States to supervise and operate "patenting" furnaces in the plant of the Wright Wire Company in Palmer, now a part of the Wickwire Spencer Steel Company.

At the time Andrew was with the Wright Wire Company he decided there was a good opportunity to develop a business for the manufacture of pinion rod in this country, so in 1905 he started operations in an old barn in Palmer. After overcoming the usual difficulties the enterprise grew and in 1906 he was joined by James who arrived from England about one year after Andrew had commenced operations. At that time, James A. B., had had no ex-

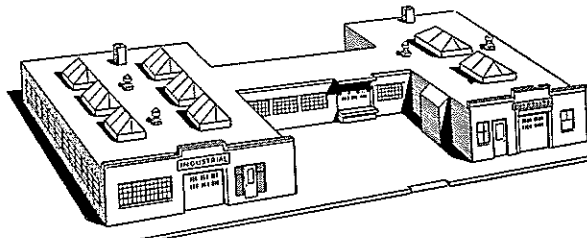
perience in the production of pinion rod, but had a little engineering knowledge. He, too, acquired skill and know-how with the growth of the business. Another brother, Percy, came into the partnership in 1919 to take care of the commercial end of the business, having had long experience in the manufacture of steel wire in England. Elbridge H., also became a partner in 1936, having had several years in the industry up to that time, and also prior experience with the American Brass Company. He specialized in the processing of special grades of steel including stainless steel as well as monel metal and pure nickel. Also he designed and supervised the building of special machinery for improved methods of processing. The business developed steadily from its original home in a barn and in 1915 its present plant was built to fill the growing demands for its specialized products that now include the

[Continued on page 48]





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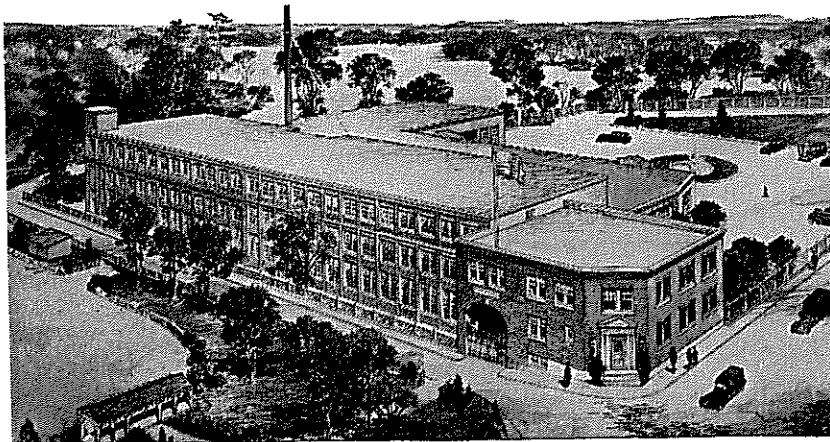
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**The "Secret" Weapon**

*[Continued from page 25]*

drawing of intricate shapes in all kinds of steel, including alloy, tool, stainless steel and non-ferrous metals.

The Rathbones have dozens of testimonial letters from Army and Navy procurement offices and well-known manufacturing companies filling large war orders expressing their appreciation of the valuable help and information given to them on particularly knotty production problems. Here is one received not long ago from the commanding officer of a Naval torpedo station on the East Coast in charge of engineering. He writes: "We are frank to tell you that yours is the first company that has given us any indication that the shape can be drawn, and we have been in touch with every company of which we have knowledge who might be able to handle this problem."

The president of a Massachusetts plant turning out large quantities of electric switches on a Navy contract was so pleased with the aid of the Rathbone organization gave them he wrote: "I want you to know that the writer greatly appreciates the splendid cooperation you have given us since we started to do business with you, and furthermore, the very fine product you are furnishing us. In these days when material is so hard to get and service and quality is often lacking, we cannot help but notice when a supplier of any commodity is outstanding in his performance and quality, and this we can very truthfully say about the Rathbone Company."

When the Selective Service Board in Palmer, hard pressed to fill its quota of inductees, was planning to take some of the men in the Rathbone shop, one of the country's largest producers of turbines and propulsion machinery for the Navy, got wind of it and made an important issue about it. Presenting the facts before high Navy officials they declared their company's production program was vitally dependent upon material supplied to them from the Rathbone shop, and that any curtailment in the Rathbone plant would actually cripple their delivery schedules. Needless to say, the men were speedily reclassified, and kept on the job producing.

*[Continued on page 58]*

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It is proposed to liberalize the Securities Act of 1933 which holds down the lid on investment capital so tight that it virtually keeps small business out of the money market.

### Incentives For Venture Money

Both big and little busines must be given proper incentives to use venture money which is lying idle because investors are discouraged by confiscatory taxation from exposing their savings, and that will be a live issue in Congress this year. Small business will be vitally interested, because it could make good use of this timid capital.

Chairman Eccles of the Federal Reserve System testified recently before the House and Senate Banking Committees and said, in support of pending measures, that industry loans by local commercial banks should be guaranteed by the Federal Reserve Bank. That would free venture capital.

### The "Secret" Weapon

[Continued from page 48]

These are but a few of the tributes to the Rathbone's skill and workmanship. Space does not permit the mention of others equally emphatic in their statements.

Although not in any sense a large plant, the Rathbone organization has played a part in America's Battle of Production all out of importance to its size. In all probability the methods and techniques which the Rathbones have been able to apply so effectively to the quick mass production of arms and munitions in wartime will be applied to the manufacture of new peacetime products in the postwar.

The Rathbones have put Palmer on the industrial map of United States so indelibly that its record can never be dimmed. It's the story of so many owing so much to so few—the specialists who came along with the right answer when things were at their darkest for many prime contractors.

### Industry on the War Front

The new portable smoke generators developed recently by the Chemical Warfare Service are small enough to be carried in the back seat of a jeep and to be concealed beneath a bush or in a dug-out, but yet are powerful enough to blot out an area five miles long and 200 yards wide,

### Army and Navy 'E' Awards

[Continued from page 42]

resourceful Vice President and Chief Engineer Clifford A. Harvey. They are the three musketeers in back of this 'E' success today. Today this record is being written into the war records of Southbridge, Massachusetts, of the State, and of the nation. During its first year of operation, on 2000 sq. ft. of floor space, it employed but twelve workers, and made sales amounting to \$16,000, but last year Harvey-Wells Electronics occupied 150,000 sq. ft. of space, employed more than 500 workers, with record sales close to \$4,000,000. Such a phenomenal rise, even in war time, is a high tribute.

"Harvey-Wells did not travel the beaten path to fame and fortune, but ventured into the almost unknown, and with the prophetic vision of tomorrow, produced something indispensable to all branches of the Armed Forces, and of vast possibilities in peacetime economy. Radically new police, marine telephone and lightweight aircraft radio sets were initial undertakings. This has broadened out into all phases of ethereal communications. Later the concern began production of quartz crystals. At a time when the production of the country was not more than 50,000 crystals a year, the Armed Forces sent in a call for immediate delivery of 24,000,000 crystals, Harvey-Wells rapidly expanded this line of activity until it employed, in the crystal field alone, 275 employes, producing 1000 crystals a day. Harvey-Wells became the center of a nation-wide activity to produce, made generous patent concessions, opened its doors wide to all to study and copy their procedures. Representatives from Fort Monmouth, from Quartz Crystal Section in Washington, spent weeks in the Southbridge plant making observations, after which they compiled a book on their findings to aid in expediting crystal manufacture. In addition, Harvey-Wells turned major attention to the broader fields of radar, radio and electronics, with ever expanding opportunities to serve and win in the coming battle. In five hectic and arduous years, Harvey-Wells has passed out of the embryonic stage into that upper class of manufacturers, and won the Army-Navy 'E' award."

The principal address was de-