The following article was developed by National Carousel Association Conservation Chairman, Charles Walker and included in the two-volume National Carousel Association Technical Manual

THE SQUEAK GETS THE GREASE

This sheet is a discussion of the key parts to the operation of the carousel, lubrication and preservation.

At the top of the center pole is the pole cap bearing. This bearing could be one of several types of thrust bearings. The most common to Dentzel, Spillman, and Allen Herschel machines is the type that has flat rollers of brass sandwiched between two steel plates. These should be greased on a regular basis. If this bearing has not been checked out and has been operating for years, it could be time to check it out. To do this, the machine will have to be taken down in order to take the load off the top bearing. If wear is found, the brass rollers can be milled.

The Spillman and Allen Herschel machines are similar to those Chance Manufacturing Company uses and can be purchased new, if the size is the same.

The Philadelphia Toboggan Company has a unique top bearing which can be checked or replaced without dismantling the machine. Atop the bearing on top of the pole are six bolts which can be loosened lowering the entire weight of the machine onto the safety bearing, enabling the changing of the bronze disc. This disc, which is still available from the Philadelphia Toboggan Company, is about 5" in diameter but actually comes in two different diameters - be sure to get the correct size - and it has a lip on top and bottom and is scored to allow oil to circulate about the surfaces. This disc is sandwiched between two concave steel plates submerged in a chamber filled with oil. The thrust bearing chamber of the Philadelphia Toboggan carousel should be kept filled with a good grade of S.A.E 30 weight oil for best results.

Located midway up the center pole is the sweep hub bearing. Some manufacturers use a type of adjustable friction bearing. The Dentzel Company has such a bearing on some of its machines.

The Philadelphia Toboggan Company, Spillman Company, Allen Herschel and Chance Manufacturing Company have a type having vertical roller bearings. Some of these machines have grease fittings which would indicate using a heavy moly-grease, such as Lithium EP-1 Grease, at least once a week and twice a week with heavy use. The Philadelphia Toboggan carousel roller bearings should be oiled daily with a high grade of S.A.E. 30 weight oil. With the PTC, the top bearings should be filled with oil, the overflow would have a small pipe attached which will take the excess oil down to the roller bearings in the sweep hub. The base of the sweep hub bearing has an overflow pipe fitting which may be attached to additional pipes which would oil the clutch bearings or be caught in a waste oil container.

To check for wear in the roller bearing, ask for NCA article "Avoiding the Unpredictible Breakdown."

The cranks which make the animals rise and fall should be at right angles to the center bevel gear in the center of the machine so that so that the teeth will mesh properly and minimize wear. Sometimes gears can be cocked slightly due to bearing wear or misalignment. This problem is usually due to moving the machine without marking each piece, thus causing the mismatching of spacers and bearings. The proper arrangement of the gears is to alternate the large and small gears evenly in succession around the bevel gear. Each crank should be alligned on quarter turns: for example, at 12:00 o'clock, 3:00 o'clock, 6:00 o'clock and 9:00 o'clock. This helps balance the operation of the machine.

The bearings along the crank on the spacers may be block type with grease fittings or, is more often the case, an open pillow bearing, either steel, babbitt or brass. The babbitt and brass fittings with no grease fittings should be oiled daily. Some steel type bearings are

equipped with a felt wick system located in the valley of the bearing. You would not see this unless the shaft were removed and the bearing cleaned. This type of bearing, with the oil wick, should be oiled with a high grade of S.A.E. 30 weight of oil once a week normally and more often with hard use. If the oil wick is crusted with gunk and functions poorly, it may be removed, cleaned, re-oiled and replaced.

Along the cranks at the center of each throw is a two-piece bearing which is the jump pole bearing. This bearing is also packed with an oilable wick or if no wick is apparent, may be packed with a thick grease, such as Lithium EP-1 Grease. Sometimes the slop in this bearing may be taken up by taking each bearing off and grinding off each flat surface, pulling each piece closer.- Care should be taken to check for tolerances so as not to bind the shaft.

Attached to the throw bearing is the jump pole. At the base of the jump pole is the telescope or the attachment to the floor. The Parker Company and some other manufacturers used a hinge-type of scissor called the "grasshopper." These were dangerous as sometimes patrons could get their feet caught or even small children could get wedged under the animal and accidents could occur

The early Dentzel machines had an oak-lined hole in the platform, allowing the jumper pole to descend below the platform in a slight pit. Sometimes the platform was raised a step to accommodate the jumpers, thus a step machine.

The most common connection from the jumper to the floor is the telescope. A smaller piece of pipe or steel rod slips up and down inside the jumper pole with one end secured to the platform. To keep grease off the riders, a metal sheath is attached parallel to the slip rod. It is important to keep this sheath from dragging on the jumper pole. It is also important to keep grease inside the center of the jumper pole and not on the outside as small children will grab for the greasy jumper pole base and smear the grease over the animals as well as themselves. Newly developed white lithium greases are ideal for this as they are cleaner. Telescope sheaths should be replaced if sharp edges are apparent in order to cut down the risk of injuries.

If the base of the jumper pole is worn, it should be cut off and a new section of pipe welded on. Care should be take to assure that the telescope slip rod slides easily up and down in the replaced pipe and the interior of the jump pole is free from weld slack.

The telescope is one of the most dangerous parts of the machine. If they become worn and bind up, they can throw cranks and supports off onto the patrons.

Some manufacturers have steps clamped to the jump pole just under the animal. Sometimes these steps slip down and bind up on the telescope, causing problems. A safety tip on keeping these from slipping would be, after the step and the animal are aligned properly so that the step will not bottom out on the telescope, a small bolt could be installed just under the step to prevent the step from slipping down. This type of step is used on Dentzel, Stein and Goldstein, and Mangles machines. On the Philadelphia Toboggan, Allen Herschel and Spillman, the step is connected with the animal. The operator should check all connections daily when the machine is in hard use.

Floor hangers should be checked to see that bolts are fast and that the floor is level. -When adjusting the floor for level, build a small jig which sits on the floor close to the edge of the machine floor. Turn the machine slowly with an eye on the jig. As the floor passes the jig, note the height. Decide on the proper floor height and set floor height to ground. If the floor is pitched, level the center lower than the outer edge. Raise two pieces on the outside until the crack closes between; then set the other pieces the same height. Trial and error and common sense should be the best guides. If diagonal floor braces and turnbuckles are used, care should be taken not to tighten too much as this pulls the floor out of round, causing cracks in the floor to open.

There are many types of drives and transmissions. The Mangels Company made machinery for their own carousels, Carmel, Stein and Goldstein, as well as others. If you have one type of carousel with a Mangels mechanism, do not become confused.

The most modern type is the liquid or fluid drive. This was developed by Allen Herschel and Chance Manufacturing Company and you will be able to find parts and information on repairs from Chance Manufacturing Company, PO Box 7144, Wichita, KS., 67201.

The earlier Allen Herschel, Illions and Dentzel had a similar sandwichtype clutch which had maple, asbestos or cork blocks which were sandwiched between two steel steel plates. The plates should be relatively clean and the wood blocks slightly oiled to keep down squeaking.

Dentzel had a similar type clutch to the early Allen Herschel - two steel plates with blocks of cork sandwiched between. All of these types of clutches may be easily cleaned and repaired using common sense as it is obvious how they operate.

Some of the other carousels, such as Looff, used drive wheels side by side. One is the idler wheel and the other wheel is connected to the pinion gear. In order to operate this type clutch, the belt from the motor is slipped over onto the drive wheel with a belt fork. When braking this type mechanism, one would slip the belt back onto the idler wheel and with the same linkage, the brake shoes are applied to the drive wheel. When adjusted properly, this type of clutch will last for some time. The disadvantage in this type is that it takes a lot of room and is usually installed in a pit below the machine and is difficult to service. (This type is similar to that used in the older single engine shop).

The Auchy friction drive used on the Philadelphia Toboggan Company carousels was probably one of the most simple and most trouble-free ever constructed. It consists of two raw hide beveled cones running in opposite directions under a drive wheel which was attached to a pinion gear. The braking system for this clutch is two round blocks of maple or oak wood which fit into brake holders attached to the upper side of the clutch frame. Attached to the base of the wheel at the pivot point center which raises and lowers the clutch wheel. The clutch wheel only travels I" total. If this type of clutch is kept clean, and adjusted correctly, it has been known to last 65 years. The brakeshoes may squeak when new and would need to be slightly oiled. Care should be taken not to oil too much as brakes will not operate properly. The underside of the drive wheel should be cleaned with kerosene or mineral spirits to allow the friction drive to operate properly.

The pinion gear shaft which is the vertical shaft in the machine house is the transmission of the power from the motor through the clutch to the sisters gear which is the segmented gear which spans the sweeps inside the machinery area'. These gears should be lubricated with a good multipurpose gear oil such a Quaker State Super Quad 85-140. Care should be taken that the pinion gear should not operate too closely to the sisters gear. If the machine turns with an uneven load, it could bottom out and break the sisters gear. If there is any slop in the center pole (cheese or sweep hub) bearing, this would also cause the sisters gear to bind up and break.

The base of the center pole and quarter pole braces should all be checked. Any play in any of these supports should be corrected as they will wear out important support points. Equal support should be on each of the quarter poles as well as the center pole base. If the center pole wallows around at the base, the quarter poles supports are too tight. One of the best methods of correcting this would be to drive wedges under the center mud sill intersection under the center pole base. If the center pole pot is too worn, otherarrangements may have to be made. A knowledgeable person should be consulted.

New space age lubricants can cut down on wear and mess. For instance, white lithium grease on telescopes is cleaner than the old wheel bearing or graphite grease. Be careful in selecting newer greases because some of them will break down under heavy pressure.

An updated instruction sheet for lubrication of carousels is included in this paper.

Assign a regular lubrication monitor to the carousel who has the regular task about the machine. The carousel should be managed like the high volume rides. If managed and maintained properly, it will last well and thrill countless thousands. If the machine makes no squeaks and runs relatively smoothly and quietly, your machine has no problems and has trouble-free operation. If squeaks are apparent when the machine is operating, you should investigate as soon as possible. Squeaks could mean wear and costly repairs.

The squeak gets the grease!

LUBRICATION UPDATE

A replacement, suggested for Lubriplate or any automotive or graphite base wheel bearing grease is Lithium EP-1 Grease which is also available in white.

A suggested replacement for open gear grease is Quaker State Super Quad 85-140. Chevron puts out an aerosol lubricant, GEARSITE SPRAYLUBE GEAR FILM. Other companies produce aerosol open gear greases. However, a disadvantage of aerosol lubricants is that droplets of the grease may get all over everything.

A suggested replacement for general oiling is a high grade S.A.E. 30 weight automotive oil.

Under the telescopes, if they are thoroughly cleaned, you might use a white lithium grease which is used in restaurants and hospitals.

Note that some of these greases may cost more but they may suit your needs and cause fewer problems in the end.

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