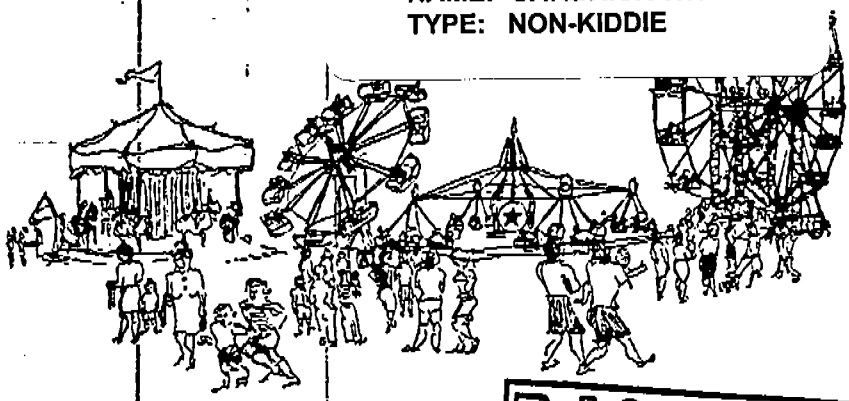
GARBRICK MANUFACTURING, INC.

MFG: GARBRICK, INC.
NAME: GARBRICK WHEEL
TYPE: NON-KIDDIE

LEWIS H. GARBRICK
LEWIS A. GARBRICK
CENTRE HALL, PENNSYLVANIA 16828
PHONE 814-364-1403



November 4, 1991

TO WHOM IT MAY CONCERN:

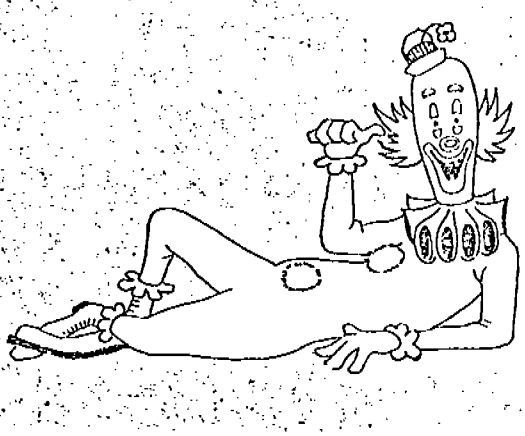
Ferris Wheels manufactured by Garbrick Manufacturing do not require non-destructive testing before January 1992. Please note this letter does not cover Nittany wheels or Centre Outdoor wheels.

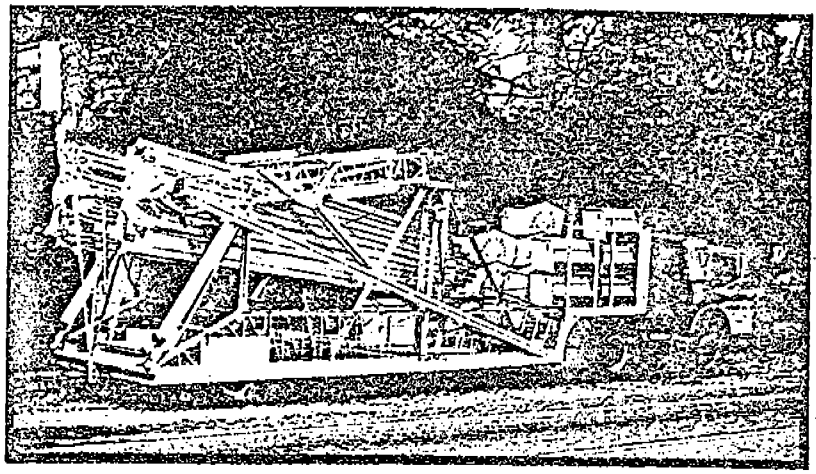
Very truly yours,

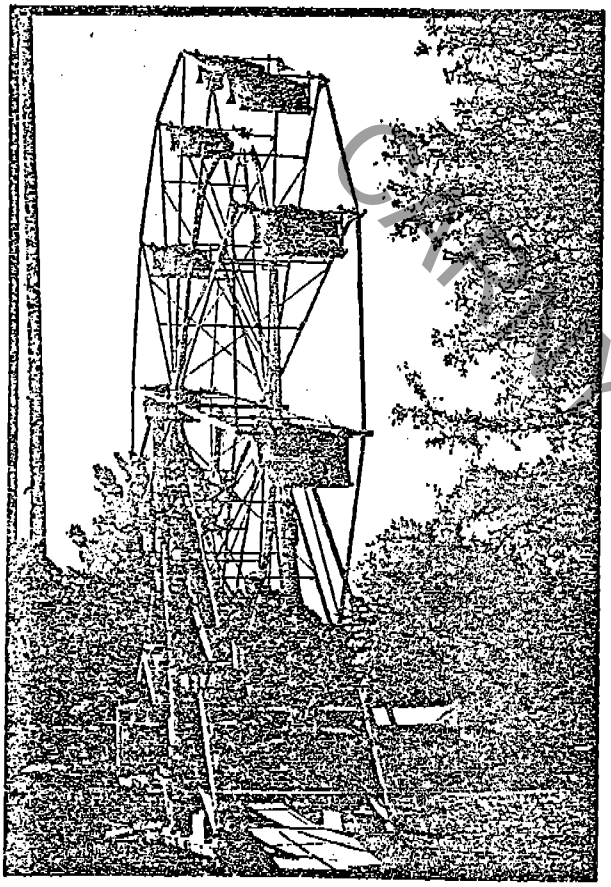
GARBRICK MANUFACTURING, INC.

Lewis A. Garbrick

Lewis A. Garbrick
Vice-President

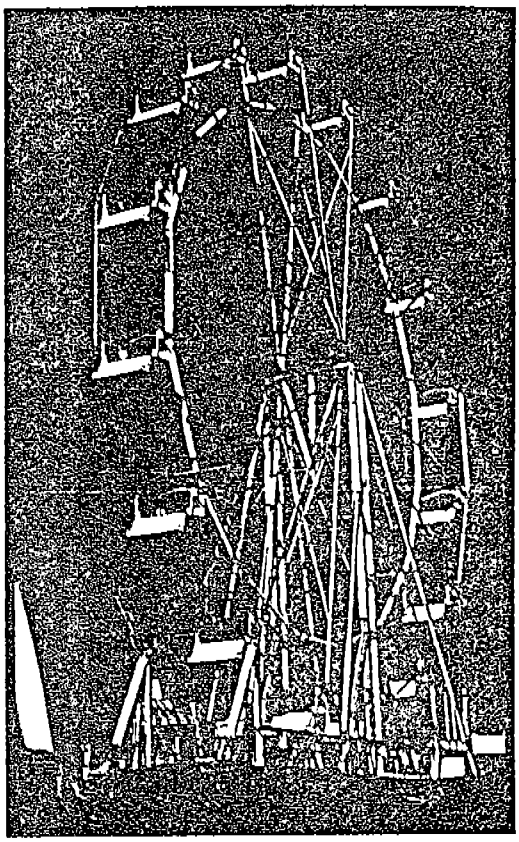


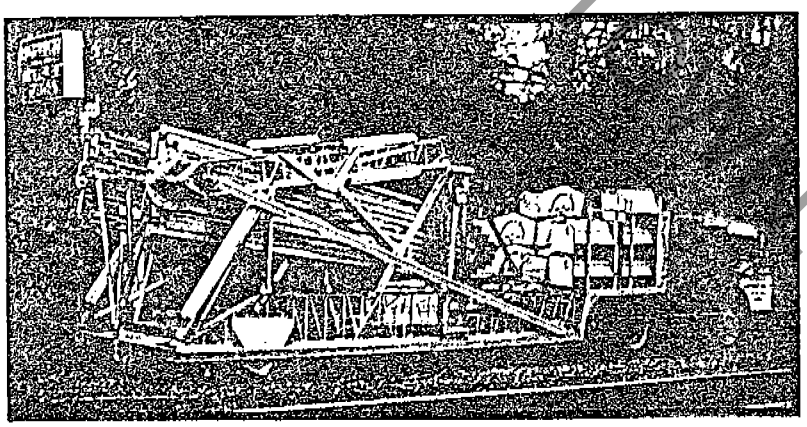




THE GARBRICK WHEEL

is a trailer mounted ride designed for quick erection by two men. Its twelve all steel seats will handle thrity-six adults. Its low operating cost and ease of moving make it a real profit maker.

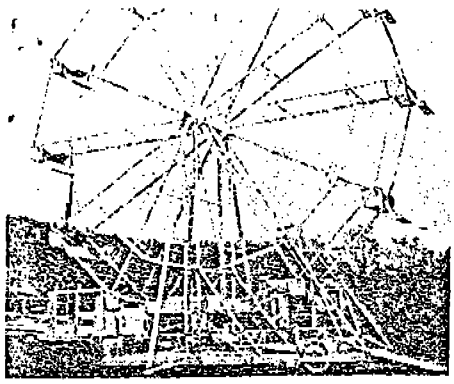




The Garbrick Wheel is a trailer mounted unit designed for easy erection by two men. Available in 12 seats (46') and 16 seats (60') sizes. Its low operating cost and ease of moving make it a real profit maker. The Garbrick Wheel uses a hydraulic system for erection and drive. The low axle trailer permits easy access to the ride.

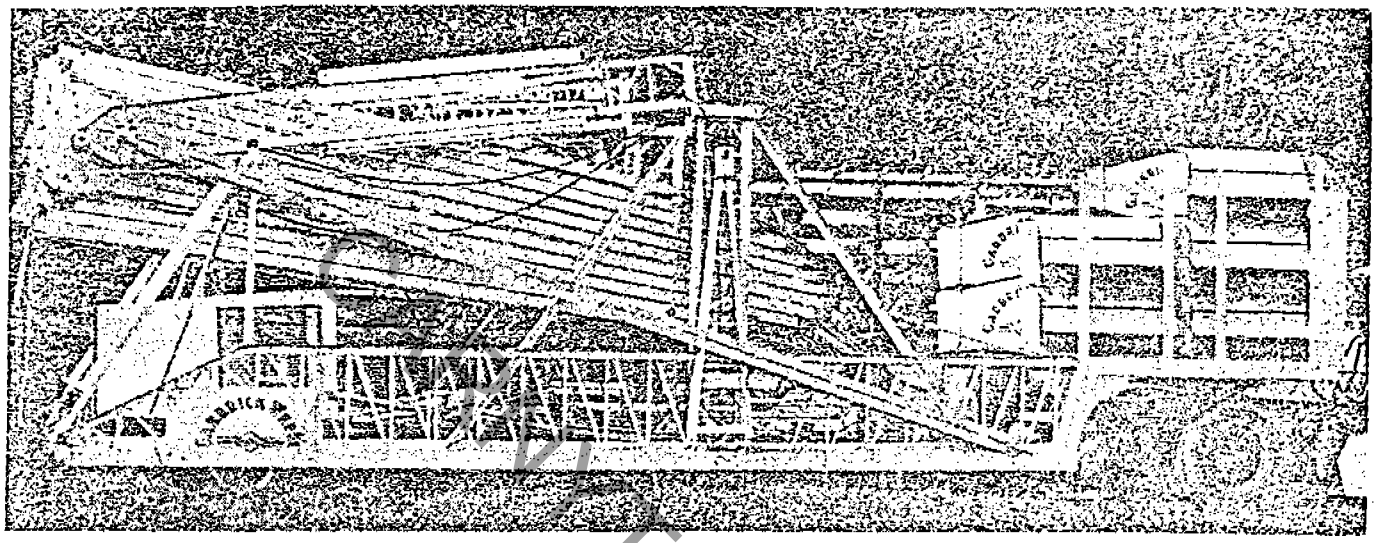
SPECIFICATIONS

	16 Seated Wheel	*12 Seated Wheel*
Capacity	16 seats ..... 48 adults	12 seats ..... 36 adults
Height	..... 60'	..... 46'
Trailer	..... 40' long 13'6" high	30' long, 12' high
Power	..... 25 HP 3 phase electric or gasoline engine	15 HP 3 phase electric or gasoline engine
Price	.....	.....



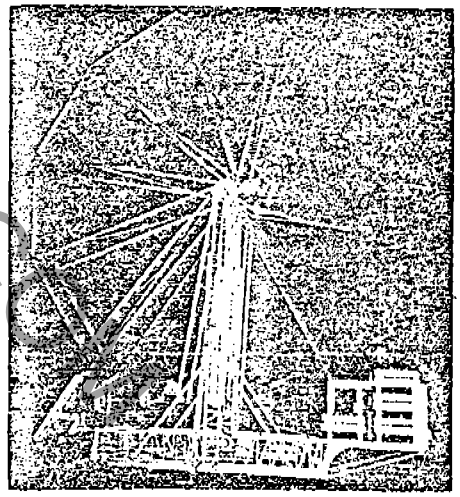
THE GARBRICK FOLDING WHEEL

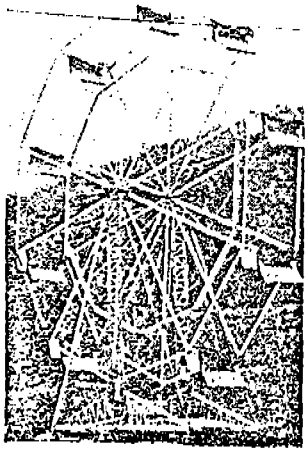
A COMPLETE SELF-CONTAINED UNIT THAT CAN BE ERECTED OR DISMANTLED IN ONE HOUR!



- Entire unit is transported and erected on its own trailer bed. No unloading or loading required.
- Comes complete with Ford power unit and fence. Ticket box available at slight additional cost.
- Wheel is erected and folded by hydraulic winch anchored to trailer bed.
- Twelve spacious seats provide 24 to 36 fares each trip.
- All structural components fabricated from standard structural steel shapes.
- Brilliantly lighted with fluorescent lights around entire inner circumference.
- No parking problem. Trailer is integral part of ride.

Price: $15,000





STANDARD GARBRICK WHEEL ALSO AVAILABLE IN TWO LOW-COST SIZES

36 FT. WHEEL	10 SEATS
42 FT. WHEEL	12 SEATS

GARBRICK MANUFACTURING

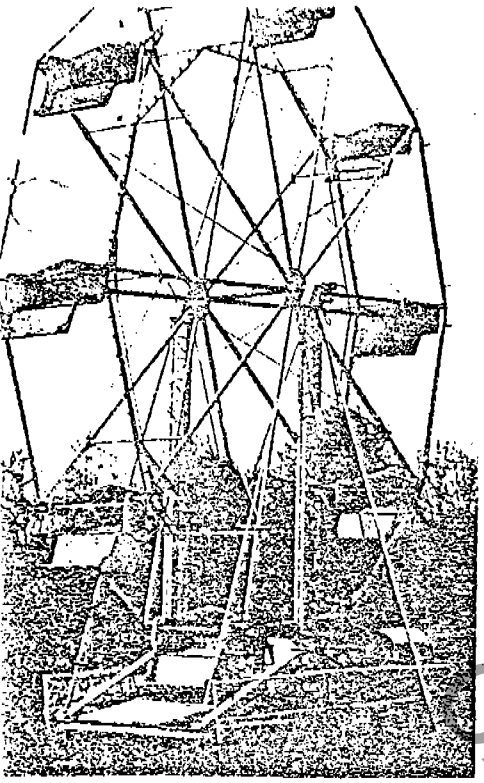
Lewis H. Garbrick Lewis A. Garbrick

CENTRE HALL, PENNSYLVANIA

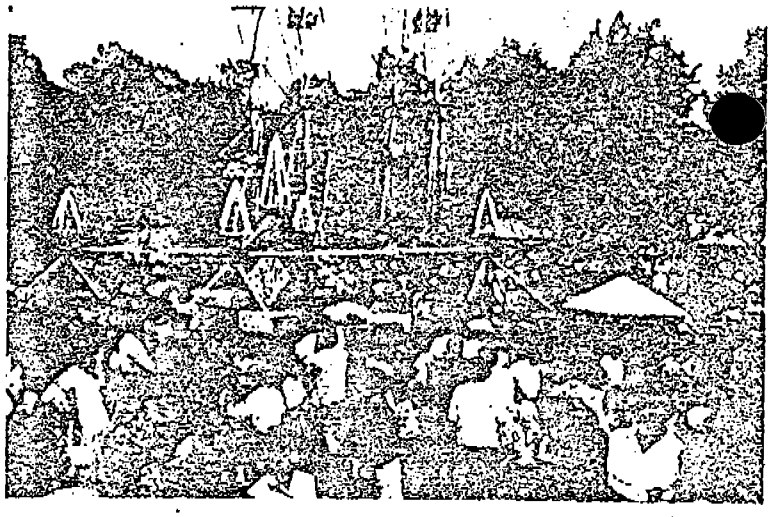
WRITE, PHONE or WIRE for additional information

Telephone EMpire 4-1403

monarch of the midway



THE GARBRICK WHEEL



THE BIG THRILL RIDE of all time

. . . the premier ride in a full line of HIGH-NET-PROFIT RIDES! An exciting spectacle . . . a thrilling ride for people of all ages, engineered and hand-crafted for you to bring MAXIMUM operation, MINIMUM cost and maintenance, and to produce MAXIMUM profits for you!

- Stands an impressive height . . . visible from the entire amusement area;
- Spacious seats bring in 20 to 36 fares each trip;
- Choice of "band" or "star" lighting for maximum crowd-appeal;
- Lots of color . . . seats are Red and Yellow;
- Furnished complete with ticket box, full fence and power u
- Quick set-up time . . . only 2 hours;
- Powered by world's most service-available engine;
- Easily portable . . . can be moved on 18-ft. flatbed truck;
- SEATS FOLD when out of operation to eliminate wind problem;
- Weighs only 3½ tons . . . complete with engine, ticket box and fence;
- All steel construction . . . electrically welded; structural parts are painted aluminum.

GARBRICK MANUFACTURING

Lewis H. Garbrick *Lewis A. Garbrick*

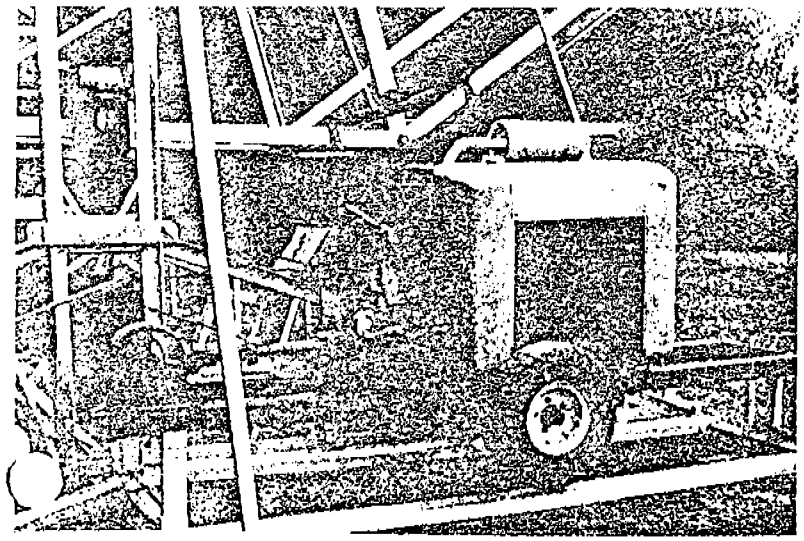
CENTRE HALL, PENNSYLVANIA

WRITE, PHONE OR WIRE for additional information

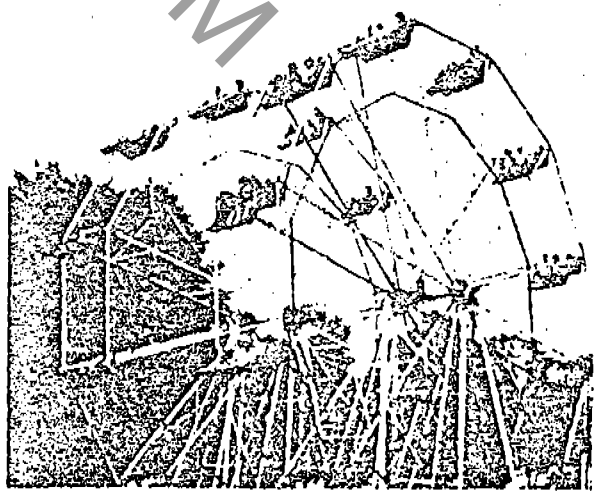
Telephone EMpire 4-1403

EXCLUSIVE SALES OFFICE

E. L. WINROD, Box 298, Largo, Florida - Phone JU 4-5049



POWER UNIT - - - Genuine FORD industrial power unit, mounted on 6.00 x 9 wheels and tires for easy handling---SERVICE is universal on this unit. Genuine FORD transmission, universal joints, differential and brake ---all mechanical parts are replaceable anywhere in the world. You're never beyond reach of immediate service on genuine FORD parts.



NOW . . . IN 2 PROFIT-ENGINEERED SIZES

36 ft. wheel - - - - - 10 seats

42 ft. wheel - - - - - 12 seats

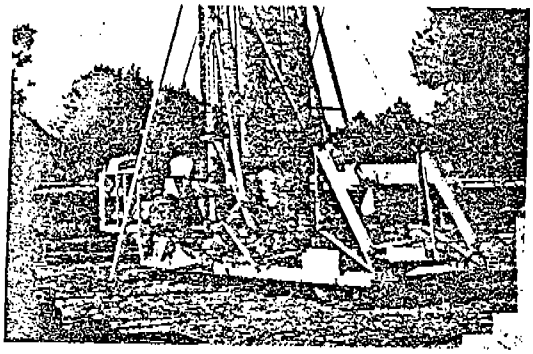
GARBRICK MANUFACTURING, INC.

LEWIS H. GARBRICK
LEWIS A. GARBRICK
CENTRE HALL, PENNSYLVANIA 16828
PHONE 814-364-1403

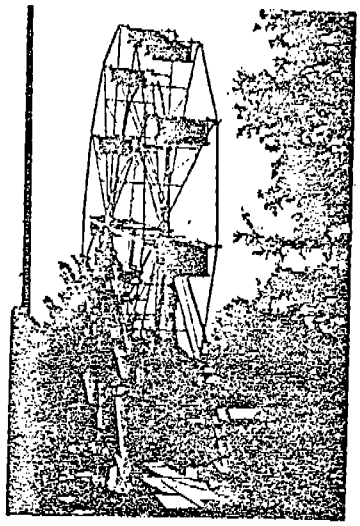
1. Serial Number
2. Name Plate
3. Ride Model - 12 or 16 seat Garbrick Wheel
4. Date of Manufacture
5. Trailer Information - Trailer when wheel is folded:
   #16 - 8' wide, 13' high, 40 ' long, weight 22,000 lbs.
   #12 - 8' wide, 12' high, 35 ' long, weight 20,000 lbs.
6. Static Information - Wheel ready for operation:
   #16 - 40' long, 24' wide, 60' high
   #12 - 35' long 24' wide, 42' high
7. Dynamic Information - Same as Static except for additional passenger weights
8. Ride Speed - 8 rpm
9. Direction of travel - Vertical and counter clockwise
10. Power Requirements - a. Electrical - 20 HP three phase
    b. Mechanical - 30 HP gas engine
11. Load Distribution per footing - Does not apply
12. Passenger Capacity - #16 - 48 passengers or 510 lbs/seat
    #12 - 36 passengers or 510 lbs/seat
13. Ride Duration - Not over three minutes
14. Recommended Blance of Passengers Loading and Unloading - Both the 16 and 12 seat Garbrick Wheel must be run balanced as close as possible
15. Passenger Restrictions - no one under eight years unless accompanied by an adult
16. Environmental Restrictions - We recommend both 16 and 12 seat Garbrick Wheels be closed during electrical storms and wind over 20 mph. We also recommend removing 5 seats after close of operating day.
17. Fastner Schedule - All bolts that are replaced must be Grade 8

MAINTENANCE

1. Grease main hub every 30 days
2. Grease seat pins as needed
3. Check hydraulic oil every 30 days - Use 10 weight motor oil if adding
4. Check wench cable every week for broken strans or kinks
5. Tire pressure on trailer - 100 lbs psi
6. Check drive cable for fraying or kinks.

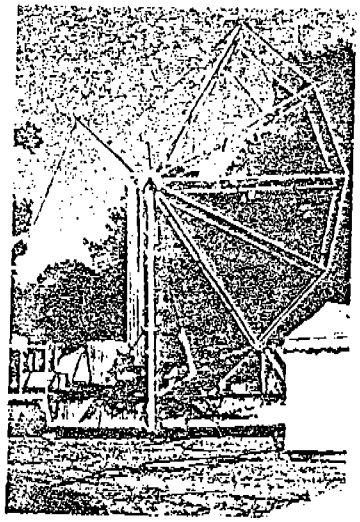


Two large hydraulic cylinders erect main structure with ease and safety in 4 min.

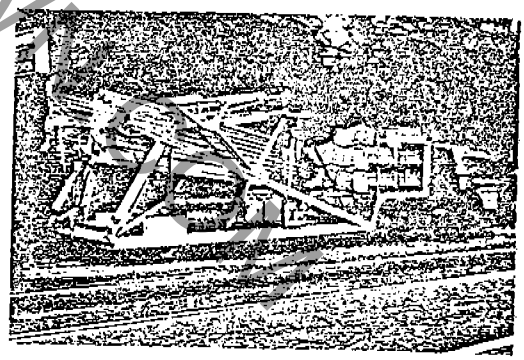


Seats are all steel, fold for handling. Fluorscent lights are standard equipment. Low trailer allows easy access to ride.

Hydraulic wench positions all spokes quickly and easily.



Complete unit is under 12' high when loaded. Trailer has vacuum or air brakes.



SPECIFICATIONS

Height	43 feet
Loaded height	Apx. 12 feet
Capacity	36 adults
Engine	Allis-Chalmers
Price	

GARBRICK MFG. INC.
Centre Hall, Pennsylvania 16828
Area 814 - 364-1403

STRUCTURAL ANALYSIS
of the
GARBRICK WHEEL

Introduction

The Garbrick Wheel is an amusement ride designed and manufactured by Garbrick Manufacturing, Centre Hall, Pennsylvania. A common name used for this type of ride is, "Ferris Wheel."

A unique feature of the Garbrick Wheel is the ability to fold the main components of the wheel to a horizontal position on a semi-trailer for transporting the device. When the ride is assembled the semi-trailer serves as the main platform of the ride. Outrigger supports are provided for stability when the ride is in operation.

The Garbrick Wheel has sixteen seats with a total capacity of forty-eight (48) passengers. When completely assembled, the maximum height of the wheel is greater than fifty (50) feet. The wheel is rotated by means of a wire rope which extends around the circumference of the wheel and is driven by a hydraulic motor. Power is supplied by a gasoline engine. The hydraulic system assures smooth starting and operation of the wheel.

All main structural components of the Garbrick Wheel are fabricated from rolled structural steel shapes and plates. Steel tubing and wire rope is used for bracing the spokes of the wheel. The structural steel used is ASTM, A36 with the exception of the main axle which is fabricated from a high strength thick walled tube. Permanent connections are made by electric arc welding, and field connections are made by bolts or cold rolled steel pins.

Structural Analysis

At the request of Garbrick Manufacturing a complete structural analysis was made of the Garbrick Wheel. The results of this analysis are presented in this report. Computation sheets are on file in the office of Robert M. Barnoff, P. E., State College, Pennsylvania.

The wheel portion of the ride was analyzed as a statically indeterminate truss. All connections for the main components of the wheel

is 11,520 pounds including fifty percent impact. Bracing is provided for both axes of the towers. This bracing was designed to reduce vibrations and has ample capacity for structural purposes.

Main Axle

A high strength steel tube is used for the main axle of the wheel. This tube has an outside diameter of three inches and a wall thickness of one inch. The axle transmits the load from the spokes of the wheel to the towers. Pillow blocks are mounted on the tops of each tower to receive this load. The maximum stress in the axle is a bending stress which varies from 13,200 psi in compression to the same value in tension as the wheel rotates. This stress includes a fifty percent impact factor.

Connection of the wheel spokes to the axle is made by means of a collar which is shrunk fit to the axle. The hub plate is then welded to this collar. This type connection was used to prevent any notching or undercutting of the axle.

Conclusion

The structural analysis of the Garbrick Wheel has verified that this amusement ride is safe, well designed and well constructed. Several wheels of this size fabricated by Garbrick Manufacturing have provided trouble-free operation for the past four years.

ROBERT M. BARNOFF, P.E.
606 Nittz Ave.
State College, Penna. 16801
814 238-4297

December 19, 1969

Mr. Lewis H. Garbrick
Garbrick Manufacturing
Centre Hall, Pennsylvania

Dear Mr. Garbrick:

A complete structural analysis was made for the Merry Mixer, an amusement ride manufactured by your firm. This analysis has shown that the ride is safe and well designed.

In addition to the analysis, a complete Merry Mixer was examined after it was fully assembled for service. The quality of the workmanship on the ride was above average, and no excessive vibrations or deflections were observed during operation of the ride.

The attached report contains the results of the structural analysis. If you have any questions concerning the report please contact me.

Sincerely,

Robert M. Barnoff, P. E.
Registered professional engineer
Pennsylvania No. 2972-E
New Jersey No. 12480

RMB/lab

are pinned connections. The towers that support the wheel were analyzed as braced compression members. Results of the analysis of each major component are presented below.

Wheel Spokes

The wheel spokes are fabricated from 3-inch structural steel channels having a weight of five pounds per foot. As the wheel rotates, the force in the spokes varies from a maximum of 1,422 pounds tension to 1,422 pounds compression. These forces include a fifty percent impact applied to both dead and live load. Based on the AISC specifications, the allowable load in tension for this member is 17,600 pounds while the allowable load in compression is 2,160 pounds.

Each spoke is braced to its companion spoke on the opposite wheel to form a framework. Adequate steel tubing and wire rope is provided for this bracing. This bracing prevents buckling of the spoke about its weak axis, and provides stability for the ride during operation and erection.

Wheel Rim Members

The main structural members that form the circumference of the wheel are called the rim members. These members are fabricated from 2-1/2 x 1-1/2 x 1/4 inch structural steel angles. These members also experience a change in stress from tension to compression as the wheel rotates. The maximum tension and compression force in the rim member is 1,880 pounds, including fifty percent impact to both dead and live loads. Using the AISC specifications the maximum allowable compressive force was calculated as 1,910 pounds. The allowable tensile force is 15,200 pounds.

Towers

The two towers that support the wheel are braced compression members fabricated from four 2-1/2 x 2-1/2 x 1/4 inch angles for each tower. The angles are used in pairs on each side of the tower and connected by welded lattice bracing. Each tower has an allowable capacity of 31,600 pounds in compression. The maximum load on the tower