Walker Process Equipment
Division of McNish Corporation

BRIDGE-SUPPORTED VS. PIER-SUPPORTED COLLECTOR MECHANISMS

A PRIMER

Quite frequently we have seen specifications written that seem to confuse the components that make up bridge- and pier-supported collector mechanisms, and in fact many times the specified components are intermixed. There must be a need, therefore, for a primer to explain the makeup of these mechanisms. This paper is an attempt to explain those differences.

Bridge-supported collectors, as the name implies, have as their basic support a bridge that spans the entire clarifier basin diameter. Pier-supported collectors have, as their basic support a center column, or pier, anchored to the bottom center of the clarifier basin. The bridge for the pier-supported collector need only span to the center, for access to the drive.

Structurally (and economically), the bridge-supported collector should only be applied on basins less than 45' diameter. Pier-supported collectors become more economical above this size, and can be as large as 250' diameter, or greater.

BRIDGE-SUPPORTED

Refer to drawing No. 1. This drawing depicts a typical bridge-supported collector. The ***bridge*** (Ref #2) is generally a beam bridge; walkways need only extend to the center drive platform, but may, for traffic reasons, extend across the full bridge length.

Because the transmission of torque from the drive to the ***arms*** (6) is through a ***torque tube*** (4), the output drive gear must necessarily be an ***external*** gear, as the torque tube is attached to the gear at the centerline. The most commonly used external gear is a ***worm gear*** (1). (See drawing No. 2 for a typical worm gear.) The worm gear drive consists of a primary gearmotor (20), which drives the worm shaft (4) input to the main output worm gear (12).

The ***skimmer*** (12) is cantilevered from the torque tube, which is an additional reason for the nominal 45' maximum diameter. The existence of the skimmer precludes support of the ***influent well*** (8) from the bridge. Therefore, the influent well is most often supported on a bearing / support (17) on the torque tube, permitting the influent well to remain stationary while the torque tube rotates. If there is no skimmer, the influent well may be supported from the bridge.

The influent well must be stationary because the influent pipe enters from the side, and is connected to, and discharges into, the influent well. In some instances, to avoid the submerged bearing, a full-diameter structure is used to support the influent well. In either case, the influent pipe must be supported independently from the influent well.

PIER-SUPPORTED

Refer to drawing No. 3. This drawing depicts a typical pier-supported collector. The **bridge** (3) is a beam bridge in smaller sizes, but economically a truss bridge becomes less costly above approximately 70' diameter. Further savings are effected with a truss bridge if the truss sides are permitted to be used in lieu of handrails. For traffic reasons, the bridge may also extend across the full basin diameter. Usually, a drive platform is desirable at the center, generally 8' square minimum.

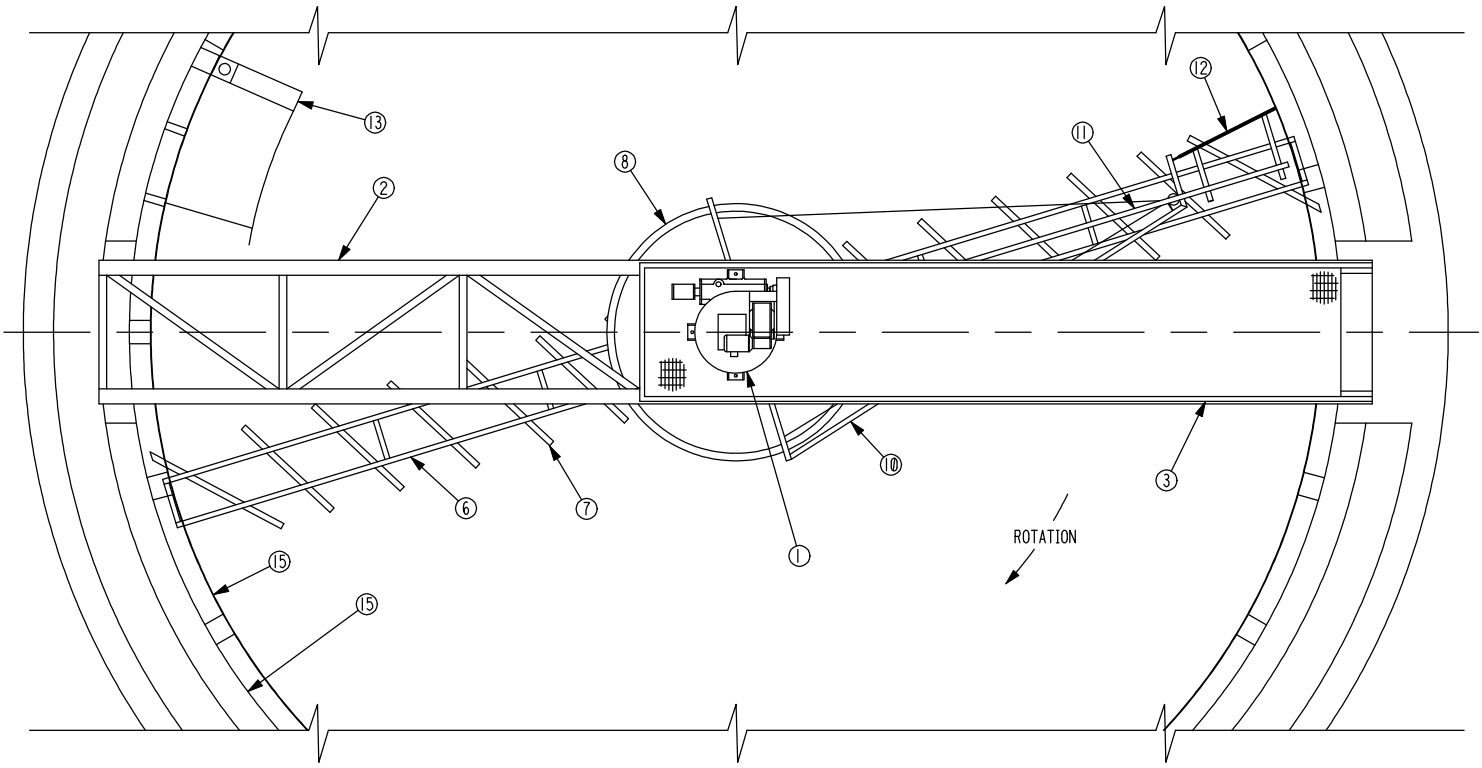
The **center pier** (6) is the main support for this mechanism. This pier is also, in most cases, the influent conduit into the basin.

The transmission of torque from the drive to the ***arms*** (9) is through the ***drive cage*** (7). Because the cage rotates outside the center pier, and is attached to the drive, the drive output gear must be an ***internal gear***, which requires that it be a ***spur gear*** output (1). Because the center pier supports the drive, the pier and its anchorage must resist the gear output torque.

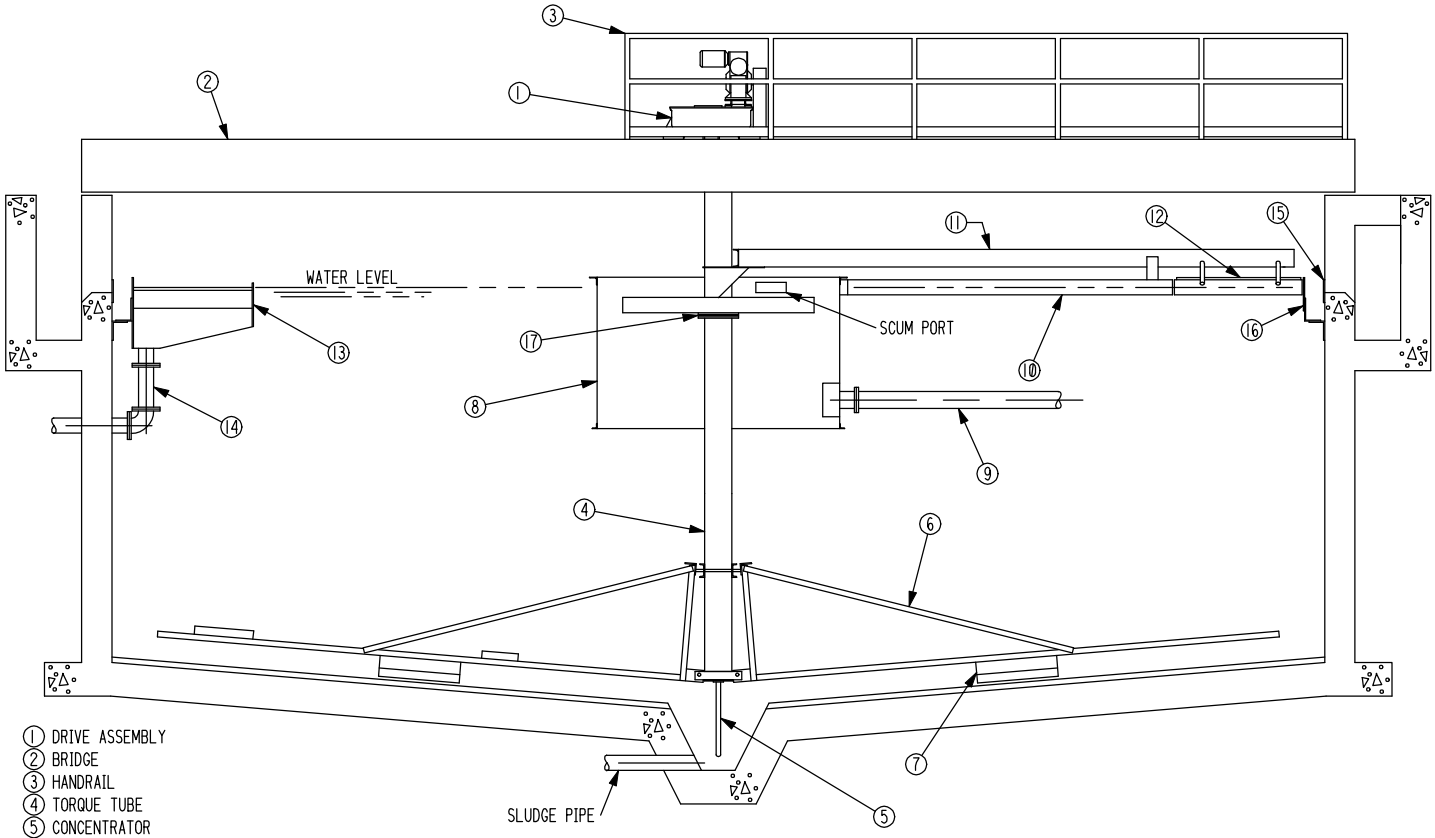
Refer to drawing No. 4, showing a typical spur gear drive assembly. This drive consists of a primary ***gearmotor*** (32), driving an ***intermediate worm gear*** (18), which in turn drives the main output ***spur gear*** (7) through a ***pinion shaft*** (12).

The ***skimmer*** (12) is supported vertically from and above the arm(s), and for this reason cannot accommodate an infrequent need (or desire) for a side influent pipe.

The ***influent well*** (8) is supported from, and rotates with, the drive cage. In some instances the well may be required to be so large that it must be structurally supported from the bridge, and therefore be stationary.



PLAN VIEW



SECTIONAL ELEVATION

1. DRIVE ASSEMBLY
2. BRIDGE
3. HANDRAIL
4. TORQUE TUBE
5. CONCENTRATOR
6. TRUSS ARM
7. FLIGHT AND SQUEEGEE
8. INFLUENT WELL
9. INFLUENT PIPE
10. SCUM DEFLECTOR
11. SKIMMER BOOM
12. SKIMMER ASSEMBLY
13. SCUM BOX
14. SCUM PIPE
15. WEIR PLATE
16. SCUM BAFFLE
17. BEARING/SUPPORTS

TYPICAL ONLY – DO NOT USE FOR CONSTRUCTION

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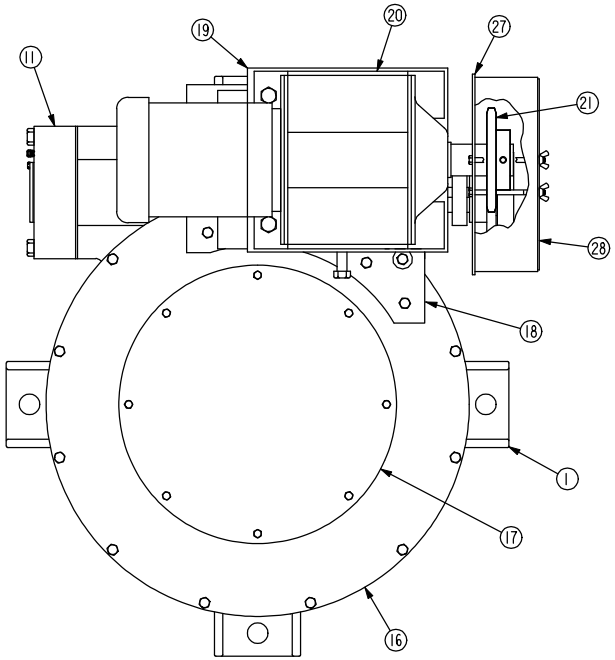
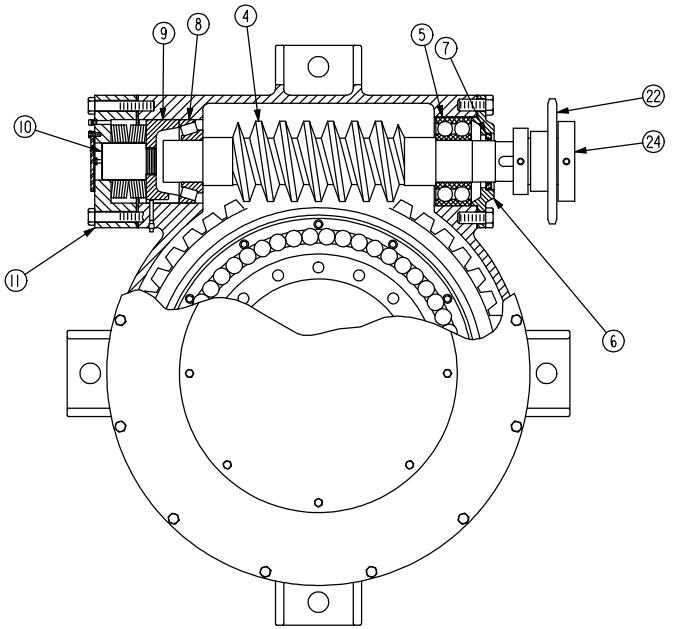
C & CP CIRCULAR COLLECTOR

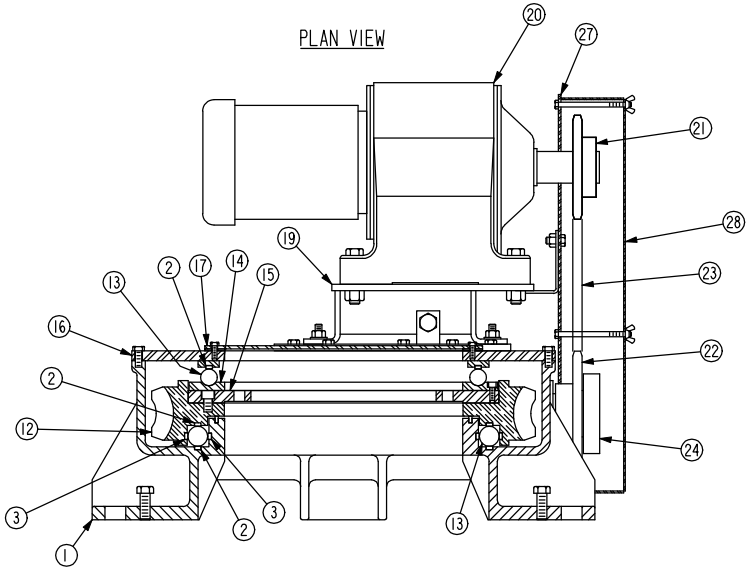
DRAWING No. 1



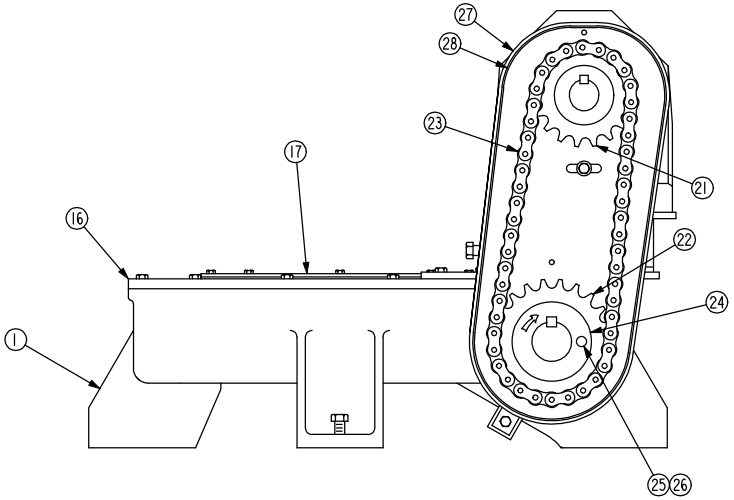
PLAN VIEW



PLAN SECTION THROUGH WORM SHAFT



SECTIONAL ELEVATION



1. WORM GEAR HOUSING
2. HORIZONTAL RACE
3. VERTICAL RACE
4. WORM SHAFT
5. BEARING
6. BEARING CAP
7. OIL SEAL
8. BEARING
9. OVERLOAD THRUST RING
10. THRUST SHAFT
11. OVERLOAD CAP
12. WORM GEAR
13. BALL BEARING
14. ANTI-LIFT THRUST RING
15. TORQUE TUBE MOUNTING PLATE
16. HOUSING COVER
17. INSPECTION HOLE COVER PLATE
18. DRIVE BASE MOUNTING PLATE
19. DRIVE BASE
20. REDUCER WITH MOTOR
21. DRIVE SPROCKET
22. DRIVEN SPROCKET
23. DRIVE CHAIN
24. SHEAR PIN COUPLING
25. SHEAR PIN LINER
26. SHEAR PIN
27. CHAIN GUARD BACK
28. CHAIN GUARD FRONT

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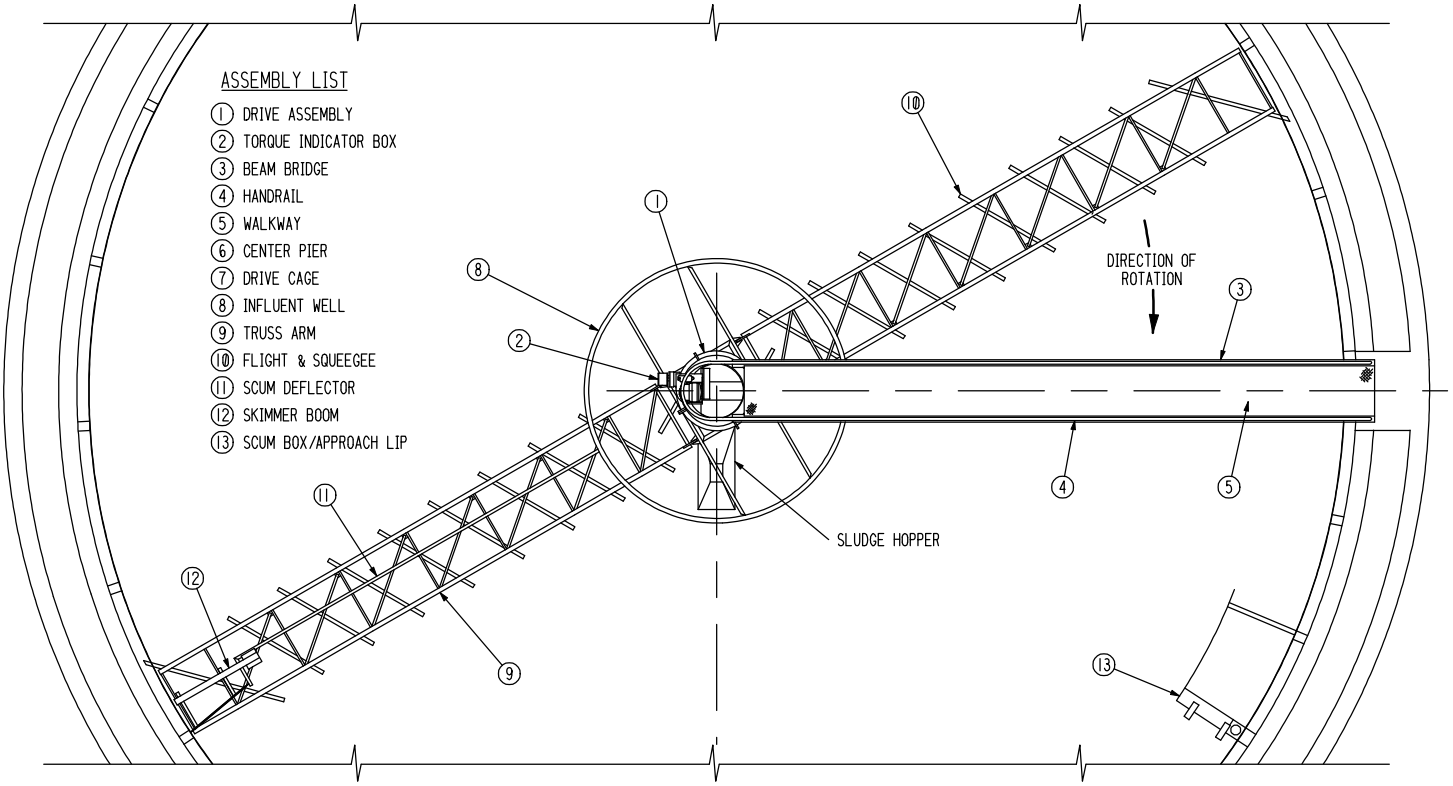
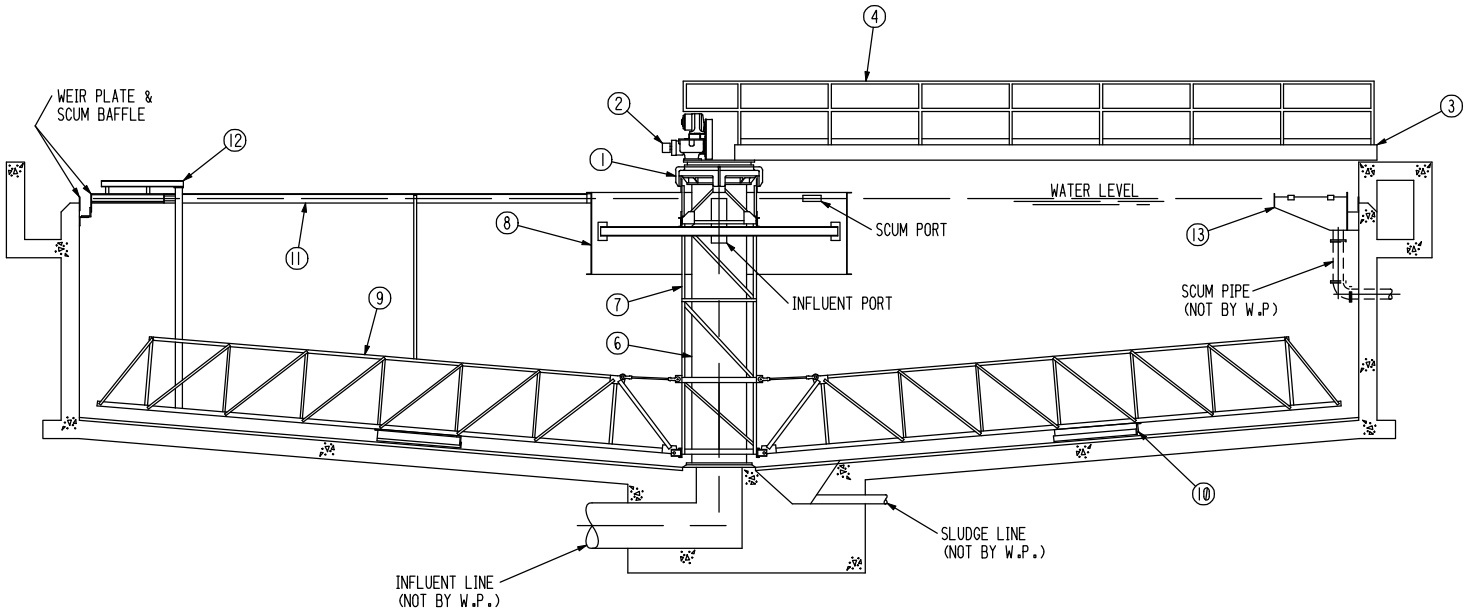
28" WORM GEAR DRIVE ASSEMBLY

DRAWING No. 2



PLAN VIEW



SECTIONAL ELEVATION

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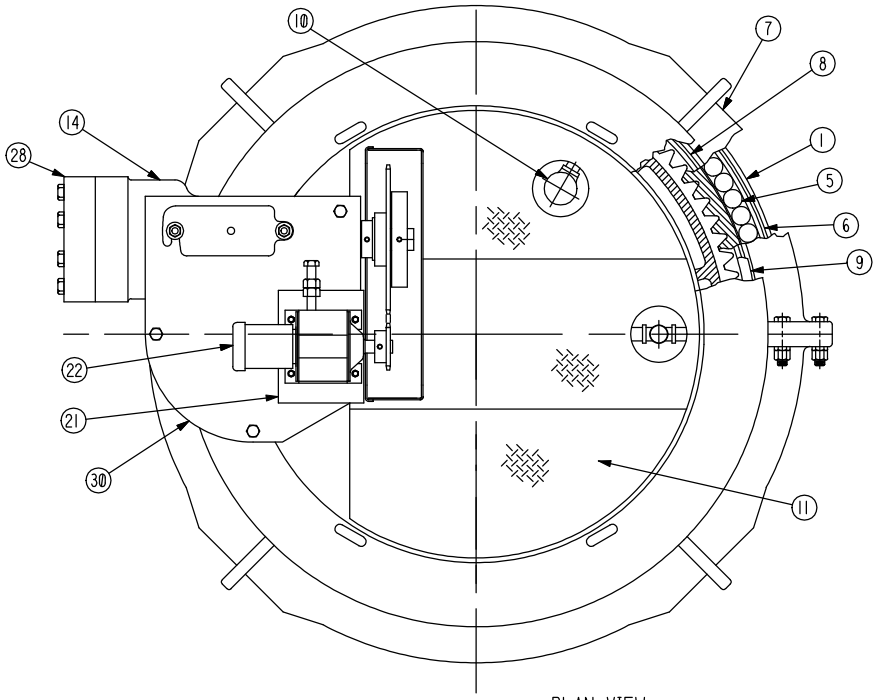
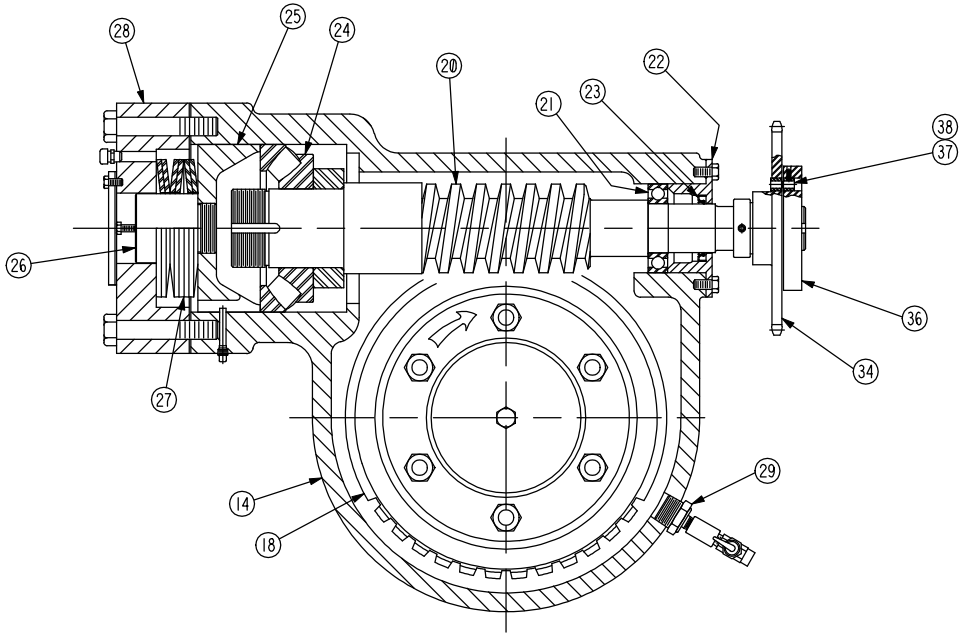
RSP COLLECTOR

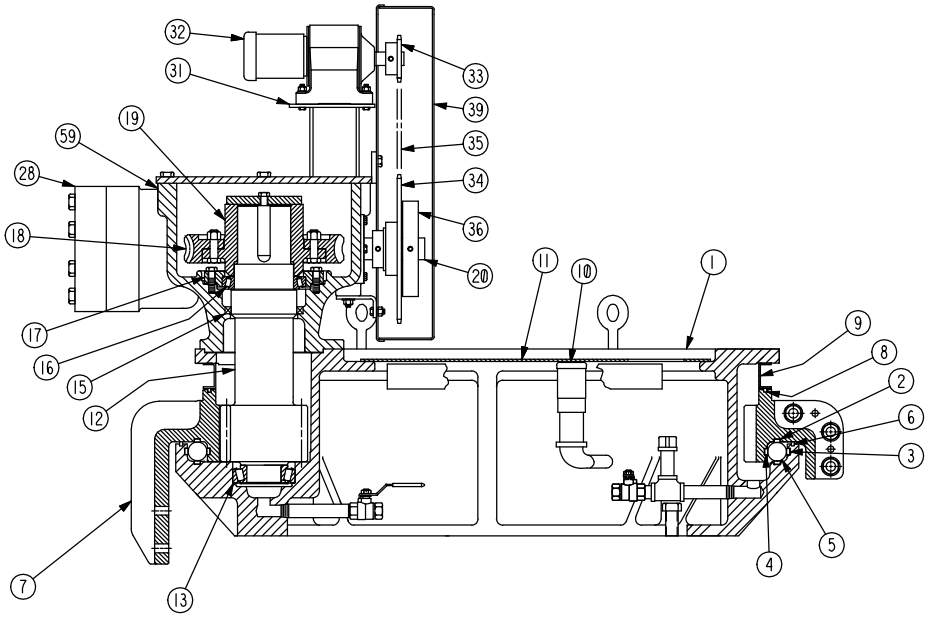
DRAWING No. 3



PLAN VIEW



PLAN SECTION THROUGH WORM SHAFT



SECTIONAL ELEVATION

1 SPUR GEAR HOUSING	21 BEARING
2 HORIZONTAL RACE	22 BEARING CAP
3 VERTICAL RACE (HOUSING)	23 OIL SEAL
4 VERTICAL RACE (GEAR)	24 BEARING
5 BEARING BALL	25 OVERLOAD THRUST RING
6 DUST SEAL (HOUSING)	26 THRUST SHAFT
7 INTERNAL SPUR GEAR (SPLIT)	27 BELLVILLE DISC SPRING
8 DUST SEAL (GEAR)	28 OVERLOAD CAP
9 DUST SEAL RETAINER	29 OIL LEVEL SIGHT PLUG
10 DIP STICK	30 WORM GEAR HOUSING COVER
11 HOUSING COVER SECTIONS	31 DRIVE BASE
12 PINION	32 GEARMOTOR
13 BEARING	33 DRIVE SPROCKET
14 WORM GEAR HOUSING	34 DRIVEN SPROCKET
15 OIL SEAL	35 DRIVE CHAIN
16 BEARING	36 SHEAR PIN COUPLING
17 BEARING RETAINER	37 SHEAR PIN LINER
18 WORM GEAR	38 SHEAR PIN
19 WORM GEAR HUB	39 CHAIN GUARD FRONT
20 WORM SHAFT	

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SPUR GEAR DRIVE ASSEMBLY

DRAWING No. 4