MANUAL AND DIRECTORY

DIE CASTING IN CANADA

Department of Industry, Ottawa, Ont.

MANUAL AND DIRECTORY OF DIE CASTING IN CANADA

This Publication was prepared jointly by the Die Casters Section of the Automotive Parts Manufacturers' Association (Canada), The Canadian Chapter of the Society of Die Casting Engineers, Incorporated, and the Materials Branch of the Department of Industry. Its purpose is to provide information on Canadian die casting facilities for existing and potential users of die castings in Canada and abroad.

The information contained in the directory was compiled from questionnaires which were sent to known Canadian die casting producers. Any companies inadvertently omitted are invited to submit data on their operations so that they may be included in a revised edition.

Department of Industry, Materials Branch, Ottawa, Canada

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ILLUSTRATIONS

PHOTO CREDITS

The assistance provided by the following companies in supplying photographic illustrations is gratefully acknowledged.

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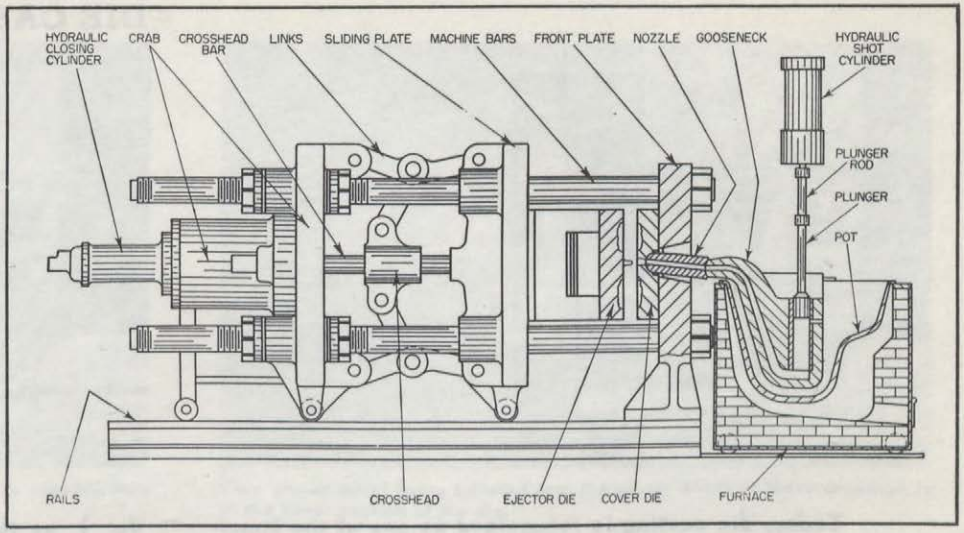
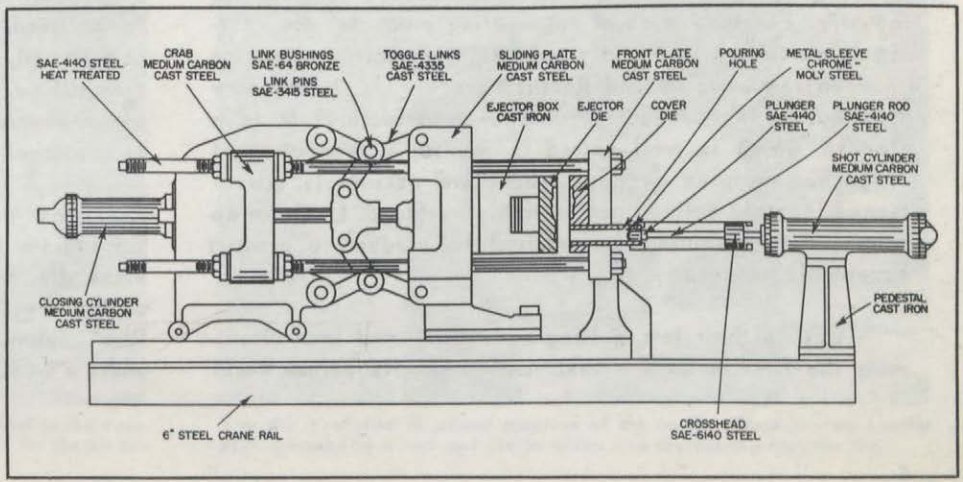


Hot Chamber Die Casting Machine



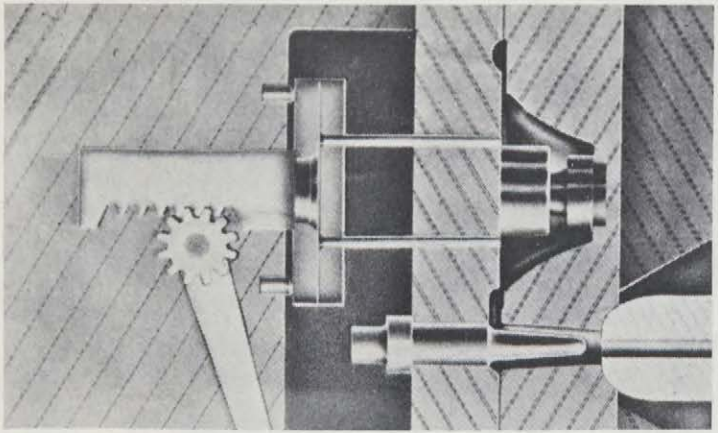
Cold Chamber Die Casting Machine

DIE CASTING

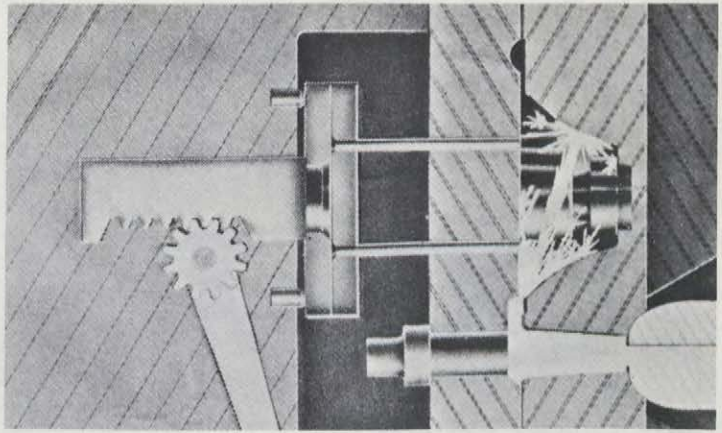
Today, die casting is recognized as one of the important high-speed quantity production processes available to industry. For thousands of engineering products, die casting – which has been aptly termed "the shortest distance between raw material and finished product" – is the only practical or economical method of manufacture. It is a process which is well suited to the rapid production of simple or complex castings which are accurately dimensioned, sharply defined and smoothly surfaced. Little or no subsequent machining is required to produce a product acceptable to industry.

Due to their low melting points, tin and lead alloys were the first to be die cast. Later, shortly before World War 1, as the result of improvements in die steels and in the operation of die casting machines, zinc alloys began to be used. In 1914, the die casting of aluminum alloys commenced, followed by copper (mainly brass) and magnesium alloys. Tin and lead alloys are now rarely used except where special properties, such as high resistance to corrosion, cannot be obtained by the use of other alloys.

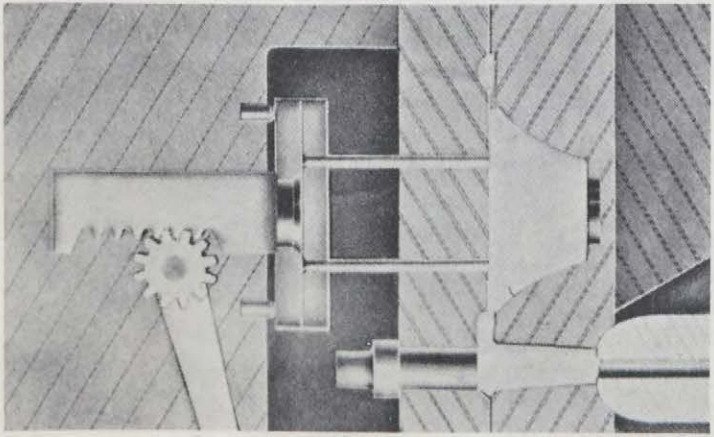
Essentially, the die casting machine consists of a mechanism for opening and closing a water-cooled split steel die, and a molten-metal injection system. One half of the die is fastened to a moving platen, the other to a fixed platen. With the two halves of the die clamped together under a massive locking force, molten alloy is



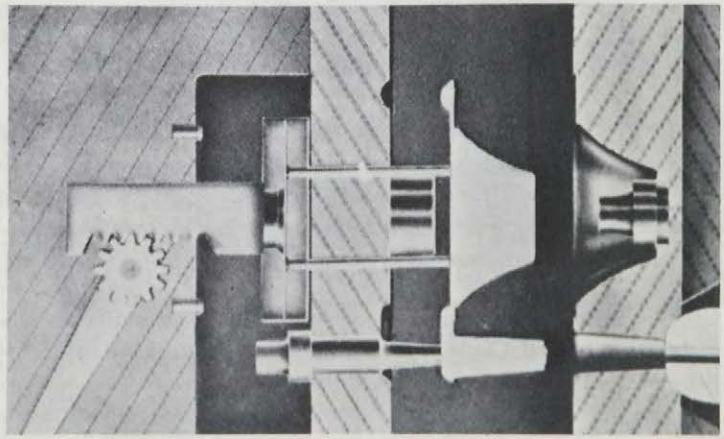
Here are the two sections of a die, closed and locked to receive from the gooseneck the "shot" of metal to form a casting.



This shows metal being injected into the cavity which in these drawings is in the cover section of the die.



The cavity of the die is now completely filled. Note the metal in the overflow well at the top of the cavity which provides an outlet for the air entrapped in the die cavity.

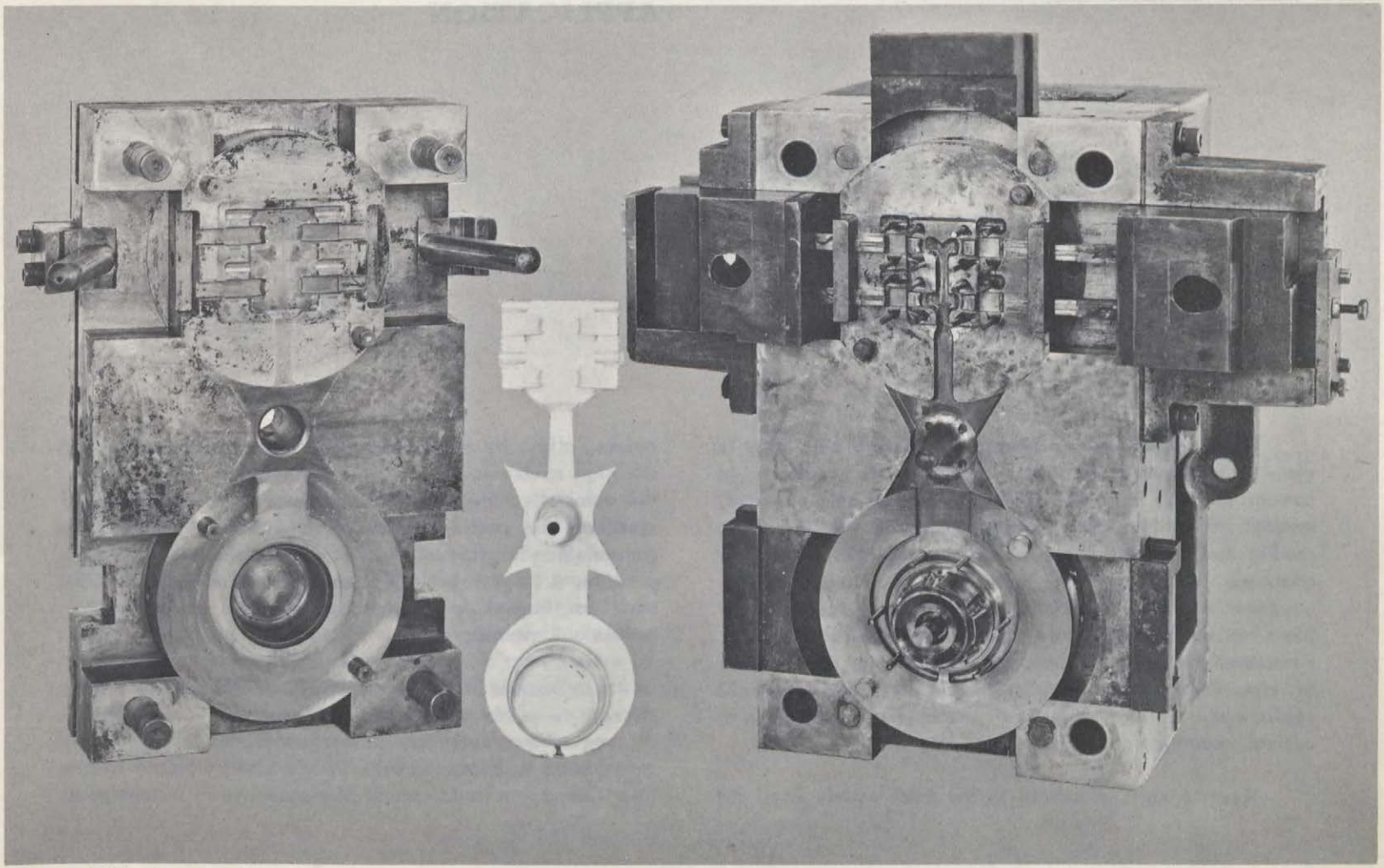


The die is opened to permit ejection of the casting. Note the two ejector pins operated by a rack and pinion which free the casting from the die.

then injected under high pressure into the die cavity. When the alloy has solidified, the two halves of the die are separated and the casting is ejected.

To produce lead, tin and zinc die castings, Hot Chamber machines are used. (See figure 1). With this type of machine, the injection plunger is immersed in a holding furnace containing the molten alloy, thus permitting rapid machine cycling speeds.

To produce aluminum, magnesium or copper alloy die castings, Cold Chamber machines are used because of the considerably higher melting points of these alloys (See figure 2). With this type of machine sufficient molten alloy for each casting is ladled into a "cold chamber" injection sleeve from a separate melting furnace located adjacent to the die casting machine. In recent years, the slower operation of Cold Chamber machines compared to Hot Chamber machines, has been partly overcome through the use of automatic ladling and metering devices.



A Typical Die Casting Die

APPLICATION

Of the various alloys used in die casting, zinc alloy is the most widely used. The major reason for its popularity, in comparison with the other alloys, is its desirable physical, mechanical and casting properties and its ability to be readily finished with commercial electroplated or organic coatings. The automotive industry is the largest single consumer of zinc die castings, for which typical applications are window regulators, door handles, decorative trim, carburetor parts, fuel pumps, etc. Other major applications of zinc die castings are component parts for household appliances, various types of machinery, photographic, optical, recording and office equipment, etc.

Next to zinc, aluminum is the most widely used die casting alloy. Its chief advantages are its light weight and its high resistance to corrosion. As in the case of zinc, the automotive industry accounts for a large percentage of aluminum die castings produced. Typical applications are transmission housings and other functional automotive components. A large volume of aluminum die cast parts is also used for household appliances, portable tools, electric motors and generators.

Magnesium alloy die castings are used where a high strength-to-weight ratio is desirable as in the manufacture of typewriters, outboard motors, photographic equipment, chain saws and lawn mowers. In the United States and in West Germany a large amount of magnesium is consumed in

die casting by automotive manufacturers.

Copper alloys are not nearly as widely used for die casting as the other alloys because of their high melting points, which result in relatively short die life. However, there are certain applications where the special properties of copper-alloy die castings more than offset their higher cost. For example, their exceptional strength and high wear resistance are particularly important in the manufacture of gears, transmission forks, clutch and shock absorber parts and bearings. Excellent resistance to corrosion is one of the properties which accounts for the extensive use of copper-alloy die castings in the plumbing and hardware industries.

Aluminum — Base Alloys

A.S.T.M. Designation B85–60
Aluminum-Base Alloy Die Castings

Designation	Standard Alloys*	
Commercial ASTM	13 S12B	380 SC84B
Composition-per cent		
Copper	0.6	3.0-4.0
Iron	2.0	2.0
Silicon	11.0-13.0	7.5-9.5
Manganese	0.35	0.50
Magnesium	0.10	0.10
Zinc	0.50	3.0
Nickel	0.50	0.50
Tin	0.15	0.35
Total Others	0.25	0.50
Aluminum	Remainder	Remainder
Properties and Constants		
Tensile Strength, psi	43,000	46,000
Yield Strength (0.2% offset), psi	21,000	23,000
Elongation, % in 2 in.	2.5	2.5
Shear Strength, psi	25,000	28,000
Fatigue Strength, psi	19,000	20,000
Specific Gravity	2.65	2.71
Weight per cu. in., lbs.	0.096	0.098
Melting Point (Liquid), °F.	1080	1100
Thermal Conductivity, CGS	0.29	0.23
Thermal Expansion, in/in/°F	11.9×10^{-6}	12.1×10^{-6}
Electrical Conductivity, % of Copper Standard	31	23

*These Standard Alloys are also available with 1.3% maximum iron content (designated A13 and A380) having higher elongation.

Alloys 13 and 380 are most commonly used and represent over 90% by weight of all aluminum alloy castings produced. Other alloys are also available but these are usually only specified for applications requiring certain specific properties.

A.S.T.M. Designation B85–60
Aluminum-Base Alloy Die Castings

Designation	Special Alloys			
Commercial ASTM	360* SG100B*	384 SC114A	218 G8A	43 S5C
Composition-per cent				
Copper	0.6	3.0-4.5	0.25	0.6
Iron	2.0	1.3	1.8	2.0
Silicon	9.0-10.0	10.5-12.0	0.35	4.5-6.0
Manganese	0.35	0.50	0.35	0.35
Magnesium	0.4-0.6	0.10	7.5-8.5	0.10
Zinc	0.50	1.0	0.15	0.50
Nickel	0.50	0.50	0.15	0.50
Tin	0.15	0.35	0.15	0.15
Total Others	0.25	0.50	0.25	0.25
Aluminum	Remainder	Remainder	Remainder	Remainder
Properties and Constants				
Tensile Strength, psi	44,000	48,000	45,000	33,000
Yield Strength (0.2% offset), psi	25,000	24,000	28,000	14,000
Elongation, % in 2 in.	2.5	2.5	5.0	9.0
Shear Strength, psi	28,000	29,000	29,000	19,000
Fatigue Strength, psi	20,000	20,000	20,000	17,000
Specific Gravity	2.63	2.70	2.57	2.65
Weight per cu. in., lb.	0.095	0.098	0.093	0.096
Melting Point (Liquid), °F.	1105	1080	1150	1170
Thermal Conductivity, CGS	0.27	0.23	0.23	0.34
Thermal Expansion, in/in/°F.	12.2×10^{-6}	11.7×10^{-6}	13.9×10^{-6}	12.9×10^{-6}
Electrical Conductivity, % of Copper Standard	29	23	24	37

*This alloy is also available in lower iron composition (designated A360) having higher ductility.

Note: The value indicated for typical properties and constants are for separately die cast test bars and do not represent values for specimens cut from die castings.

For Canadian buyers of aluminum die castings the following table will be useful.

Relevant Specifications for Aluminum Alloy Die Casting Alloys

Commercial US Alloy No.	A.S.T.M. Alloy No. (B85-60)	C.S.A. Alloy No. (HA. 3)	Alcan Alloy No.
A13	S12A	S12P	•160X
13	S12B	- -	B160
A380	SC84A	SC84	143
380	SC84B	- -	C143
A360	SG100A	- -	B150
360	SG100B	- -	B150
384	SC114A	- -	6369
218	G8A	G8	340
43	S5C	S 5	123

Copper — Base Alloys

The chemical compositions, physical properties and constants for the copper base alloys most generally used for die casting are shown in the following table.

A.S.T.M. Designation B176-62
Copper Base (Brass) Alloy Die Castings.

Designation	Standard Copper-Base Alloys		
Commercial and ASTM	Z30A	ZS331A	Zs144A
Composition-per cent			
Copper	57.0 min.	63.0 to 67.0	80.0 to 83.0
Silicon	.25 max.	0.75 to 1.25	3.75 to 4.25
Lead, max.	1.50	0.25	0.15
Tin, max.	1.50	0.25	0.25
Manganese, max.	0.25	0.15	0.15
Aluminum, max.	0.25	0.15	0.15
Iron, max.	0.25	0.15	0.15
Magnesium, max.	----	----	0.01
Other elements, max.	0.50	0.50	0.25
Zinc	30.0 min.	Remainder	Remainder
Properties and Constants			
Tensile Strength, psi	55,000	70,000	85,000
Yield Strength (0.2% offset) psi	30,000	35,000	50,000
Elongation, % in 2 in.	15	25	25
Impact Strength, Charpy, ft. lb.	40	50	70
Hardness, Rockwell B Scale	55-60	68-72	85-90
Modulus of Elasticity	15×10^{-6}	15×10^{-6}	20×10^{-6}

Note: The values indicated for typical properties and constants are for separately die cast test bars and do not represent values for specimens cut from die castings.

Lead and Tin-Base Alloys

A few typical lead and tin alloys which are still used for special applications where high corrosion resistance is required or where high density or unit weight is an important factor follow.

	Copper per cent	Antimony per cent	Lead per cent	Tin per cent
Lead alloy	–	10	90	–
" "	–	15	80	5
Tin alloy	4.5	4.5	--	91
" "	3	10.5	25.0	61.5

Magnesium-Base Alloys

Two alloys – AZ90X and AZ91X – are generally used for die castings. The difference between the two alloys is in the zinc content. In alloy AZ90X the zinc content is 0.2% max. whereas in alloy AZ91X the zinc content is 0.4% minimum up to 1.0% maximum.

Alloy AZ91X is quite suitable for the general range of die castings, but it has been shown that the lower content of zinc in AZ90X facilitates the high speed production of thin wall die castings and substantially reduces hot cracking.

C.S.A. Standard HG. 11 Magnesium Alloy Die Castings		
Alloy Number	HG. 11.AZ90X	HG. 11.AZ91X
Composition - percent		
Aluminium	8.5 to 9.5	8.3 to 9.3
Zinc	0.2 max.	0.40 to 1.0
Manganese	0.15 to 0.40	0.15 to 0.40
Silicon, max.	0.15	0.15
Copper, max.	0.01	0.01
Nickel, max.	0.005	0.005
Iron, max.	0.008	0.008
Others	0.02	0.02
(Total Other Elements)	0.10	0.10
Magnesium	Remainder	Remainder

The properties and constants for the above two alloys are as follows:	
Tensile Strength, psi	34,000
Tensile Yield Strength (0.2% offset) psi	23,000
Elongation, % in 2 in.	3
Shear Strength, psi	20,000
Compressive Yield Strength, psi	22,000
Ultimate Compressive Strength, psi	58,000
Fatigue Strength, psi	14,000
Specific Gravity	1.80
Weight per cu. in., lb.	0.066
Thermal Conductivity, CGS	0.17
Thermal Expansion, in./in./°F	15.2×10^{-6}
Electrical Conductivity, % of Copper Standard	10

Note: The values indicated for typical properties and constants are for separately die cast test bars and do not represent values for specimens cut from die castings.

Zinc — Base Alloys

The die casting alloys in the following tables are commonly referred to by the Industry as Alloy No. 3 and 5 respectively. However, it is recommended that the appropriate formal A. S. T. M. designation be employed when zinc alloy die castings are being purchased.

A. S. T. M. Designation B. 86-63 Zinc-Base Alloy Die Castings		
CHEMICAL COMPOSITION		
Designations		
A. S. T. M. (present)	AG40A	AC41A
A. S. T. M. (previous)	(XXIII)	(XXV)
S. A. E.	903	905
Trade or Common	Alloy No. 3	Alloy No. 5
% Copper	0.25 max. (b)	0.75 to 1.25
% Aluminum	3.5 to 4.3	3.5 to 4.3
% Magnesium	0.020 to 0.05	0.03 to 0.08
% Iron	0.100 max.	0.100 max.
% Lead	0.005 max.	0.007 max.
% Cadmium	0.004 max.	0.005 max.
% Tin	0.003 max.	0.005 max.
% Zinc	Remainder	Remainder

(a) Note: Zinc alloy die castings may contain nickel, chromium, silicon and manganese in amounts of 0.02, 0.02, 0.035 and 0.5 per cent respectively. No harmful effects have ever been noted due to the presence of these elements in these concentrations and, therefore, analyses are not required for these elements.

(b) Note: For the majority of commercial applications, a copper content in the range of 0.25 to 0.75 per cent will not adversely affect the serviceability of die castings and should not serve as a basis of rejection.

Typical properties and constants are shown in the table below. The values indicated are for separately die cast test bars and do not represent values for specimens cut from die castings.

TYPICAL PROPERTIES: ZINC ALLOY DIE CASTINGS	
Properties and Constants	(Special Note)
Tensile Strength, psi	41,000 --- 47,000
Elongation, % in 2 in.	10 --- 7
Impact Strength, Charpy, ft. lbs.	43 --- 48
Shear Strength, psi	81,000 --- 38,000
Specific Gravity	6.6
Weight per cu. in., lbs.	.24
Melting Point (liquidus) F	727.9
Thermal Expansion, in/in/ F	15.2×10^{-6}
Electrical Conductivity, % of Copper Standard	26

SPECIAL NOTE: Values are typical and where double figures are shown they represent the properties for copper content at minimum and maximum of composition.

PRODUCT REQUIREMENTS INFORMATION

The transmission of concise and complete information between the buyers and vendors of die castings is essential to the preparation and submission of sound die casting quotations. In an effort to eliminate the inconsistencies and misunderstandings which may arise when the cost of die castings is being estimated, the American Die Casting Institute has compiled and issued the following Product Standards for Die Casting.

The standards provide buyers with a check list of product requirements and enable die casting suppliers to establish a common basis of quotation. Use of these standards should contribute towards satisfaction by both buyer and vendor when a die casting goes into actual production. Copies may be obtained from the Die Casters' Section of the Automotive Parts Manufacturers' Association (Canada), Toronto.

PRODUCT STANDARDS FOR DIE CASTINGS

PRODUCT REQUIREMENTS INFORMATION

Supplemental data to details on print, for use in establishing basis of quotation.

(Reference — ADCI Standard C-9)

Customer's Name _____ Individual _____

Address _____
(Street) (City) (Zone) (State)

Prints attached — ☐ yes, ☐ no. Part name and number _____

Is part in present production?—☐ yes, ☐ no. Sample available?—☐ yes, ☐ no. If not _____
ESTIMATED WEIGHT

Anticipated total order _____ Quantity per release _____

Anticipated annual requirement _____ Daily _____ or weekly _____ requirements

Alloy to be used _____ Estimate due date _____

IN INDICATING YOUR PART REQUIREMENTS BELOW NOTE THAT, THE LOWER THE NUMBER, THE LOWER THE PRODUCTION COST. (THIS INFORMATION MAY ALSO BE INDICATED ON YOUR PRINTS BY CODING WITH THE APPLICABLE REQUIREMENT NUMBERS SUCH AS A1, B2, C1, ETC.)

A. SURFACE CONDITION	☐ 1. Some residue and chips not objectionable. ☐ 2. Shop run — blown reasonable free of chips but not degreased. ☐ 3. Clean, dry and free of chips.
B. CAST SURFACE FINISH	☐ 1. Mechanical Grade — finish is not significant. ☐ 2. Painting Grade — some streaks and chill areas that can be covered with paint. ☐ 3. High Quality — for electroplating, anodizing or other decorative finishing.
C. FLASH REMOVAL Parting Line External Profile	☐ 1. No die trimming — break off gates and overflows and remove flash within ⅛". ☐ 2. Die trimmed — to within approx. 015" of die casting surface (See ADCI Standard E-10). ☐ 3. Hand filed or polished — flush with die casting surface.
D. FLASH REMOVAL Cored Holes	☐ 1. Flash not removed. ☐ 2. Flash trimmed to within .010" of die casting surface. ☐ 3. Flash to be machined.
E. FLASH REMOVAL Ejector Pins	☐ 1. Not removed. (See ADCI Standard E-9). ☐ 2. Crushed or flattened. (See ADCI Standard E-9). ☐ 3. Removed from specific locations.
F. PRESSURE TIGHTNESS	☐ 1. No requirement. ☐ 2. Pressure tight to agreed upon psi. Testing medium _____ ☐ 3. Other arrangements to be agreed upon.
G. FLATNESS	☐ 1. No requirement. ☐ 2. To tolerances shown in ADCI Standard E-5. ☐ 3. Critical — to special requirement.
H. DIMENSIONS	☐ 1. Normal — (As per ADCI Standards). ☐ 2. Semi-Critical — must hold certain specified dimensions. Others as per ADCI Standards. ☐ 3. Critical — must hold all specified dimensions.
I. CUSTOMER'S RECEIVING INSPECTION	☐ 1. No Statistical Quality Control — no unusual inspection requirements. ☐ 2. Statistical Quality Control — AQL's over 2.5%. ☐ 3. Statistical Quality Control — shipment acceptable at AQL of _____%. (2 and 3 above, require details of inspection procedure, with major and minor defects agreed upon)
J. PACKAGING	☐ 1. Not critical — bulk packed. ☐ 2. Layer packed — with separators. ☐ 3. Packed in cell type separators or individually wrapped.
K. SPECIAL REQUIREMENTS	

PRODUCT STANDARDS FOR DIE CASTINGS

FINISHING REQUIREMENTS INFORMATION

Supplemental data to Product Requirements Information (ADCI Standard C9) for use in establishing basis of quotation.
(Reference—ADCI Standard C10)

Customer's Name _____ Individual _____

Address _____ Date _____
(Street) (City) (Zone) (State)

Prints attached – ☐ yes, ☐ no. Part name and number _____

Is part in present production?–☐ yes, ☐ no. Sample available?–☐ yes, ☐ no. If not _____
ESTIMATED WEIGHT

Anticipated total order _____ Quantity per release _____

Anticipated annual requirement _____ Daily _____ or weekly _____ requirements

Alloy to be used _____ Estimate due date _____

IN INDICATING YOUR PART REQUIREMENTS BELOW NOTE THAT, THE LOWER THE NUMBER, THE LOWER THE PRODUCTION COST. (THIS INFORMATION MAY ALSO BE INDICATED ON YOUR PRINTS BY CODING WITH THE APPLICABLE REQUIREMENT NUMBERS SUCH AS L1, M2, N1, ETC.)

L. PARTING LINES	☐ 1. Polishing not required. ☐ 2. Polish only where marked on drawing. ☐ 3. Polish all parting lines (except as noted).
M. SURFACE PREPARATION	☐ 1. No buffing required. ☐ 2. Mechanical (burnishing, tumbling, etc.). ☐ 3. Buff as indicated on drawing.
N. PLATING, ANODIZING etc.	☐ 1. Protective Only _____ ☐ 2. Decorative _____ ☐ 3. Severe exposure _____ Specs. _____
O. PAINTING	☐ 1. Protective Only _____ ☐ 2. Decorative: Specs. _____ ☐ 3. Application requires base coat or special treatment (as noted).
P. EXPOSURE	☐ 1. Normal interior. ☐ 2. Exposure to weather: Specs. _____ ☐ 3. Exposure to unusual chemistry: Specs. _____
Q. APPEARANCE	☐ 1. Utility Grade. ☐ 2. Commercial Grade. ☐ 3. Superior Grade.
R. SPECIAL REQUIREMENTS	_____ _____ _____

DIRECTORY OF DIE CASTERS BY PROVINCE

Note: Under "Die Casting Machines Installed" the following coding system has been employed.

1. **Al = Aluminum; Cu = Copper; Pb = Lead; Zn = Zinc; Mg = Magnesium**
2. **The figures following the chemical symbol indicate number of machines (in brackets) and locking pressure.**

Example: Al (2) 400 = Aluminum alloy die casting machines of which there are two with a locking pressure of 400 tons.

British Columbia

STUART DIECASTING COMPANY LIMITED,
1270 Boundary Road,
Vancouver 6.
Telephone: CY 9-7551

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum and Zinc

DIE CASTING EQUIPMENT INSTALLED: Al (1) 400 Zn (1) 100
(1) 500 (1) 150
(1) 200
(1) 400

Alberta

SIREN MANUFACTURING COMPANY LIMITED,
3436-15 Street, S.E.,
Calgary.
Telephone: 273-4212

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining and finishing.

DIE CASTING ALLOYS USED: Aluminum and Zinc

Manitoba

BAYCAST PRODUCTS LIMITED,
2200 Logan Avenue,
Winnipeg.
Telephone: 775-0441

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining and assembly.

DIE CASTING ALLOYS USED: Aluminum

DIE CASTING EQUIPMENT INSTALLED: Al (1) 75

DIECAST PRODUCTS LIMITED,
1085 Winnipeg Avenue,
Winnipeg 3.
Telephone: Spruce 4-5541

EASTERN SALES OFFICE: Room 6, 105 Willowdale Avenue,
Willowdale, Ontario.
Telephone: 225-7132

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: ZN (1) 250

Ontario

AMEROCK LIMITED,
Meoford.
(P.O. Box 521, Meoford.)
Telephone: 625
Telex: 02-8724

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (6) 200
(1) 400

BANNER METAL PRODUCTS LIMITED,
1680 Kildare Road,
Windsor, Ontario.
Telephone: 256-2606

SERVICES AVAILABLE: Custom die casting and associated, toolmaking, machining and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (2) 18

BARBER DIE CASTING COMPANY LIMITED,
Hillyard Street,
Hamilton.
(P.O. Box 416, Postal Station "B")
Telephone: 527-9178 Area Code: 416

SERVICES AVAILABLE: Custom die casting, product design and machining. Toolmaking, finishing and assembly are done both in the company plant and sub-contracts to reputable firms.

DIE CASTING ALLOYS USED: Aluminum, Zinc, Magnesium and Copper.

DIE CASTING MACHINES INSTALLED:

ALLOY	LOCKING PRESSURES (tons)
Aluminum	Full range of machines, 250 to 1,400 tons.
Zinc	Full range of machines, 250 to 1,400 tons.
Magnesium	Full range of machines, 250 to 600 tons.
Copper	Full range of machines, 250 to 600 tons.

BURLINGTON DIE CASTING LIMITED,
2410 Industrial Street,
Burlington.
(P.O. Box 152, Burlington)
Telephone: 637-7834

SERVICES AVAILABLE: Custom die casting, product design, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum

DIE CASTING EQUIPMENT INSTALLED: Al (1) 300
(1) 500
(1) 600

CANADIAN GENERAL ELECTRIC COMPANY LIMITED,
107 Park Street North,
Peterborough.
Telephone: 742-7711

SERVICES AVAILABLE: None. The company's facilities are captive. It has facilities for die casting, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum

DIE CASTING EQUIPMENT INSTALLED: Al (2) 10
(1) 100
(2) 400

CARPENTER DIE CASTING COMPANY LIMITED,
474 Burlington Street East,
Hamilton.
Telephone: 529-8530

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum and Zinc

DIE CASTING EQUIPMENT INSTALLED: Al (1) 150 Zn (1) 100
(1) 400 (1) 200
(1) 500 (1) 300

CHRYSLER CANADA LIMITED,
15 Brown's Line,
Toronto 14.
Telephone: 259-2341
Telex: 0229438

SERVICES AVAILABLE: None. The company's facilities are captive. It has facilities for die casting, machining, and finishing.

DIE CASTING ALLOYS USED: Aluminum

DIE CASTING EQUIPMENT INSTALLED: Al (5) 600
(4) 750
(2) 1,000

COULTER MANUFACTURING COMPANY LIMITED,
28 Richmond Street West,
Oshawa.
(P.O. Box 190, Oshawa)
Telephone: 725-4736 Area Code: 416

SERVICES AVAILABLE: Custom die casting, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING MACHINES INSTALLED: Zn (1) 200 Zn (2) 500
(1) 300 (1) 600

DAISY MANUFACTURING COMPANY OF CANADA LIMITED,
185 King Street,
Preston.
Telephone: 653-3212

SERVICES AVAILABLE: None. The company's facilities are captive. It has facilities for die casting, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (1) 400

DIE CASTERS COMPANY LIMITED,
45 Colville Road,
Toronto 15.
Telephone: 249-8254

SERVICES AVAILABLE: Custom die casting, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (2) 100
(1) 150

DOMINION DIE CASTING LIMITED,
Libby Street,
Wallaceburg.
Telephone: 627-3361

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining and assembly.

DIE CASTING ALLOYS USED: Aluminum, Zinc and Magnesium

DIE CASTING EQUIPMENT INSTALLED: Al (1) 400 Zn (1) 100
(3) 600 (6) 400

E & S QUALITY PRODUCTS,
P.O. Box 94,
Cottam.
Telephone: 839-4892

SERVICES AVAILABLE: Custom die casting, toolmaking, and machining.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (1) 80
(1) 175
(1) 225

ELECTROLINE MANUFACTURING COMPANY LIMITED,
1305 Windsor Avenue,
Windsor.
(P.O. Box 592, Windsor)
Telephone: CL 2-7266

SERVICES AVAILABLE: Custom die casting, toolmaking, machining, finishing and assembly. (Does some captive die casting also.)

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (2) 250
(2) 400

FISHER GAUGE WORKS LIMITED,
194 Sopia Street,
Peterborough.
Telephone: 745-0567, Area Code: 705

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining and assembly.

DIE CASTING ALLOYS USED: Aluminum and Zinc

DIE CASTING EQUIPMENT INSTALLED: one aluminum and eight zinc machines which are specially designed to produce close-tolerance die cast gears.

HAHN BRASS LIMITED,
367 Victoria Street,
New Hamburg.
Telephone: 662-1620

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (1) 50
(1) 200
(1) 300

THE HOOVER COMPANY LIMITED,
Barton Street East at Gage Avenue,
Hamilton.
(P.O. Box 3010, Postal Station "B", Hamilton)
Telephone: Liberty 5-1151

SERVICES AVAILABLE: Custom die casting, some toolmaking and machining, complete finishing and assembly. (Does some captive die casting also).

DIE CASTING ALLOYS USED: Aluminum

DIE CASTING EQUIPMENT INSTALLED: Al (1) 500
(2) 600

HUDSON BAY DIECASTING LIMITED,
West Drive, Bramalea.
(P.O. Box 1050, Brampton)
Telephone: 677-3282

SERVICES AVAILABLE: Custom die casting, toolmaking, machining, finishing and assembly, chrome plating.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING MACHINES INSTALLED: Zn (4) 500
(2) 800

J & K ZINC DIE CASTING COMPANY LIMITED,
48 Crockford Boulevard,
Scarborough.
Telephone: 759-6759

SERVICES AVAILABLE: Custom die casting, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (1) 100
(1) 250

JUTRAS DIE CASTING LIMITED,
165 Midwest Road,
Scarboro.
Telephone: 751-4150

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (1) 100
(1) 250

LAKESHORE DIE CASTING LIMITED,
482 South Service Road,
Oakville.
(P.O. Box 25, Oakville)
Telephone: Oakville: VI 5-2867 Toronto WA 4-9874

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum and zinc

DIE CASTING EQUIPMENT INSTALLED: Al (1) 350 Zn (1) 250
(4) 600 (2) 300
(2) 800 (1) 500

LAST MINUTE MANUFACTURING COMPANY LIMITED,
100 Wellington Street,
Thorold.
Telephone: 227-1802

SERVICES AVAILABLE: Custom die casting, toolmaking, machining and assembly.

DIE CASTING ALLOYS USED: Aluminum and Zinc

DIE CASTING EQUIPMENT INSTALLED: Al (1) 500 Zn (1) 150
(2) 300
(1) 400

LIGHTNING FASTENER COMPANY LIMITED,
50 Niagara Street,
St. Catharines.
Telephone: 685-7321 Telex: 021-522

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (5) 0.3
(15) 0.5

THE McKINNON INDUSTRIES LIMITED,
Ontario Street,
St. Catharines.
Telephone: 684-7211

SERVICES AVAILABLE: None. The company's facilities are captive. It has facilities for die casting, toolmaking, machining and assembly.

DIE CASTING ALLOYS USED: Aluminum

DIE CASTING EQUIPMENT INSTALLED: Al (1) 500
(1) 600
(1) 800

MENDLER MANUFACTURING COMPANY LIMITED,
Malden Road,
Windsor.
(P.O. Box 126, Sandwich P.O., Windsor)
Telephone: 969-6081

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (1) 60 Zn (1) 250
(1) 150 (1) 400

NATIONAL HARDWARE SPECIALTIES LIMITED,
P.O. Box 250,
Dresden.
Telephone: 683-4451 Area Code: 519

SERVICES AVAILABLE: Custom die casting, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (1) 100
(5) 400
(1) 600

OUTBOARD MARINE CORPORATION OF CANADA LIMITED,
Monaghan Road,
Peterborough.
Telephone: 743-2261

SERVICES AVAILABLE: None. The company's facilities are captive. It has facilities for die casting, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum and Magnesium

DIE CASTING EQUIPMENT INSTALLED: Al (4) 600 Mg (3) 600
(2) 800

PRECISION CASTINGS LIMITED,
156 St. Helens Avenue,
Toronto 4.
Telephone: LE 7-3146

SERVICES AVAILABLE: Custom die casting, toolmaking and machining.

DIE CASTING ALLOYS USED: Aluminum

DIE CASTING EQUIPMENT INSTALLED: Al (1) 400 A2 (1) 600
Al (1) 1,000

PRESSURE CASTINGS OF CANADA LIMITED,
1777 Weston Road,
Weston.
Telephone: 241-9111

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: A number of machines of varying capacity suitable for the production of household appliances, automotive parts, hardware items etc.

REGAL DIE CASTING COMPANY LIMITED,
7 Research Road,
Brampton.
Telephone: 677-1435

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (1) 100
(1) 250

SCHULTZ DIE CASTING OF CANADA LIMITED,
77 St. David Street,
Lindsay.
Telephone: 324-6161

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING MACHINES INSTALLED: Zn (2) 50 Zn (1) 500
(6) 200 (1) 750
(5) 400

STAR EXPANSION INDUSTRIES (1963) LIMITED,
1061 The Queensway,
Toronto 18.
Telephone: 259-8241

SERVICES AVAILABLE: None. The company's facilities are captive. It has facilities for die casting, toolmaking and assembly.

DIE CASTING ALLOYS USED: Zinc and Lead

DIE CASTING MACHINES: Three zinc and three lead machines

WEBSTER MFG. (LONDON) LIMITED,
1161 King Street,
London.
(P.O. Box 4575, London)
Telephone: 455-1220

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, mochining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (1) 75 Zn (1) 500
(4) 150 (1) 600
(1) 400

WHITE DIE CASTING COMPANY LIMITED,
354 McNab Street,
Dundas, Ontario.
Telephone: 627-7513

SERVICES AVAILABLE: Custom die casting, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (2) 300

Quebec

BARSCHEL AND COMPANY,
955-14th Avenue,
Lachine.
Telephone: 637-8181

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining and assembly.

DIE CASTING ALLOYS USED: Zinc and Lead

DIE CASTING MACHINES INSTALLED: Zn (1) 100 Pb (1) 50

CLIX FASTENER CORPORATION
425 River Street,
Montreal 19.
Telephone: 767-9971

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, finishing and assembly and, if required, machining.

DIE CASTING ALLOYS USED: Zinc

*DIE CASTING EQUIPMENT INSTALLED: Zn (8) 0.37
(3) 1.0

*The company plans to install large equipment and so will be able to handle orders for larger die castings.

DOMINION LOCK COMPANY LIMITED,
7301 Decarie Boulevard,
Montreal 9.
Telephone: 738-1112

SERVICES AVAILABLE: Custom die casting, toolmaking, machining finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum and Zinc

DIE CASTING EQUIPMENT INSTALLED: Al (1) 200 Zn (1) 100
(1) 200
(1) 400

EASTERN DIE CASTING INCORPORATED,
2020 Thimens Street,
St. Laurent,
Montreal 8.
Telephone: 748-7308

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining and assembly.

DIE CASTING ALLOYS USED: Aluminum, Zinc and Lead

DIE CASTING EQUIPMENT INSTALLED: Al (1) 100 Zn (1) 35 Pb (1) 35
(2) 250 (1) 50 (1) 100
(1) 450 (1) 100
(1) 250

ELECTROLUX (CANADA) LIMITED,
2751 Trans-Canada Highway,
Pointe Claire.
Telephone: 695-1470 Area Code: 514
Telex: 01-20298-Elux. Poclar

SERVICES AVAILABLE: Nane. The company's facilities are captive. It has facilities for die casting, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum

DIE CASTING EQUIPMENT INSTALLED: Al (1) 400
(2) 600
(1) 800 (on order)

HERLICON METALS AND PLASTICS INCORPORATED,
3815 Ruskin Street,
Montreal 38.
Telephone: 722-5101

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum and Zinc

DIE CASTING EQUIPMENT INSTALLED: Al (2) 300 Zn (1) 250
(1) 400

HOME HEALTH EQUIPMENT CORPORATION,
739 Mountain Street,
Montreal 3.
Telephone: 866-1355

SERVICES AVAILABLE: Custom die casting, product design, drilling, tapping and assembly. Outside firms are available to provide toolmaking and finishing services.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING MACHINES INSTALLED: Zn (1) 20
(1) 100

KOMO FASTENERS LIMITED,
5570 Cartier Street,
Montreal.
Telephone: 527-1301

SERVICES AVAILABLE: Custom die casting, toolmaking, machining and assembly.

DIE CASTING ALLOYS USED: Zinc

DIE CASTING EQUIPMENT INSTALLED: Zn (6) ?

LYSTER DIE CASTING LIMITED,
Lyster Station,
Megantic County.

Telephone: 389-5751

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum and Zinc

DIE CASTING MACHINES INSTALLED: Al (1) 500 Zn (5) 25

METALLURGIE ST. RAYMOND LIMITED,
350 St. Hubert Street,
St. Raymond (Portneuf).

Telephone: 384-7056

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum, Zinc and Copper

DIE CASTING EQUIPMENT INSTALLED: Al (1) 300, Zn (1) 300, Cu (1) 0.5

RICHMOND MACHINE TOOL AND DIE CASTING, COMPANY LIMITED,
5680 Fullum Street,
Montreal.

Telephone: CR 3-2875

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum and Zinc

DIE CASTING EQUIPMENT INSTALLED: Al (1) 250 Zn (1) 50
(1) 400 (3) 150
(1) 600 (2) 200
(1) 250
(1) 300

SINGER COMPANY OF CANADA LIMITED,
200 St. Louis Street,
St. Jean.

Telephone: 348-4921

SERVICES AVAILABLE: None. The company's facilities are captive. It has facilities for die casting, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum and Zinc

DIE CASTING EQUIPMENT INSTALLED: Al (1) 100 Zn (1) 100

TERRY BURNERS INCORPORATED,
5015 Buchan Street,
Montreal.

Telephone: 739-1971

SERVICES AVAILABLE: None. The company's facilities are captive. It has facilities for die casting, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum and Zinc

DIE CASTING EQUIPMENT INSTALLED: Al (1) 150 Zn (1) 20
(1) 200
(1) 250

New Brunswick

A. O. POPE LIMITED,
90 Winter Street,
Saint John, New Brunswick.

Telephone: 693-2369 Area Code 506

SERVICES AVAILABLE: Custom die casting, product design, toolmaking, machining, finishing and assembly.

DIE CASTING ALLOYS USED: Aluminum, Zinc and Brass

DIE CASTING EQUIPMENT INSTALLED: Al (1) 100 Zn (1) 100 Cu (1) 100
(1) 150
(1) 200

DIRECTORY OF DIE CASTERS BY PRODUCTS

COMPANY AND PROVINCE / PRODUCT	Automotive Parts	Business Equipment	Electrical and Electronic Equipment	Hardware Items	Household Appliances	Industrial Equipment	Music and Communication Items	Photographic Equipment	Small Precision Die Castings	Tools	Toys
BRITISH COLUMBIA											
Stuart Diecasting Company Limited, Vancouver.			x	x		x				x	
ALBERTA											
Siren Manufacturing Company Limited, Calgary.	x		x	x	x					x	
MANITOBA											
Baycast Products Limited, Winnipeg.	x		x			x					
Diecast Products Limited, Winnipeg.		x	x	x		x	x				
ONTARIO											
Amerock Limited, Meaford.				x							
Banner Metal Products Limited, Windsor.	x										
Barber Die Casting Company Limited, Hamilton.	x	x	x	x	x		x				
Burlington Die Castings Limited, Burlington.	x	x	x		x	x				x	x

COMPANY AND PROVINCE PRODUCT	Automotive Parts	Business Equipment	Electrical and Electronic Equipment	Hardware Items	Household Appliances	Industrial Equipment	Music and Communication Items	Photographic Equipment	Small Precision Die Castings	Tools	Toys
Canadian General Electric Co. Ltd., Peterborough.			x		x	x					
Carpenter Die Casting Co. Ltd., Hamilton.		x		x	x	x				x	x
Chrysler Canada Ltd., Toronto.	x										
Coulter Manufacturing Co. Ltd., Oshawa.	x				x						
Daisy Manufacturing Co. of Canada Ltd., Preston.											x
Die Casters Company Limited, Toronto.		x		x	x	x					
Dominion Die Casting Limited, Wallaceburg.	x	x	x	x	x	x				x	
E & S Quality Products, Cottam.	x			x						x	
Electroline Manufacturing Co. Ltd., Windsor.	x		x								
Fisher Gauge Works Limited, Peterborough.	x	x	x	x	x		x	x	x		x

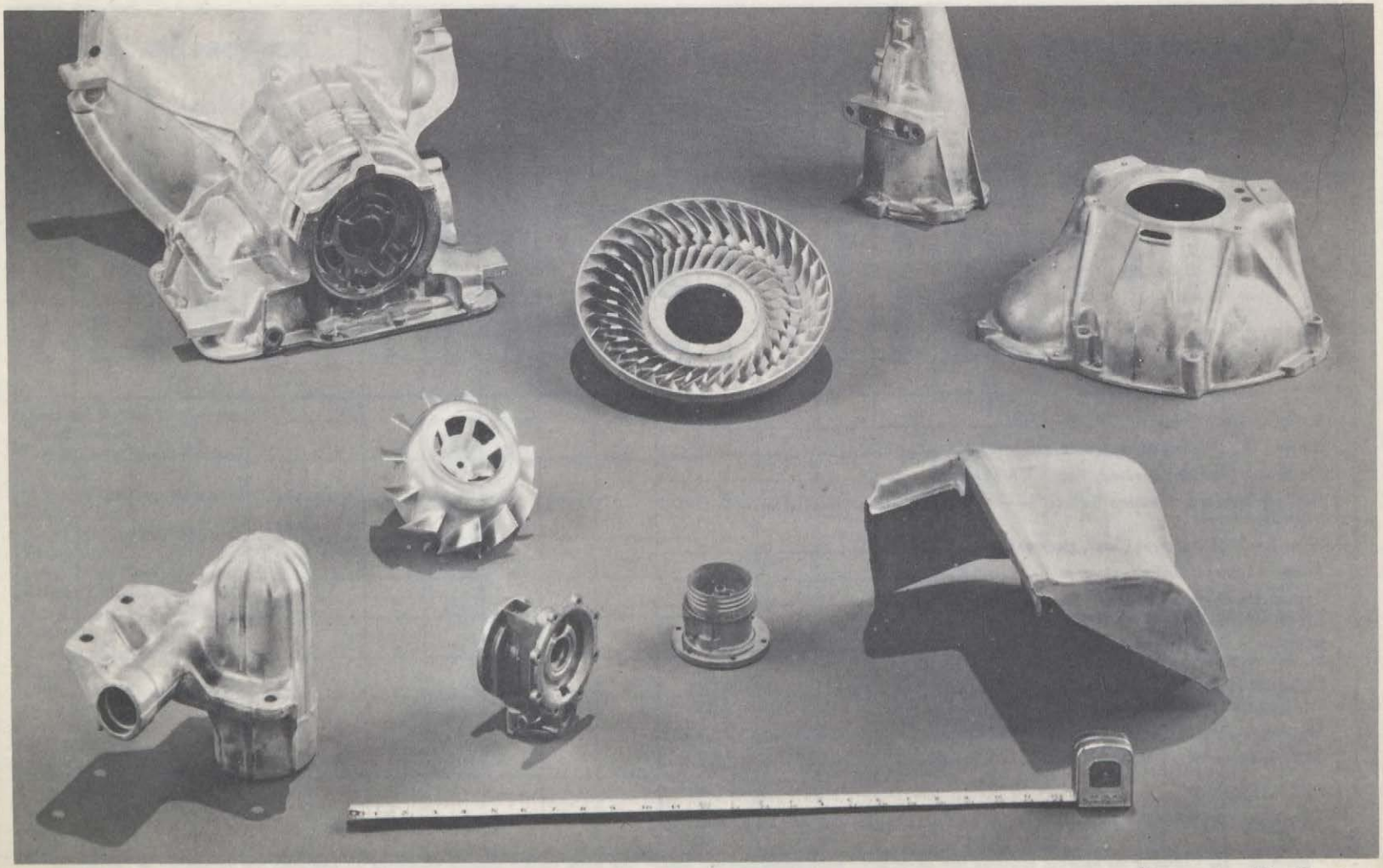
COMPANY AND PROVINCE	PRODUCT	Automotive Parts	Business Equipment	Electrical and Electronic Equipment	Hardware Items	Household Appliances	Industrial Equipment	Music and Communication Items	Photographic Equipment	Small Precision Die Castings	Tools	Toys
Hahn Brass Limited, New Hamburg.		x			x							
Hoover Company Limited, The Hamilton.		x		x		x						
Hudson Bay Diecastings Ltd., Bramalea.		x	x	x		x	x	x	x		x	
J & K Zinc Die Casting Co. Ltd., Scarborough.		x	x	x	x	x	x					x
Jutras Die Castings Ltd., Scarborough.		x	x	x	x	x	x					x
Lakeshore Die Casting Ltd., Oakville.		x	x	x	x	x	x	x	x		x	x
Last Minute Manufacturing Co. Ltd., Thorold.		x		x	x	x	x				x	x
Lightning Fastener Co. Ltd., St. Catharines.					x	x						
McKinnon Industries Limited, St. Catharines.		x										
Mendler Manufacturing Co. Ltd., Windsor.		x	x	x	x	x						
National Hardware Specialties Ltd., Dresdan.		x	x	x	x	x	x	x			x	x

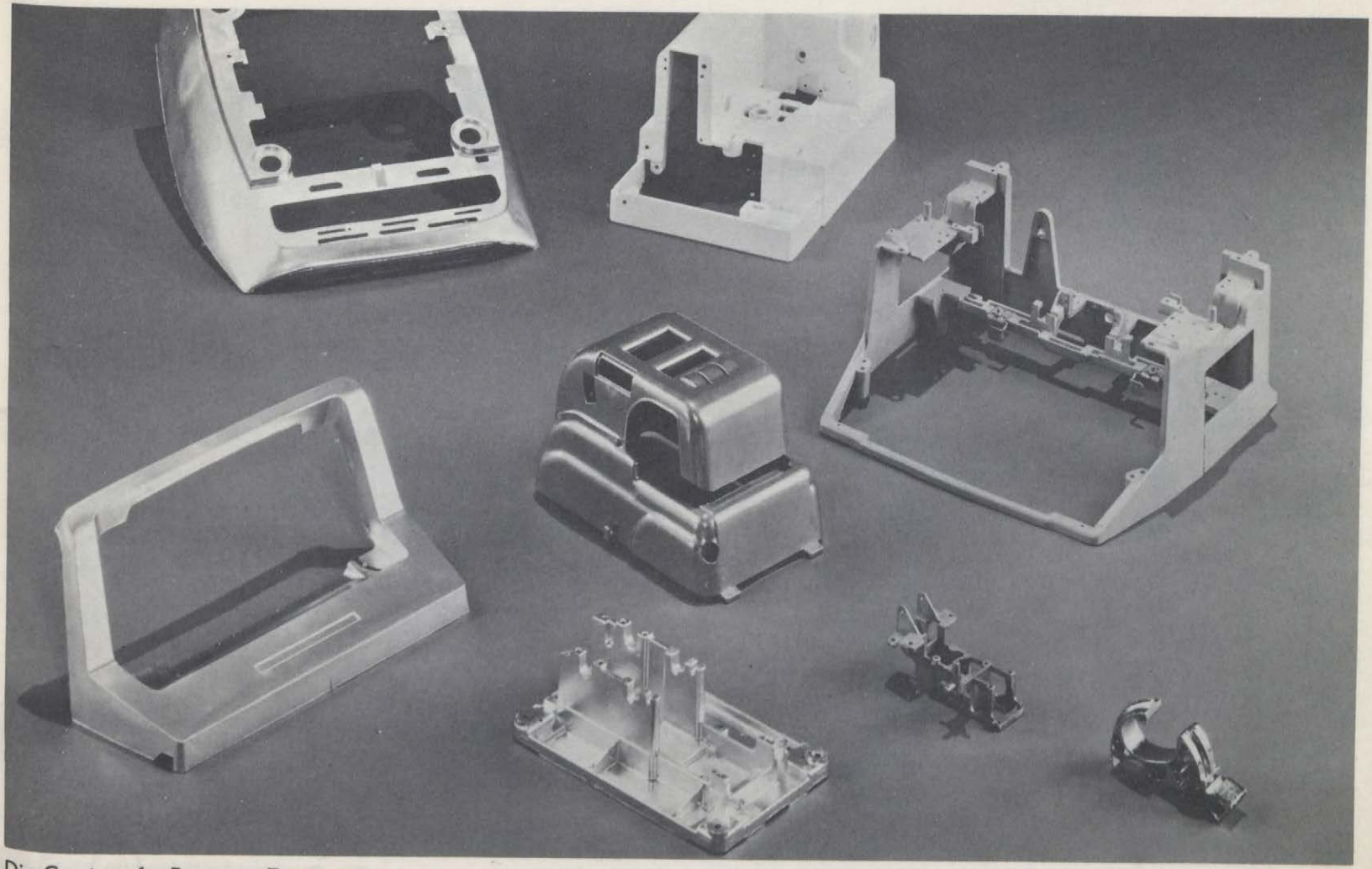
COMPANY AND PROVINCE / PRODUCT	Automotive Parts	Business Equipment	Electrical and Electronic Equipment	Hardware Items	Household Appliances	Industrial Equipment	Music and Communication Items	Photographic Equipment	Small Precision Die Castings	Tools	Toys
Outboard Marine Corporation,* Peterborough.						×					
Precision Castings Limited, Toronto.	×	×	×	×	×	×					
Pressure Castings of Canada Ltd., Weston.	×	×	×	×	×		×			×	×
Regal Die Casting Co. Ltd., Brampton.	×		×		×						
Schultz Die Casting Co. of Canada Ltd., Lindsay.	×	×	×	×	×	×	×			×	
Star Expansion Industries (1963) Ltd., Toronto.				×							
Webster Mfg. (London) Ltd., London.	×	×	×	×	×	×	×	×		×	×
White Die Casting Co. Ltd., Dundas.	×	×	×	×	×	×				×	×
QUEBEC											
Barschel and Company, Lachine.			×	×							
Clix Fastener Corporation, Montreal.				×							×

* *Specializes in producing die castings for Outboard Motors, Chain Saws and Power Lawnmowers.*

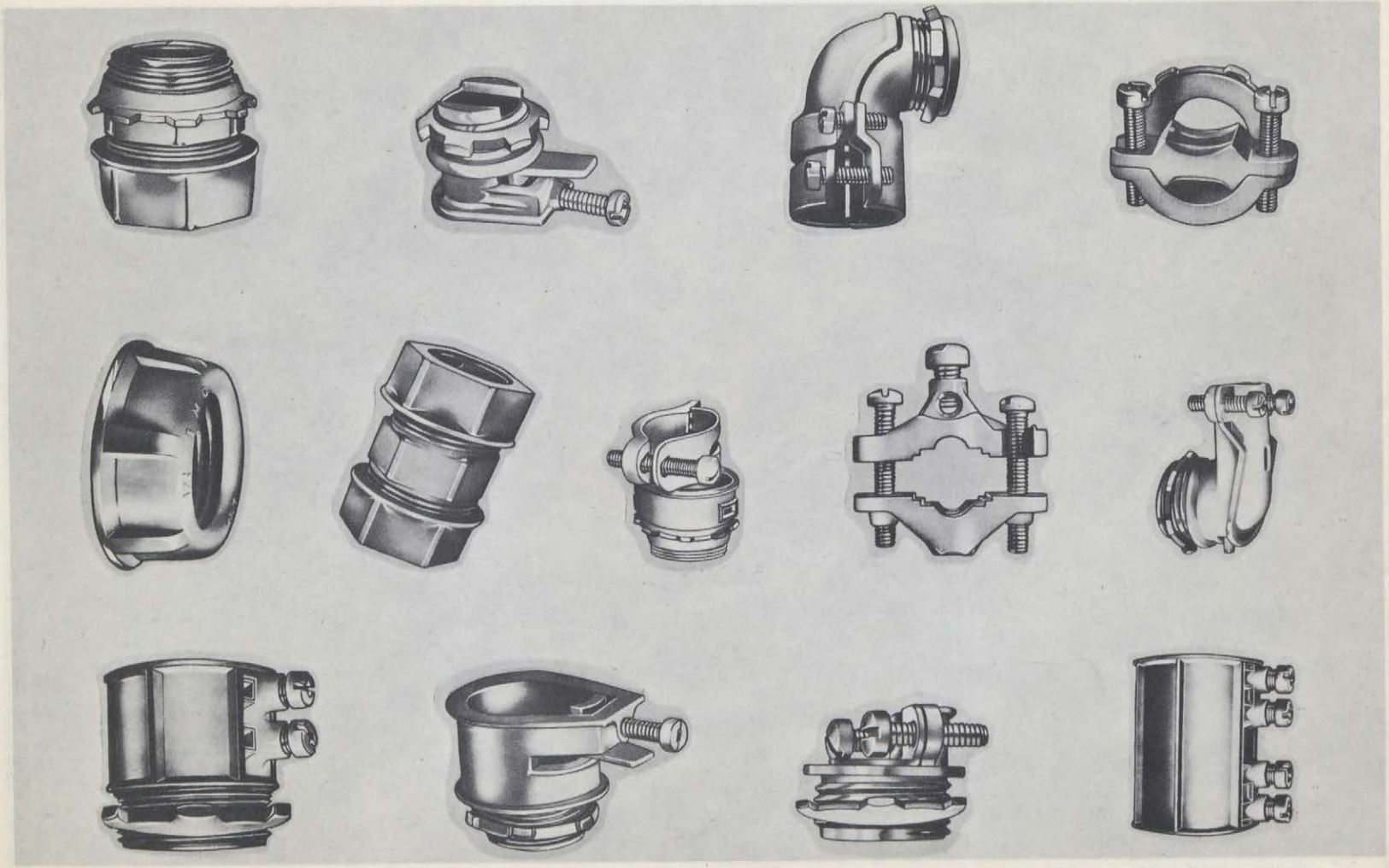
COMPANY AND PROVINCE / PRODUCT	Automotive Parts	Business Equipment	Electrical and Electronic Equipment	Hardware Items	Household Appliances	Industrial Equipment	Music and Communication Items	Photographic Equipment	Small Precision Die Castings	Tools	Toys
Dominion Lock Company Ltd., Montreal.				x							
Eastern Die Casting Incorporated, Montreal.			x	x	x	x					x
Electrolux (Canada) Limited, Pointe Claire.					x						
Herlicon Metals & Plastics Incorp., Ville St. Michel.				x	x						x
Home Health Equipment Corp., Montreal.			x	x	x	x				x	
Komo Fasteners Limited, Montreal.			x	x							
Lyster Die Casting Limited, Lyster Station, Megantic Country.		x		x	x						
Metallurgie St. Raymond Ltd., St. Raymond, Portneuf Country.		x		x	x	x					
Richmond Machine Taal & Die Casting, Ca. Ltd., Montreal.	x	x	x	x	x	x	x	x		x	x
Singer Company af Canada Ltd., St. Jean.			x							x	
Terry Burners Inc., * Montreal.						x					
NEW BRUNSWICK											
A.O. Pape Limited, Saint John.			x	x	x	x	x				

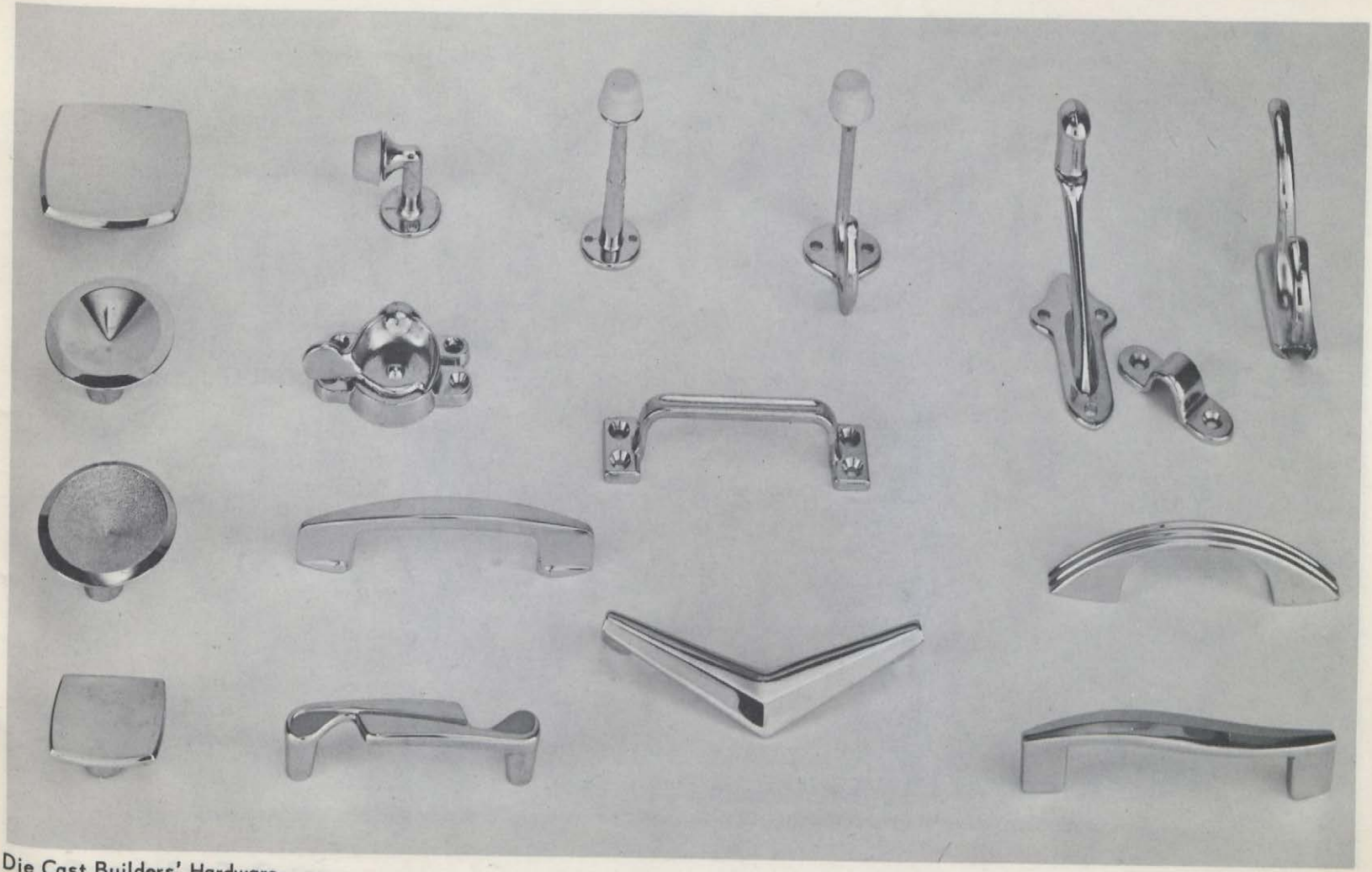
* *Produces die castings for heating systems and associated equipment.*

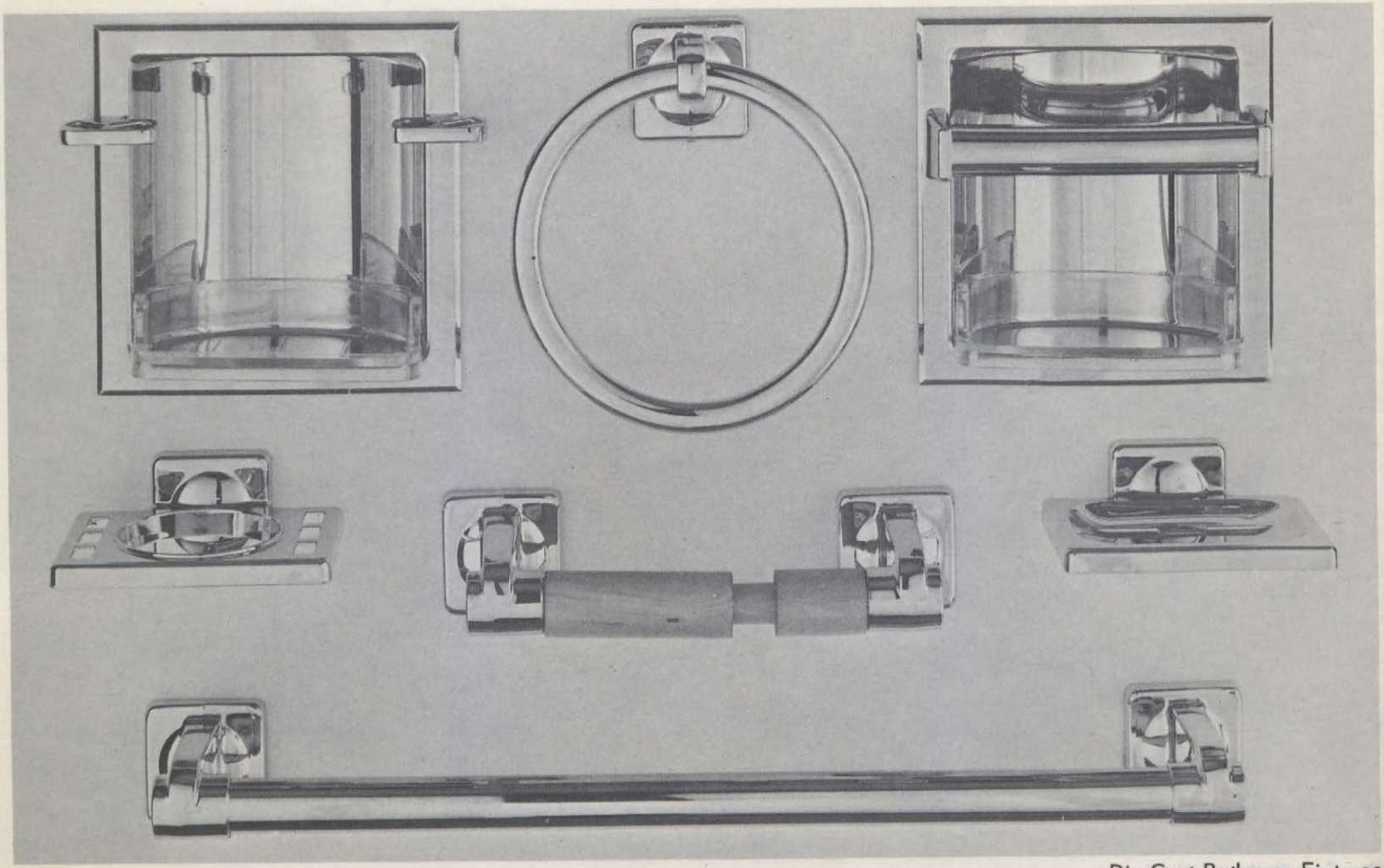


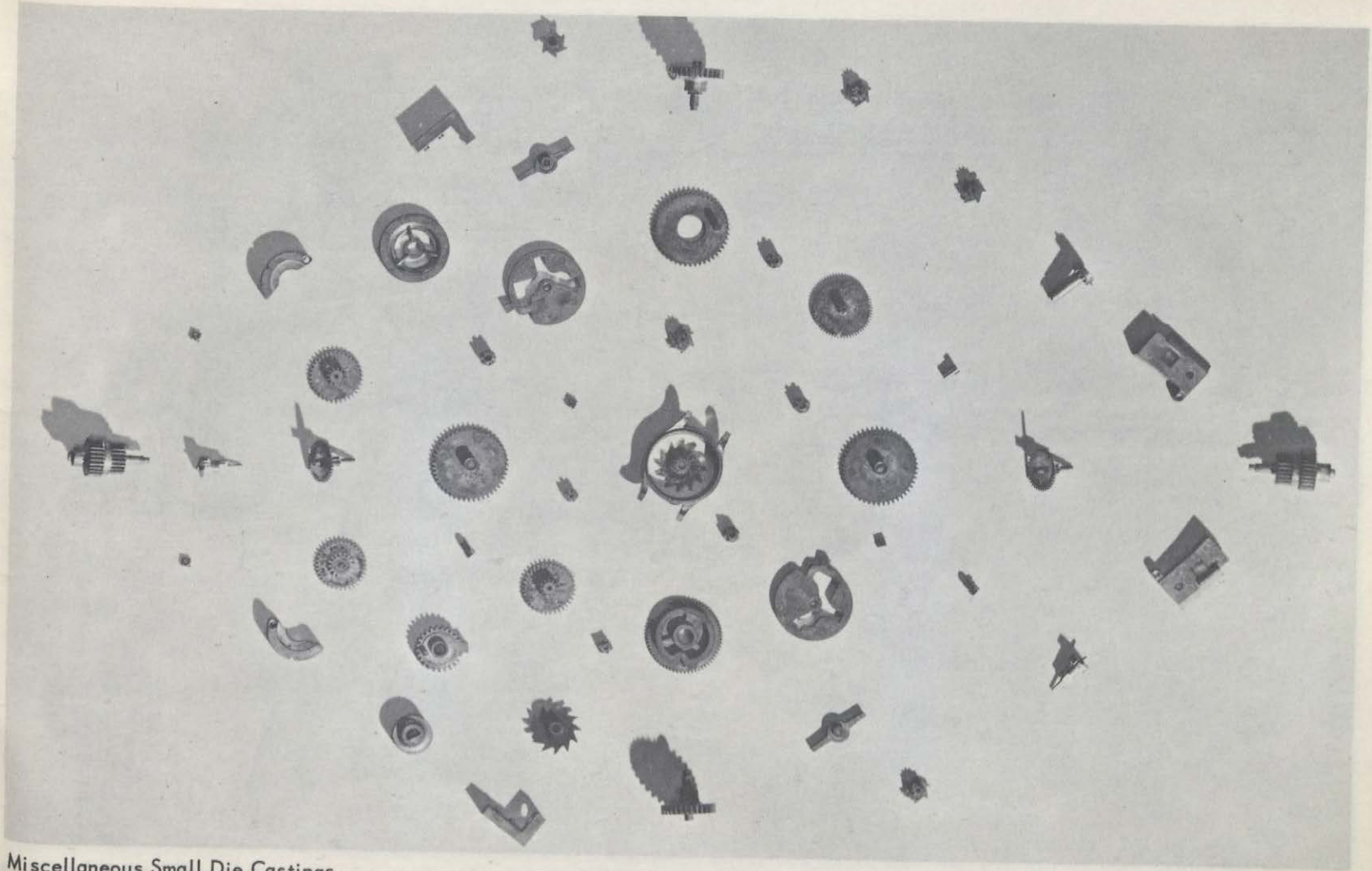


Die Castings for Business Equipment

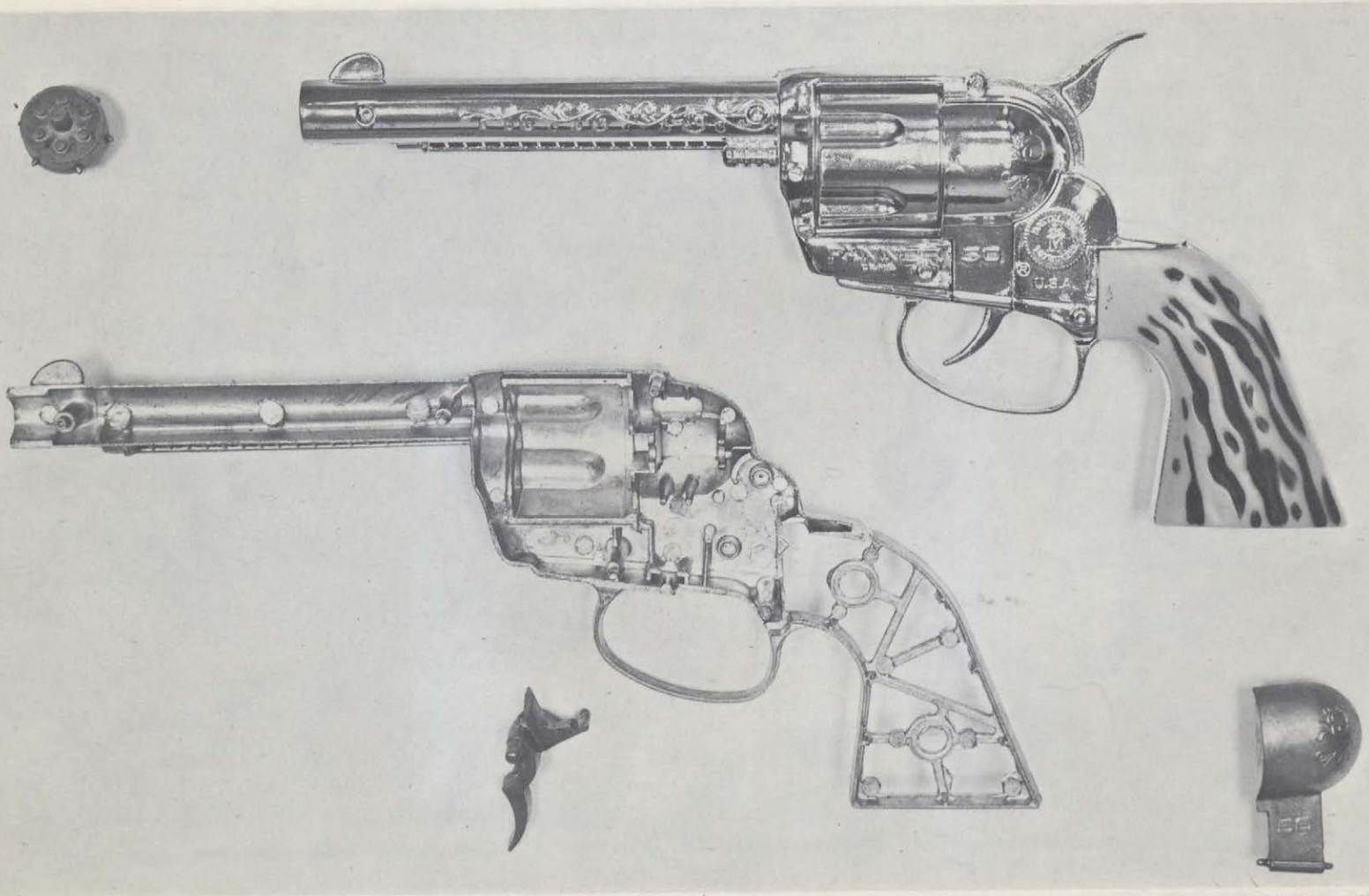








Miscellaneous Small Die Castings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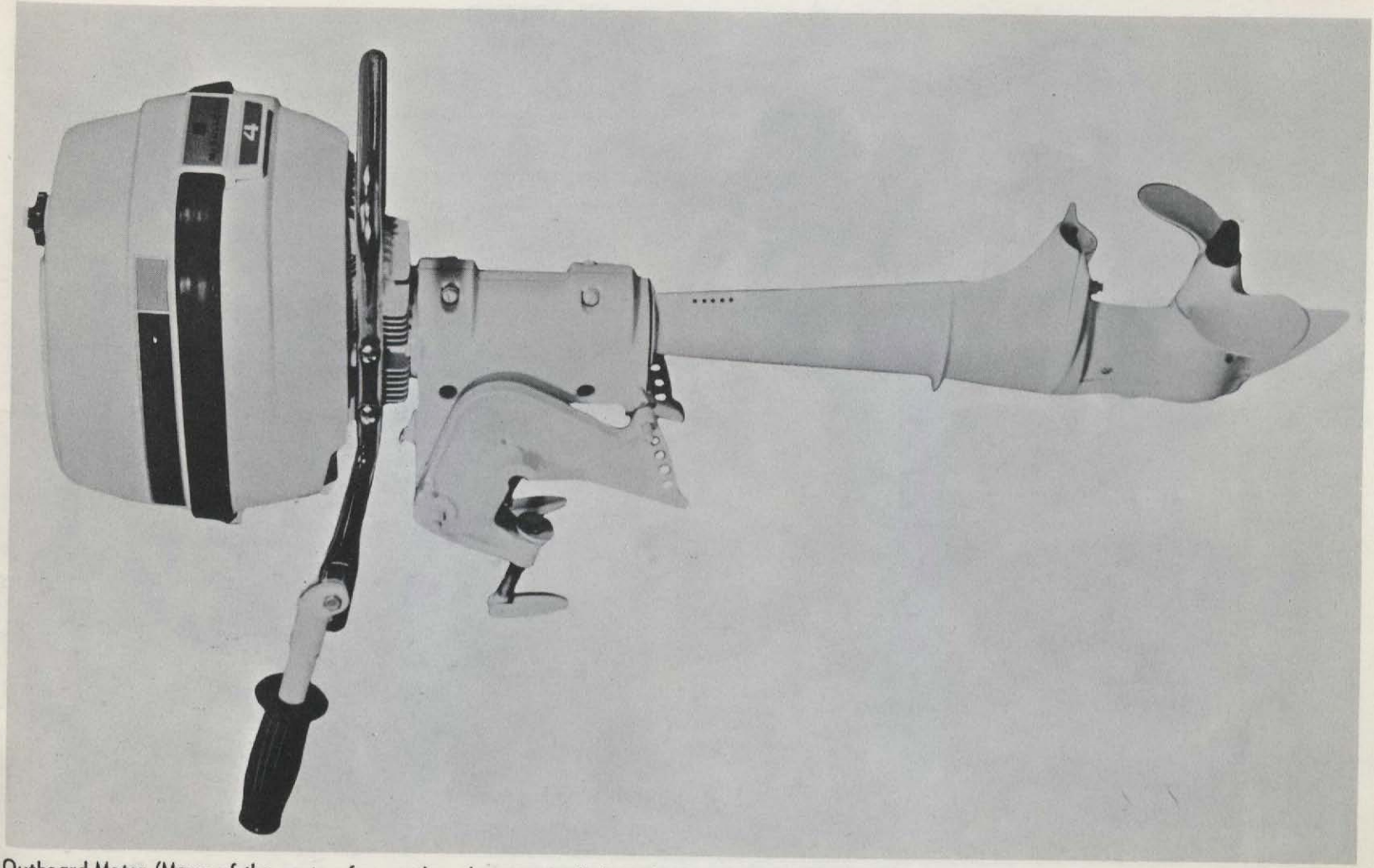
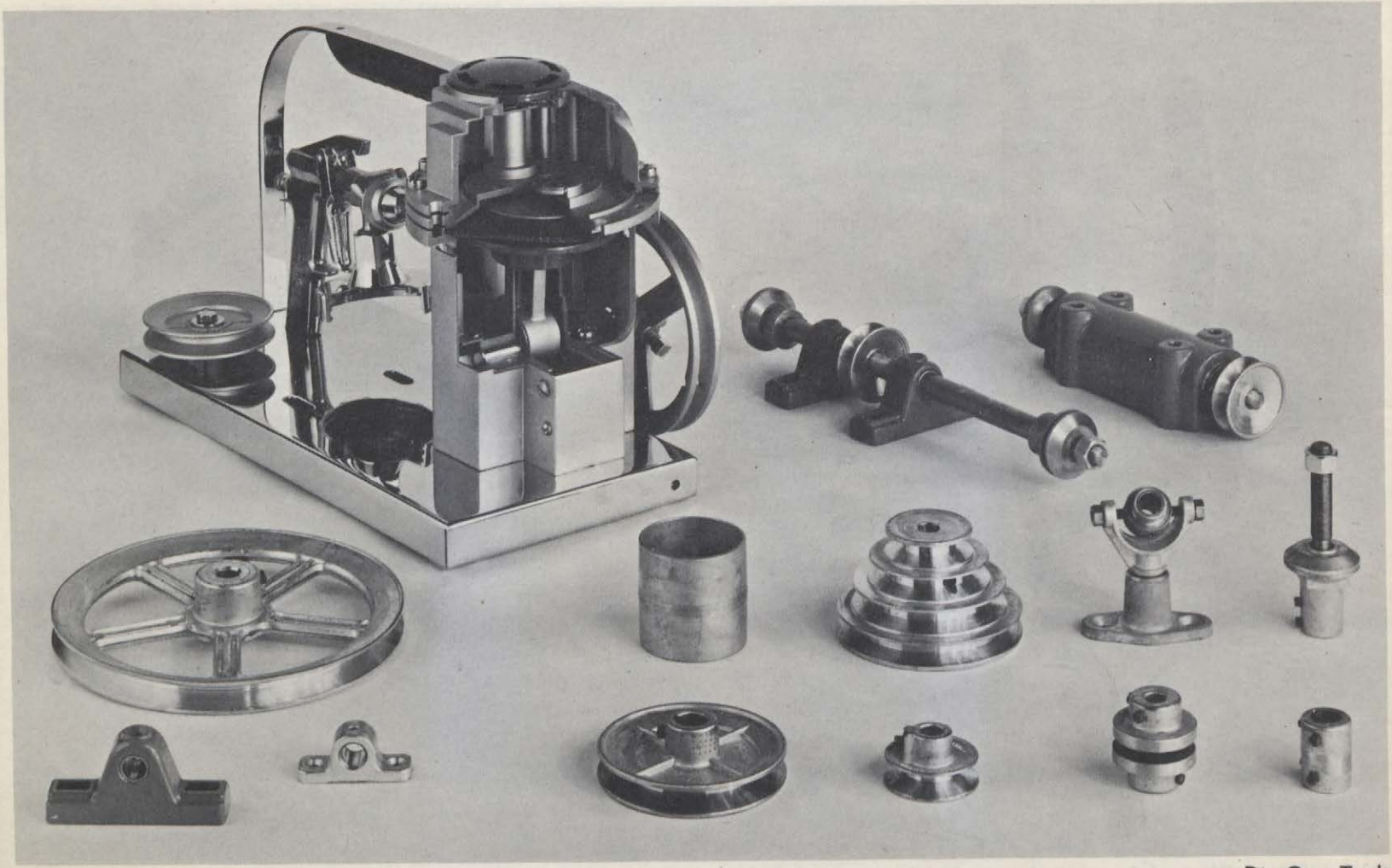


Outboard Motor (Many of the parts of an outboard motor, including the housing, are die cast)



ROGER DUHAMEL, F.R.S.C., Queen's Printer and Controller of Stationery, Ottawa, 1966