

**Indiana University – Purdue University Fort Wayne**  
**Opus: Research & Creativity at IPFW**

---

Manufacturing & Construction Engineering  
Technology and Interior Design Senior Design  
Projects

School of Engineering, Technology and Computer  
Science Design Projects

---

4-25-1988

# Design and Fabrication of a Single-Stage Paddle Snowthrower, Belt-driven by a Modified Three Horsepower Briggs & Stratton Gasoline Engine

Ronald W. Bryie

*Indiana University - Purdue University Fort Wayne*

Follow this and additional works at: [http://opus.ipfw.edu/etcs\\_seniorproj\\_mctid](http://opus.ipfw.edu/etcs_seniorproj_mctid)

---

## Opus Citation

Ronald W. Bryie (1988). Design and Fabrication of a Single-Stage Paddle Snowthrower, Belt-driven by a Modified Three Horsepower Briggs & Stratton Gasoline Engine.

[http://opus.ipfw.edu/etcs\\_seniorproj\\_mctid/21](http://opus.ipfw.edu/etcs_seniorproj_mctid/21)

This Senior Design Project is brought to you for free and open access by the School of Engineering, Technology and Computer Science Design Projects at Opus: Research & Creativity at IPFW. It has been accepted for inclusion in Manufacturing & Construction Engineering Technology and Interior Design Senior Design Projects by an authorized administrator of Opus: Research & Creativity at IPFW. For more information, please contact [admin@lib.ipfw.edu](mailto:admin@lib.ipfw.edu).

Senior Project

MET 497

Final Report of Design and Fabrication of a  
Single-Stage Paddle Snowthrower, Belt-Driven  
by a Modified Three Horsepower Briggs & Stratton  
Gasoline Engine

Prepared for : Professor D. McAleece

Prepared by : Ronald W. Bryie CMfgT

April 25, 1988

## Table of Content

iii..	Informative Abstract	32...Appendix 1
	Introduction	32.....Material List
1.....	Present Mounting Method	35.....Production Drawings
2.....	Steel Driveshaft	52...Appendix 2
4.....	Project Duration	52.....Bearing Specifications
5....	Technical Plan	53...Appendix 3
6.....	Design of Snowthrower	53.....Calculations
6.....	Design Criteria	65...Appendix 4
6.....	Safety	65.....Design Proposal
7.....	Reliability	
8.....	Snow Removal	
8.....	Component Descriptions	
9.....	Driveshaft	
10.....	Connector Rings	
12.....	Paddle Assembly	
13.....	Frame	
15.....	Modified 3 hp Engine	
18.....	Drivetrain	
20.....	Housings	
21.....	Pivoting Directional Vanes	
25.....	Wheels	
25.....	Handle	
25.....	Calculations	
25...	Fabrication	
26...	Testing	
27.....	Test Data Recorded	
28...	Cost	
30...	Conclusion	
30...	Acknowledgements	
31...	Bibliography	

## Table of Figures

- 1....Fig. 1. Connector Ring/Shafts and Aluminum Drum
- 3....Fig. 2. Driveshaft, Connector Rings, Tension Pins, Aluminum Drum
- 8....Fig. 3. Rear view of Snowthrower
- 9....Fig. 4. Front view of Snowthrower
- 10...Fig. 5. Driveshaft
- 11...Fig. 6. Connector Ring
- 12...Fig. 7. Fiber Reinforced Paddle
- 13...Fig. 8. Aluminum Drums
- 14...Fig. 9. Left Frame
- 14...Fig. 10. Right Frame
- 15...Fig. 11. Conventional Engine Mount
- 16...Fig. 12. Snowthrower Engine Mount
- 17...Fig. 13. Oil Fill Modification
- 17...Fig. 14. Hoses, Switch, Throttle Connection
- 19...Fig. 15. Drivetrain with Idler Assembly
- 20...Fig. 16. Back Housing Plate
- 21...Fig. 17. Top Housing Plate
- 22...Fig. 18. Vanes, Vane Mounts, Vane Linkage
- 23...Fig. 19. Vane Linkage
- 24...Fig. 20. Vane Support, Vane Lever Arm

## Tables

- 27.....Test Data Recorded
- 28.....Suppliers specification of Steel
- 29.....Cost

## Informative Abstract

The innovation in the design of this snowthrower is the use of a solid 1018 cold-drawn steel shaft passing through the paddle assembly. The steel driveshaft is placed in Fafnir roller bearings mounted outboard of the aluminum frame. Two circular 1018 steel connector rings are fastened to the steel driveshaft accurately and securely with 0.250" tension pins. The paddle assembly fastens to these connector rings. This design ensures proper alignment of the paddle assembly and connector rings, because the rings will not deviate, as they can with present mounting techniques.