NPS Form 10-900
(Rev. 8-86)

1087

JUL 12 1989

OMB No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name: Ball and Roller Bearing Company
other names/site number: American Family Crafts
Joseph Nutt House and Machine Shop

2. Location

street & number: 20-22 Maple Avenue — N/A ☐ not for publication
city, town: Danbury — N/A ☐ vicinity
state: Connecticut code: CT county: Fairfield code: 001 zip code: 06810

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
		Contributing	Noncontributing
☒ private	☒ building(s)	3	____ buildings
☐ public-local	☐ district	____	____ sites
☐ public-State	☐ site	____	____ structures
☐ public-Federal	☐ structure	____	____ objects
	☐ object	3	____ Total

Name of related multiple property listing: N/A

Number of contributing resources previously listed in the National Register: N/A

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this ☒ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☒ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of certifying official: John W. Shannahan, State Historic Preservation Officer — Date: July 7, 1989

State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of commenting or other official — Date

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:

☒ entered in the National Register. ☐ See continuation sheet. — Beth L. Savage — 8/25/89
☐ determined eligible for the National Register. ☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____

Signature of the Keeper — Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)

DOMESTIC/Single dwelling
INDUSTRY/Manufacturing facility

Current Functions (enter categories from instructions)

COMMERCIAL/Office

7. Description

Architectural Classification (enter categories from instructions)

LATE VICTORIAN/Queen Anne
OTHER: Late 19th century factory

Materials (enter categories from instructions)

foundation Stone
walls Asbestos
Brick
roof Gable
other

Describe present and historic physical appearance.

The Ball and Roller Bearing Company is a late nineteenth- and early twentieth-century industrial complex located in Danbury, Connecticut. Its one-third of an acre site at the intersection of Maple Avenue and Crosby Street is approximately one-seventh of a mile east of Main Street, at the edge of a section of warehouses and commercial buildings to the west and south, adjacent to downtown Danbury. A neighborhood of wood-frame, nineteenth-century houses lies to the north and east. The tracks of the former New York and New Haven Railroad pass diagonally in front of the buildings, creating a triangular lot to which the factory building's shape conforms. (Photograph 1, Figure 1)

The complex consists of three buildings, which were originally freestanding but which have been connected by a series of walkways since the early twentieth century. In December, 1987, a fire damaged the factory's northern-most sections, affecting approximately one-fourth of the total complex. A brick factory at 17-21 Crosby Street, across the street from the complex, was at one time used by the Ball and Roller Bearing Company but has been excluded from the nomination because it does not relate to the criteria of significance. (Photographs 1,4)

The former company office, currently a store, is the two-and-a-half story, Queen Anne-influenced Joseph Nutt House, built in 1886. It is cruciform in plan, with modest detailing consisting of molded caps on the two-over-two double-hung windows, denticulated molding in the gable windows, and wood t rim in a lattice pattern at the gable peaks. A two-sory bay window with bracketed cornices is located in the north elevation. (Photographs 2,3) The house was originally a residence, but was converted to an office during the early twentieth century. The second floor and attic remain intact. The second floor retains original door and window surrounds with concentric corner blocks, four-panelled doors with porcelain and glass knobs, and a set of sliding doors with frosted glass. Access to the second floor is by a staircase with turned balusters and fluted newels with notched chamfers and an incised line-and-dot pattern. (Photograph 9)

Attached to the west elevation of the Joseph Nutt House is the one-story brick monitor-roofed building used formerly as a hardening room. Presently used for the display and storage of craft products, its original function was for the hardening stage of ball bearing manufacture. The building is 30' x 43', built of brick laid in common bond, with flat arches above the large multi-paned front windows which flank a central doorway. (Photograph 5)

[X] See continuation sheet

The main sections of the factory are of wood-frame construction and lie to the north of the company office. The oldest part of the factory, which was originally two stories but was extended upward a story during the early twentieth century, is immediately adjacent to the company office. It is rectangular, 48' x 60', with a moderately pitched gable roof. Its visual focus is a hip-roofed elevator tower, adjacent to which are two levels of half-glazed, crossbuck-panelled loading doors, over which an iron I-beam extends. Windows in the lower two levels of the east elevation are six-over-six. Those on the third story of the east elevation and on all stories of the west elevation consist of groupings of three tall twelve-over-twelve windows. The oldest part of the factory is free of fire damage. (Photographs 2,4)

The remainder of the factory consists of a series of three two-story additions. Each addition has a different roofline and is lighted by pairs or groupings of three twelve-over-twelve windows. The roof types include gable, shed and flat roofs. These sections have been damaged and were partially or wholly gutted by fire. (Photographs 1,4)

The interior of the factory consists of three open working floors. Framing is mill construction, with 7" x 11" pine posts and beams reinforced at joints by cast-iron collars. The pine flooring is laid across the width of the building. An early twentieth-century cage-type Otis freight elevator remains in the elevator tower. (Photographs 6, 7,8)

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:
[X] nationally [X] statewide [X] locally

Applicable National Register Criteria [X] A [X] B [ ] C [ ] D

Criteria Considerations (Exceptions) [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [ ] G

Areas of Significance (enter categories from instructions)	Period of Significance	Significant Dates
Industry	1904-1922	1917
Invention		1917

Cultural Affiliation: N/A

Significant Person: Lewis Heim

Architect/Builder: N/A

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

The Ball and Roller Bearing Company is significant for its association with inventor Lewis Heim. In the factory Heim developed the modern centerless grinding machine, an important advance in machine tool technology. (Criteria A,B)

The company's buildings originated with a house and two-story machine shop built in 1886 by Joseph Nutt, an English-born machinist. Nutt operated the shop and resided with his family in the house until his death in 1896. His machine shop operation served Danbury hat manufacturers.

Danbury had risen to prominence as a major national center of men's hat manufacturing during the late eighteenth and early nineteenth centuries. By the 1880s two dozen independent hat companies employing some 4,000 hatters were located in the city. Hundreds more were employed by what today would be termed "satellite industries," businesses which supplied various needs of the hat companies.[1] Among these latter were machine shops, the first of which, the Danbury Foundry, was established in 1864. By 1889 six were in operation. Several, like Nutt's, were founded by English-born machinists. Nutt's shop is the last of these six shops extant in 1889 to survive in any form.

In 1904 the property was acquired by Lewis and Alfred Heim for their Heim Machine Company. Lewis Heim was an inventor who is considered by historians of machine tool technology to have been a pivotal figure because of his invention of the prototype of the modern centerless grinding machine.[2]

Heim was born on a farm in East Fishkill, New York, in 1874. He moved to Danbury as a youth, working in hat shops where he developed and patented several designs for hatmaking machines, which he sold to a multinational hat machine company with a branch in Danbury, Turner Machine Co. Heim later developed and patented commercial laundry machines, and founded the Heim Machine Company to manufacture them. The machines were marketed internationally in Canada, Europe, Asia, and Australia, as well as in the United States.[3] Heim, in partnership with his brother Alfred, turned next to the manufacture of automotive bearings. Connecticut had become the leading center of bearing

[X] See continuation sheet

9. Major Bibliographical References

Secondary Sources:

American Machinist, Editors, "Power From Internal Combustion," American Machinist, November, 1977.

Woodbury, Robert, History of the Grinding Machine, Cambridge, Mass.: M.I.T. Press, 1959.

Primary Sources:

Ball and Roller Bearing Company records, including catalogs, photographs, advertising brocures, and sales and service account book of the Heim Centerless Cylindrical Grinder.

Crofutt, Fred B., Crofutt's Danbury City Directory, various numbers, 1885-1896.

[x] See continuation sheet

Previous documentation on file (NPS):

- [ ] preliminary determination of individual listing (36 CFR 67) has been requested
- [ ] previously listed in the National Register
- [ ] previously determined eligible by the National Register
- [ ] designated a National Historic Landmark
- [ ] recorded by Historic American Buildings Survey # _____
- [ ] recorded by Historic American Engineering Record # _____

Primary location of additional data:

- [ ] State historic preservation office
- [ ] Other State agency
- [x] Federal agency
- [ ] Local government
- [ ] University
- [ ] Other

Specify repository:
See asterisk,* on next page, Section 9, page 2

10. Geographical Data

Acreage of property .3 acres

UTM References

	Zone	Easting	Northing
A	18	629400	4583920
B			
C			
D			

[ ] See continuation sheet

Verbal Boundary Description

[x] See continuation sheet

Boundary Justification

[x] See continuation sheet

11. Form Prepared By

name/title William E. Devlin, Reviewed by John Herzan, National Register Coordinator
organization N/A date Feb. 1, 1989
street & number 36 Park Lane West telephone (203) 354-1370
city or town New Milford state CT zip code 06776

manufacturing by 1910 with the success of companies like Fafnir in New Britain, New Departure in Stamford, and the Torrington Company. In 1909 Lewis and Alfred Heim founded the Ball and Roller Bearing Company. By 1917 they had expanded the former Nutt Machine Shop three times to accommodate their growing production.

In 1917 Lewis Heim patent the Heim Centerless Cylindrical Grinder, a significant contribution to the technology of mass production. During the nineteenth century and early twentieth century, advances in grinding technology facilitated the development of precision machine tools to accommodate the demands of the railroads and later of the automobile industry. Such machines as the Universal Grinding Machine, developed by Brown and Sharpe in the 1870s, and the heavy-duty production precision grinder, invented by Connecticut's Charles P. Norton in 1905, which "enabled the fledgling automotive industry to build engines accurately and efficiently,"[4] helped make possible the rapid advance in manufacturing which characterized the period.

By the early twentieth century, three methods of grinding were in use- internal, external and end grinding. All of these methods used machines which resembled lathes in construction and appearance and held workpieces in the same way as a lathe. Centerless grinding was known in principle but was little-used outside the needle manufacturing industry. Heim's Centerless Cylindrical Grinder was an enclosed machine with two grindstones which rotated near each other, on parallel shafts but at different speeds. A blade-like rest set slightly above the midpoint of the two stones held the workpiece, which was constantly cooled by a stream of water while it was being ground. This new design allowed cylindrical workpieces to be ground accurately and inexpensively to tolerances as precise as one-thousandth of an inch. Heim continued to improve upon the design throughout his career, receiving a total of 28 patents for improvements to the grinder during his lifetime. (Figure 2)

Heim's Centerless Cylindrical Grinder became the basis for all modern centerless grinding machines.[5] The machine had an immediate and widespread application in the automobile indsutry for grinding small cylindrical engine parts such as pistons and valve tappets, as well as roller bearing casings. The Ball and Roller Bearing Company produced 257 of the machines before 1922 in the 20-22 Maple Avenue factory. Buyers included automobile companies like Olds, Reo, and International Harvester, and other bearing manufacturers like New Departure and the Torrington Co. When other manufacturers began to offer similar centerless grinders on the market, Heim sued for patent infringement and won a large settlement. Hoping to expand, the company purchased several new factory sites, finally constructing a new facility across the street from 20-22 Maple Avenue, but at the end of 1922, just as the new factory was being completed, Heim sold the patent rights to the Heim Centerless Cylindrical Grinder to the Cincinnati Milling Machine Company. 20-22 Maple Avenue is the

only factory where the centerless grinder is known to have been produced by Heim. The company sold the new factory in 1928.

Heim left Ball and Roller Bearing Company in the mid-1920s to invest in Florida real estate, in the Mount Dora area. After he suffered reverses during the 1930s, he attempted to re-establish himself in the company but the new owners, all former employees, reportedly rebuffed him. Heim then founded a new company, based in Fairfield, Connecticut, and now known as Heim-Incon. He continued his career as an inventor until his death in 1964.[6] Among his inventions are machine tool parts still known in the indsutry as Heim joints and Heim rod ends. During World War II Heim is said to have contributed to the Allied victory by designing bearings for Allied fighters based on the design of captured Messerschmitt parts, which allowed Allied planes to outmaneuver the German fighters.[7]

The Ball and Roller Bearing Company continued to manufacture bearings, reaching a production peak during World War II when it had contracts for tank bearings for the U.S. Army and employed 125 people. The company helped pave the way for industrial diversification in Danbury in several ways. The efforts of local businessmen to assist Heim in his quest for property for a new plant in 1917 led to the founding later that year of the Danbury Industrial Corporation, one of the nation's earliest economic development corporations. The company also laid the foundation locally for bearing manufacturing. With the move to Danbury of the Barden Corporation during World War II, bearing manufacturing became Danbury's largest single employer, helping to fill the void created by the decline of hat manufacturing after the war. The Ball and Roller Bearing Company remained at 20-22 Maple Avenue until 1974 when, nearing bankruptcy, it moved to New Milford, where it continues in business on a modest scale. The factory was sold to the present owner, who made craft products for department store chains.

ENDNOTES

1. Crofutt, Fred B., Crofutt's Danbury City Directory, 1889, pp. 252-254.
2. Woodbury, Robert, History of the Grinding Machine, Cambridge, Mass.: M.I.T. Press, 1959, pp. 151-155. Also, Editors of American Machinist, "Power From Internal Combustion," American Machinist, November, 1977, p. E-10.
3. Biographical sketch of Lewis Heim supplied by Peter Leibhold, Museum Specialist, Division of Engineering History, National Museum of American History, Smithsonian Institution, April, 1988.
4. Woodbury, Ibid., p. 108.
5. Woodbury, Ibid., p. 155.
6. Interview with Michael Smith, Vice-President, Ball and Roller Bearing Company, New Milford, Conn., April, 1988.

7. Editors, Heim-Incon Bearing Manual, 1978. "Heim, Profile in Ingenuity," p. E-2.

Danbury News, "Ball and Roller Bearing Company Will Erect Large Factory," March 22, 1916.

Danbury Tax Assessor's Records, City Hall, Danbury, Connecticut.

Danbury Town Clerk's Records, including land and vital records, City Hall, Danbury, Connecticut.

Heim-Incon Bearing Manual, 1978.

*National Museum of American History, Smithsonian Institution. Information provided by Peter Leibhold, Museum Specialist, Division of Engineering History. Material includes copies of patents, biographical sketch of Lewis Heim, and other notes.

News-Times, Danbury, Conn., "Ball and Roller Bearing Co. to Move," Jan. 19, 1975.

Sanborn Map Co., New York, Insurance Map of Danbury, Conn., 1889, 1904, 1909, 1919 editions.

Underwriters Bureau of New England, Boston, Mass. Maps-1917, 1923, 1932.

Interviews:

Peter Leibhold, Museum Specialist, Division of Engineering History, National Museum of American History, Smithsonian Institution, April, 1988.

Michael Smith, Vice-President, Ball and Roller Bearing Company, New Milford, Connecticut, April, 1988.

Verbal Boundary Description:

The property is described in Volume 563, page 59, of the Danbury Land Records, located in the Town Clerk's Office, City Hall, Danbury. The boundary includes all of City Lot 113046, outlined in bold on the attached copy of a section of sheet I-13, of Danbury Tax Assessor's Map.

The owner has an easement on the narrow section of the building's north wall which overlaps the property boundary onto the railroad right-of-way. The easement is based on the building's pre-existing the right-of-way. (Figure 1)

Boundary Justification:

The boundary includes the entire original lot which has historically been associated with the property, and which is associated with the period and criteria discussed in the text. Ball and Roller Bearing Company owned other parcels in Danbury at various times, and even constructed a factory building on a lot across Crosby Street from the property under discussion, but these have been excluded because of the absence of a strong association with the period and criteria of significance.

The boundary thus includes only the complex of interconnected buildings associated directly with inventor Lewis Heim and with the production of his most significant invention, the Heim Centerless Cylindrical Grinder. (Figure 1)

PHOTOGRAPHS

For all photographs:

Ball and Roller Bearing Company
Danbury, Connecticut
Photograph by William E. Devlin
Neg. on file, Connecticut Historical Comm.
59 South Prospect St., Hartford, CT 06106

Photograph 1: April, 1988 Photo
East facades and north elevations, looking south

Photograph 2: April, 1988 Photo
East facades and north elevation of company office (Joseph Hutt House) and oldest part of factory

Photograph 3: July, 1984 Photo
East facade and south elevation of Joseph Nutt House (company office)

Photograph 4: April, 1988 Photo
West elevation, showing fire-damaged portion to left

Photograph 5: April, 1988 Photo
Hardening room building, south facade, looking northeast

Photograph 6: April, 1988 Photo
Interior, first floor of factory building

Photograph 7: April, 1988 Photo
Interior, second floor of factory building

Photograph 8: April, 1988 Photo
Framing detail, factory building

Photograph 9: April, 1988 Photo
Interior, second floor, company office (Joseph Nutt House)

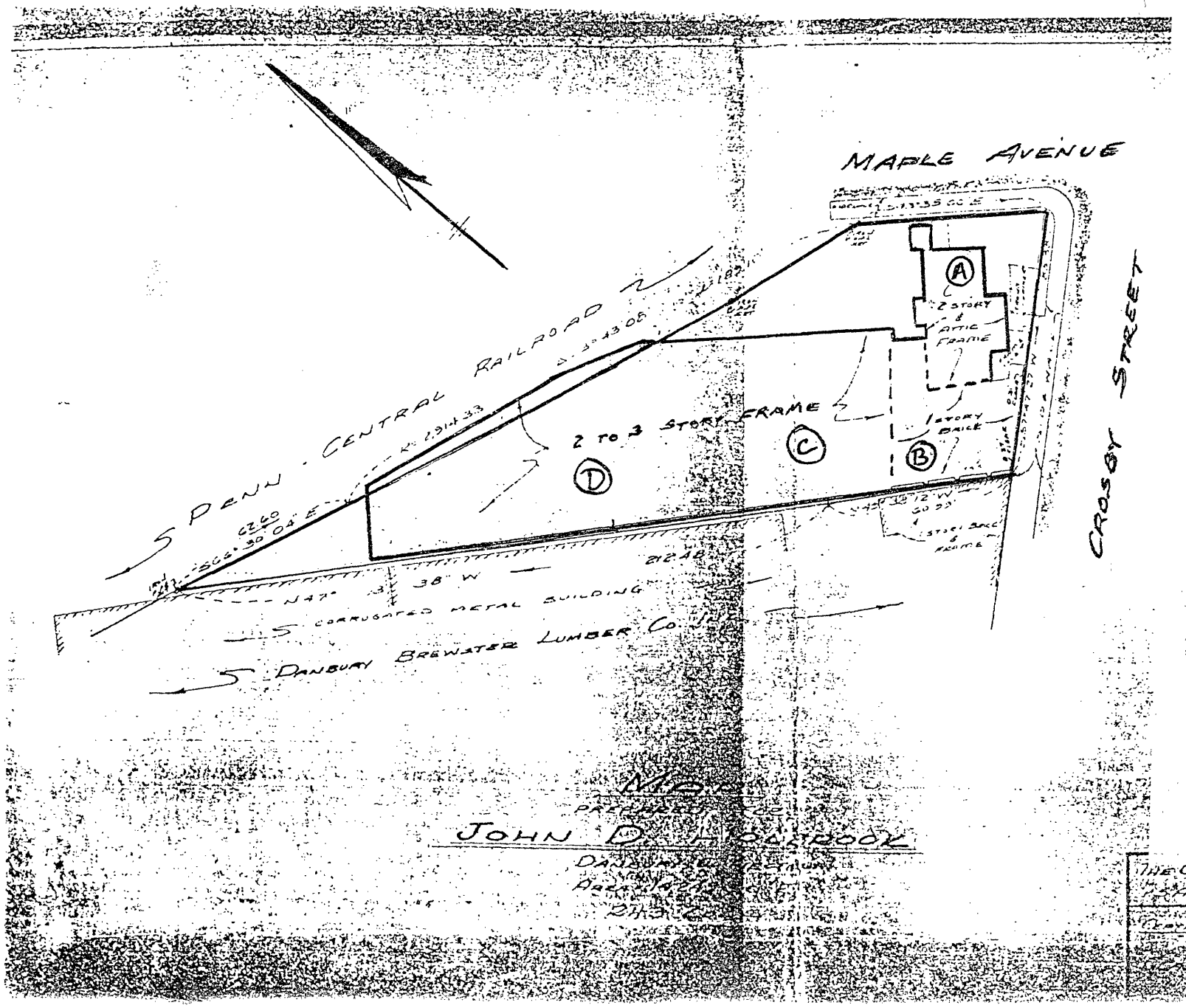
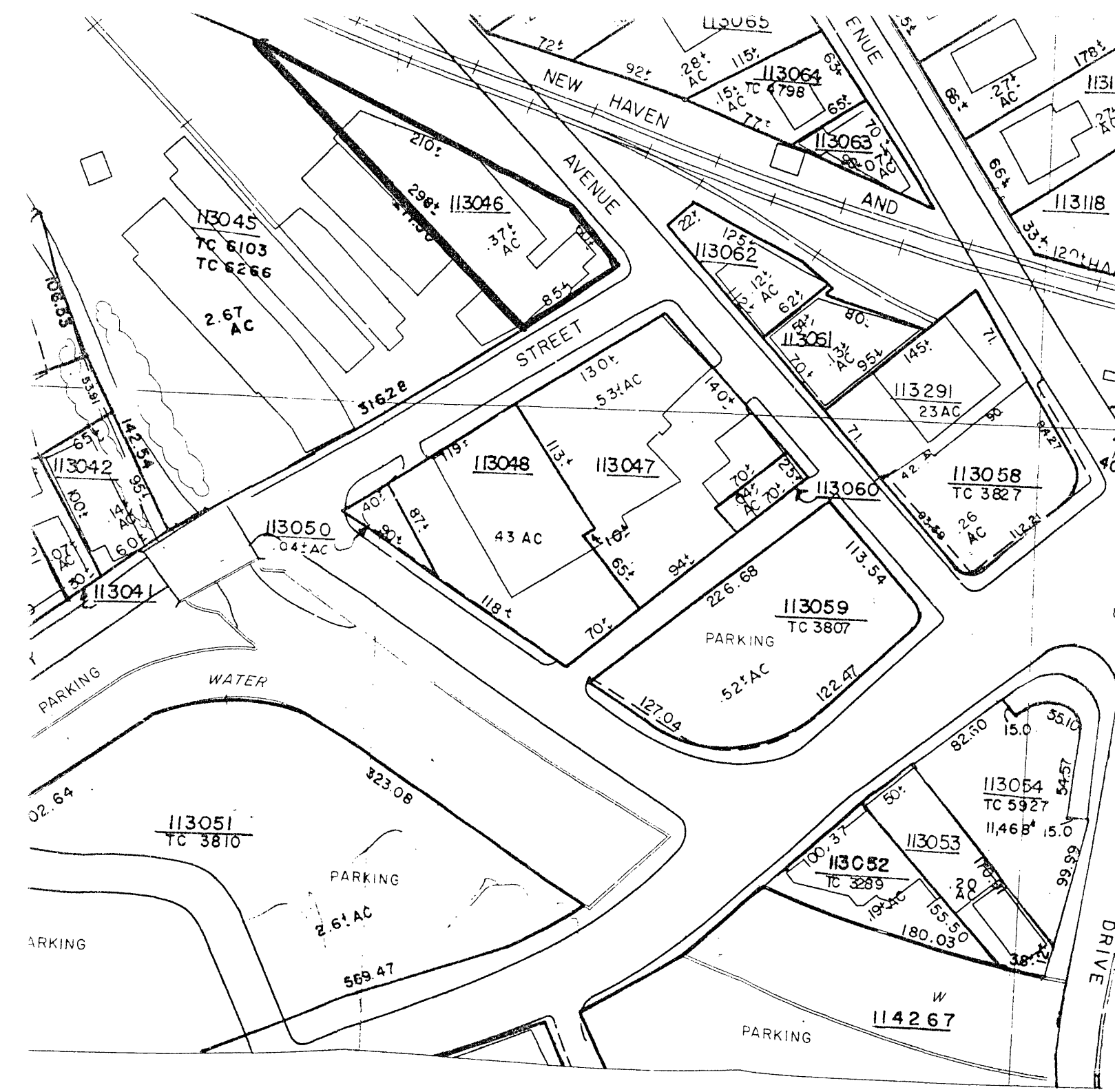


FIGURE 1.-Sketch Map
Ball & Roller Bearing Co.
20-22 Maple Ave.
Danbury, Conn.
Map prepared in 1974 for John Holbrook, present owner. Not to scale

Key:
A=Joseph Nutt House, 1886
B=Hardening Building, c. 1909
C=Three-story section of factory; lower two stories built 1886, upper added c. 1909.
D=Two-story sections of factory, added c. 1910-1916

Notes: Dotted lines indicate walls of individual structures, which are attached by walkways.

Owner has easement on the wall of the factory building which overlaps the property line onto the railroad right-of-way.



Ball and Roller Bearing
Company
Danbury, Connecticut

Danbury Tax Assessor's
Map

I-14

N

GRIDS BASED ON CONNECTICUT
STATE COORDINATE SYSTEM

100 0 100

L. R. HEIM.

ROLL GRINDING MACHINE.

APPLICATION FILED JULY 13, 1917.

1,264,930.

Patented May 7, 1918.

4 SHEETS—SHEET 1.

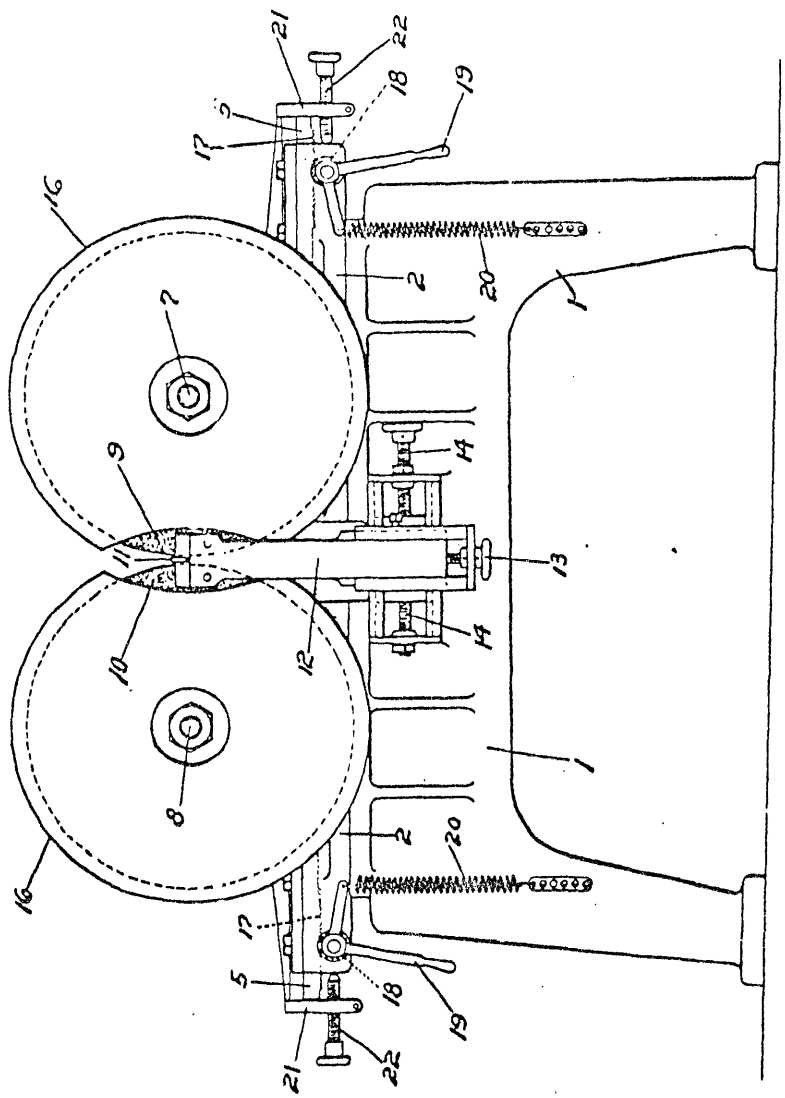


Fig. 1

WITNESS

Celestia F. Hayden

INVENTOR

Lewis R. Heim

BY

A. M. Wooster

ATTORNEY

FIGURE 2