

# STEELE

*Fawcett*

## INCLA III

### COMBINATION DRY PAN / RIM DISCHARGE GRINDER MODEL B

ROLLERS 70" DIA. X 18" FACE;  
WEIGHT 14,638 LBS. EACH. TIRE  
AND GRINDING PLATE SEGMENTS  
28PC CHROME ALLOY.

MANUAL OR ELECTRICAL ROLLER  
SUSPENSION DEVICES FOR  
INDEPENDENTLY MOUNTED  
OFFSET ROLLERS.

SPIRAL MAIN SCRAPERS ADJUST  
TO CONTROL TIRE WEAR. ALL  
SCRAPERS HAVE RENEWABLE  
28PC ALLOY SHOES.

SELF-ALIGNING FOOTSTEP  
BEARING HOUSING CONTAINS  
SEPARATE ROLLER THRUST  
AND RADIAL BEARINGS.

BALL AND ROLLER BEARINGS  
THROUGHOUT WITH SUPERIOR  
OIL, GREASE AND DIRT SEALS.

LARGE, EFFICIENT WORM  
REDUCER DRIVE IS ENTIRELY  
SUPPORTED BY VERTICAL SHAFT.

DRILLED STEEL OR CAST 28PC  
ALLOY INCLINED SCREEN PLATES.

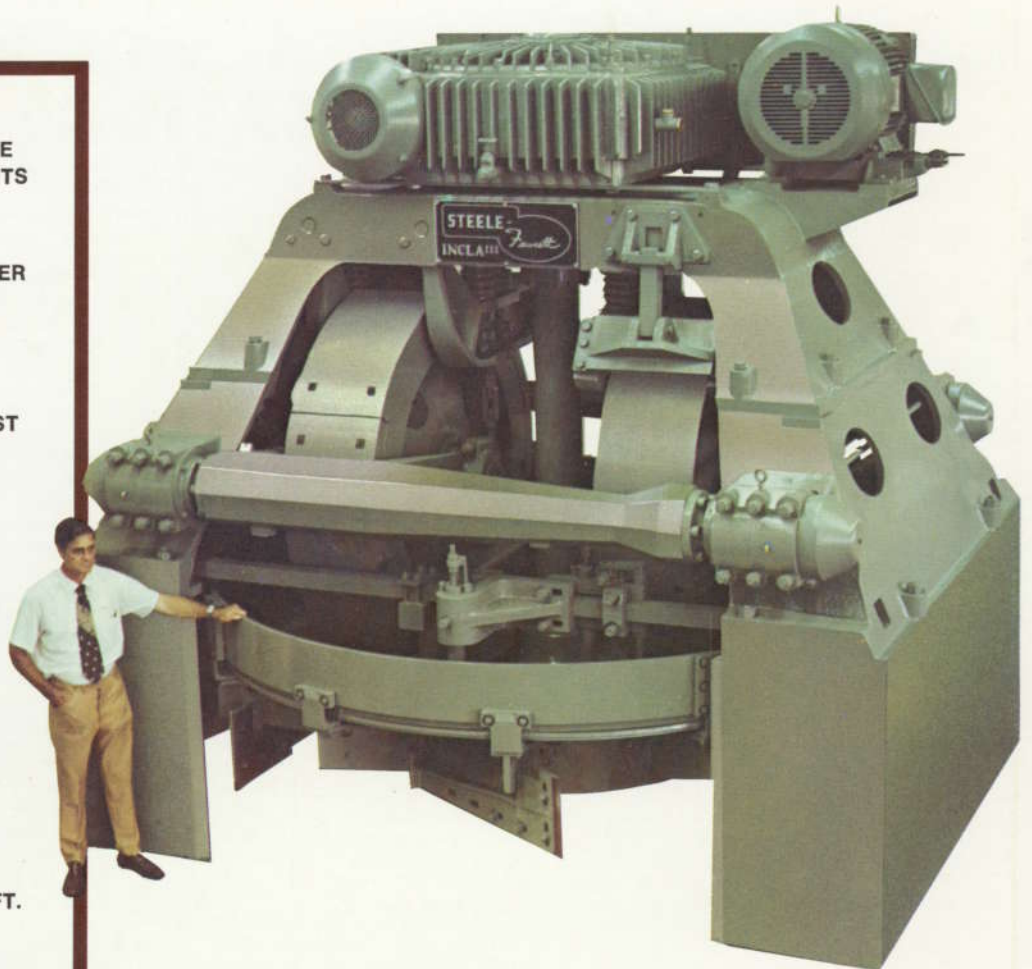


Fig. 1 Standard Dry Pan (rotating-rim) Version



# DEVELOPMENT

Our INCLA IIIB is a direct descendant of over one hundred and sixty world-famous INCLA III's built by Thos. C. Fawcett, Ltd. (now Craven-Fawcett (Leeds) Ltd.) in England, or by their licensee. With their able assistance we have changed the design slightly to incorporate gears, bearings, and seals from U.S. sources, and also have made the INCLA so that it can be operated not only as a standard, rotating-rim DRY PAN, but also as a fixed-rim RIM DISCHARGE GRINDER. For reliability, capacity, and low maintenance costs the resulting machine is far ahead of anything now offered from within the U.S.A. To date (May 1977) we have built twenty-seven INCLA IIIB's and are confident that you will be impressed with the design and its capabilities.



Fig. 2 Footstep Bearing and Support Beam

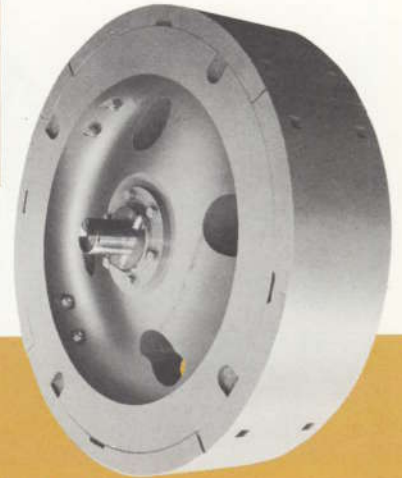


Fig. 3 Standard Roller with four 28PC ALLOY Tire Segments 18" wide

## SPECIFICATIONS

**"28PC ALLOY":** This identifies our tough and highly abrasive-resistant castings which contain 28% pure chromium. We use this for all replaceable wearing parts throughout the INCLA except drilled steel screen plates.

**GEAR OR WORM REDUCER:** (Figs. 1, 5 & 6) Cast of DUCTILE (SG) iron, mounted at top of, and entirely supported by, Vertical Shaft. Worm cut in solid shaft of AISI 4320 steel, carburized, hardened, and ground. Worm Wheel SAE 65 hard gear-bronze, mounted on DUCTILE (SG) iron Center. Ratio 29.5 to 1. Efficient grease, oil and dirt seals, and cooling fan. Mechanical factor of safety is far more than adequate for 125 HP; even the thermal rating is almost two-to-one.

**DRIVING MOTOR:** (Figs. 1 & 14) Standard is Frame No. 444T, 125 HP x 1800 rpm (60 Hz) or 1500 rpm (50 Hz), Design "C" (high starting torque type), with Mag. ACL Starter. Starting under load greatly facilitated with Roller Suspension Devices (Figs. 7 & 8). For medium or light duty a 100 HP motor may be substituted. Slip-ring motor may substitute for Design "C". We can drill the Motor Support Bracket to accept a variety of motor base rails.

**PAN:** (Figs. 9, 10, 11 & 12) Main casting is DUCTILE (SG) iron with twelve Pan Arms of same material bolted on to support Screen Plates and Pan Rim (if rotating). 28PC ALLOY Pan Rim Liner Segments protect inside of Rim from wear.

**PAN RPM:** Normally 33.0 rpm, making rim speed 1,140 ft. (348 m) per minute. May be as slow as 28 rpm, depending on customer's requirements, nature of clay, HP available, etc.

**GRINDING PLATE SEGMENTS:** (Figs. 11, 12 & 16) Six (6) per set, of 28PC ALLOY, 2 $\frac{3}{8}$ " (60 mm) in thickness and weighing approx. 400 lbs. (181.6 kg) each segment.

**SCREEN PLATE SEGMENTS:** (Figs. 11, 12 & 15) These may be of cast 28PC ALLOY with circumferentially aligned tapered slots  $\frac{1}{4}$ " (6.4 mm) wide, or they may be fabricated of  $\frac{1}{16}$ " (1.75 mm) thick steel plate with maximum number of  $\frac{3}{16}$ " (4.8 mm),  $\frac{1}{4}$ " (6.4 mm), or  $\frac{5}{16}$ " (8 mm) diameter tapered, drilled holes. A full set of either type of Screen Plates consists of twelve Inner and twelve Outer Segments. Weight of one cast 28PC ALLOY Screen Plate: Inner—108 lbs. (49 kg); Outer—98 lbs. (44.5 kg). Weight of one fabricated steel Screen Plate: Inner—70 lbs. (32 kg); Outer—66 lbs. (30 kg).

**ROLLER CASTINGS:** (Figs. 3, 7 & 8) Cast Iron. Without Roller Tire Segments these measure 63 $\frac{1}{2}$ " (1,613 mm) O.D., and each weighs approx. 10,180 lbs. (4,622 kg). Each is normally drilled with sixteen holes for 1" (25.4 mm) diameter squarehead bolts for mounting four Roller Tire Segments 18" (457 mm) wide. To special order these Roller Castings can be drilled with an additional 16 holes in different locations to accept the mounting of

eight (8) Tire Segments only 9" (228 mm) wide. (See ROLLER TIRE SEGMENTS, below, and Fig. 8.)

**ROLLER TIRE SEGMENTS:** (Figs. 3, 7, 8 & 16) Of cast 28PC ALLOY approx. 3 $\frac{1}{4}$ " (82.6 mm) thick. Standard usage is four of these per Roller, each 18" (457 mm) wide and weighing 830 lbs. (377 kg). 9" wide Tire Segments weigh 415 lbs. (188 kg) each. These 9" Tire Segments may be exchanged laterally to equalize wear, but we have found that using the Adjustable Blades (Figs. 11 & 12) at the discharge end of each Spiral Main Scraper more effective for this purpose. All Tire Segments are factory-fitted to a master pattern with a hardening plastic polyester resin to insure complete contact with machined surface of Roller Casting when mounted.

**COMPLETE ROLLER:** (Fig. 3) These are 18" (457 mm) wide x 70" (1,778 mm) outside diameter. With Roller Shaft, Bearings, and weight contribution by the Yoke Casting (Fig. 4), the total effective CRUSHING WEIGHT for each Roller is 14,638 lbs. (6,646 kg).

**ROLLER SHAFTS AND BEARINGS:** (Fig. 3) Shafts are 6" (152 mm) dia., each fitted with two roller radial and one ball thrust bearings. Very effective grease/dirt seals are used, and lubrication points are located for convenience and safety.

**FOOTSTEP BEARING ASSEMBLY:** (Fig. 2) An unusually effective design incorporating large, heavy-duty individual Timken Thrust and Radial Bearings enclosed in a DUCTILE (SG) rotating, self-aligning housing with an extremely effective labyrinth dirt/grease seal at lower end surface. This assembly is bolted firmly to the rotating Pan, and fits down over a Pintle Casting, centered on a heavy fabricated and reinforced double 12" (305 mm) Support Beam. Entire housing is easily removable by simply jacking up Pan, Vertical Shaft, and Gearbox as one unit.

**VERTICAL SHAFT:** (Figs. 1, 5 & 11) 9" (229 mm) dia., two-piece, forged steel with Flanged Coupling just below Gearbox.

**SCRAPERS:** (Figs. 11 & 12) Two Spiral Main Scrapers and one Center Scraper, all rigidly mounted from two 3" (76 mm) square solid steel Scraper Bars with adjustment horizontally and vertically. Center Scraper is one-piece 28PC ALLOY, while others are protected by renewable 28PC ALLOY Blades or Shoes. Each Main Scraper has an adjustable End Blade for directing clay under Rollers (see ROLLER TIRE SEGMENTS, above). There are six Underneath Scrapers with renewable 28PC ALLOY Blades.

**WEIGHT:** The complete INCLA IIIB, LESS MOTOR, whether assembled as a standard rotating-rim DRY PAN, or as a fixed-rim RIM DISCHARGE GRINDER, weighs approx. 87,000 lbs. (39,500 kg). We reserve the right to change dimensions and specifications without notice.

See Installation Diagram, with dimensions, on back of this brochure.



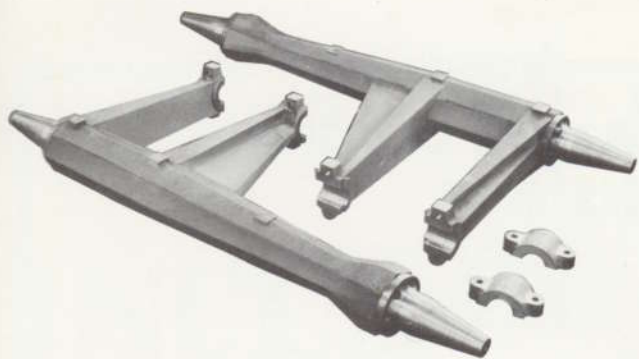


Fig. 4 Roller Yoke Castings

There are two tremendous Yoke Castings of DUCTILE (SG) iron which position each Roller exactly so as to permit motion only up and down. The ends of these castings are tapered stub-shafts which work in adjustable Yoke Bushings. Looking down on the Pan from above, it will be seen that the center line of each Roller Shaft is offset from the center of the Vertical Shaft 4" so as to produce the INCLA's famous "heel-grinding" action.

Cast entirely of DUCTILE (SG) iron, it is assembled as one complete, self-contained, oil-retaining, dustproof unit incorporating the upper section of the Vertical Shaft with Flanged Coupling projecting below, but can be removed easily. The flat steel Gearbox Mounting Springs (clearly visible in Figs. 1 and 8) merely prevent rotation of the Gearbox, while permitting slight vertical movement of the whole Vertical Shaft and Gearbox Assembly.



Fig. 7 Standard Manual Roller Suspension Devices

These allow turnbuckle-adjustment of Rollers from actual contact with Grinding Plates up to about 1½" (38 mm) in height when all wearing parts are new. Suspension of Rollers is always a convenience for Pan clean-out and for changing of Roller Tire Segments, and may be helpful under certain conditions in controlling screen-analysis of throughput.



Fig. 8 Optional Electrical Roller Suspension Devices

These will raise, lower, or hold a Roller in any position by means of push-button control. In this picture also may be seen a Roller fitted with 8 Tire Segments 9" wide, rather than the standard 4 Tire Segments 18" wide.

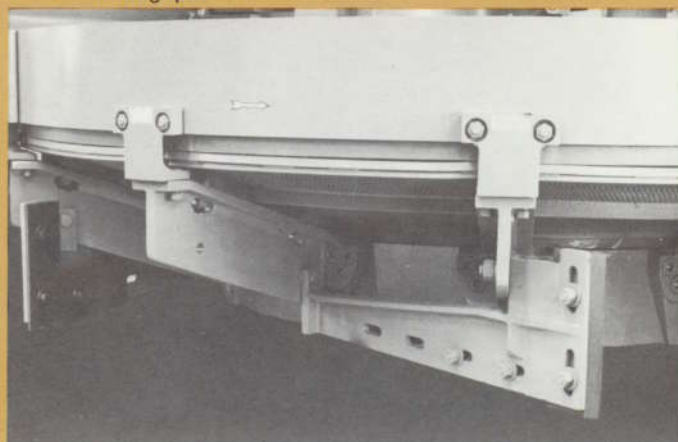


Fig. 9 Standard Arrangement—Rotating Rim  
Discharge of clay is through the perforated Screen Plates. Note Underneath Scrapers with renewable 28PC ALLOY blades.

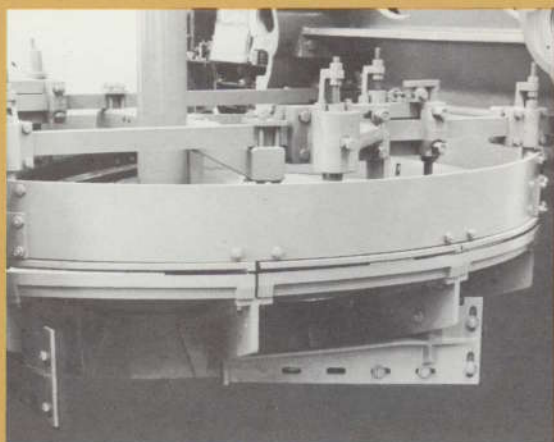


Fig. 10 Optional Fixed-Rim Discharge  
For operation as a Rim Discharge Grinder, the Pan Rim is supported from the two 3" square Scraper Bars. It is raised and lowered by means of adjusting screws to provide a peripheral slot for clay discharge. All nonwearing parts are protected against abrasion by segments of 28PC ALLOY. (See Fig. 12.) Screen Plates are not removed or supplanted by blank segments when operated as a Rim Discharge Grinder.





Fig. 5 Worm Gearbox



Fig. 6 Worm and Worm Gear Assembly

Steel Worm, cut in shaft,  
7.546" (191.7 mm) P. D.  
Bronze Worm Gear  
40.454" (1,027.5 mm) P.  
D. for center distance of  
24" (609.6 mm). Gearbox  
is virtually unbreakable  
DUCTILE (SG) iron. All  
bearings are roller.

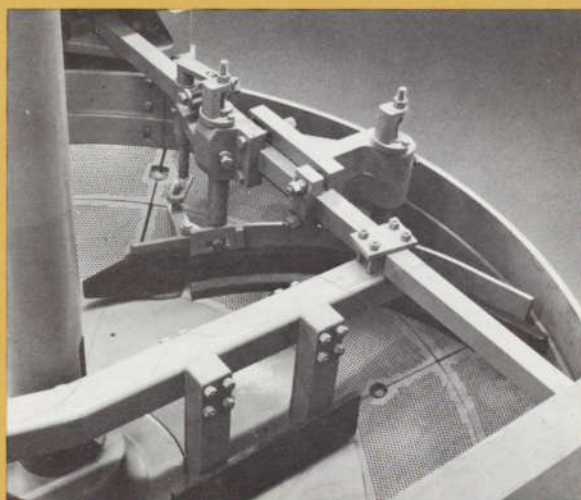


Fig. 11 Scrapers

We see here one of the two Spiral Main Scrapers and the Center Scraper, which has a blade of cast 28PC ALLOY and is in a fixed position, but vertically adjustable. Also in evidence are drilled tapered-hole steel Screen Plates and the 28PC ALLOY Rim Liners used with rotating Pan Rim. Because of their configuration, Spiral Scrapers permit higher Pan rpm without overspill.



Fig. 12 Adjustable Blade on Spiral Scraper

All of the Blades or Shoes on these Scrapers are of 28PC ALLOY, and the last, or Discharge Blade, is pivoted so that the direction of clay may be changed from time to time to provide more even wear on the Roller Tire Segments. Cast slotted 28PC ALLOY Screen Plates and Pan Rim Liners for use with fixed-rim discharge are also in evidence.

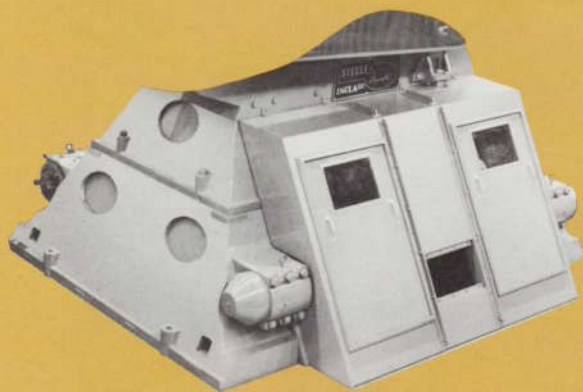


Fig. 13 Optional Dust Enclosures

These are fabricated of plywood. The center panel on each side permits an upper opening to receive tailings and a lower one for raw material, with Plexiglass observation windows. We favor fan location low and at the rear of the INCLA foundation, drawing air and dust down, through, and around the Pan.

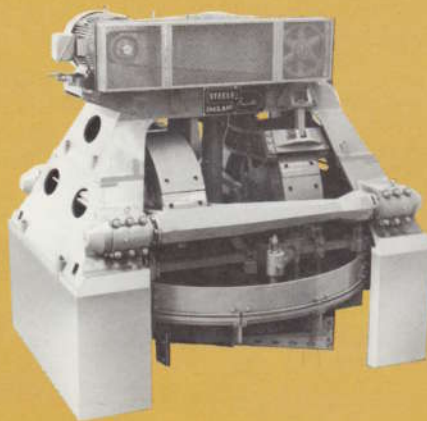


Fig. 14 Standard V-drive Guard

Also in this view may be seen details of Manual Roller Suspension Devices and the arrangements for vertical adjustment of the Fixed Rim, used for rim discharge.



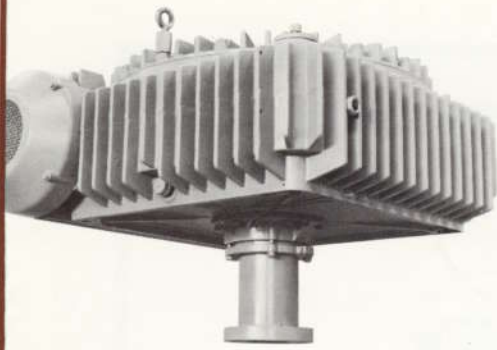


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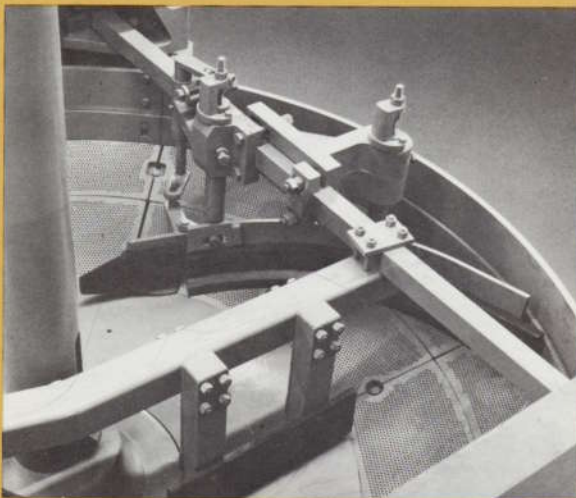


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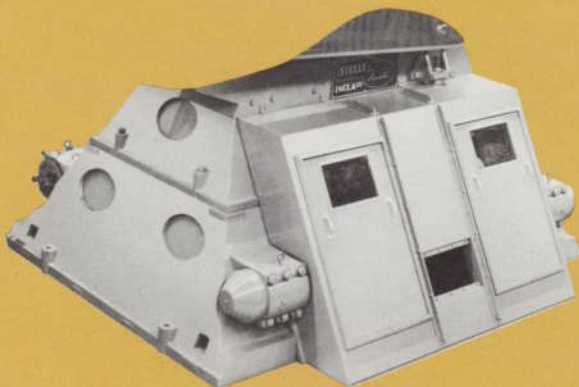


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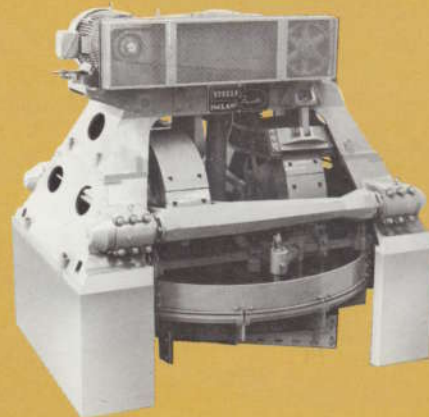


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## SUGGESTED INSTALLATION DIAGRAM WITH DIMENSIONS

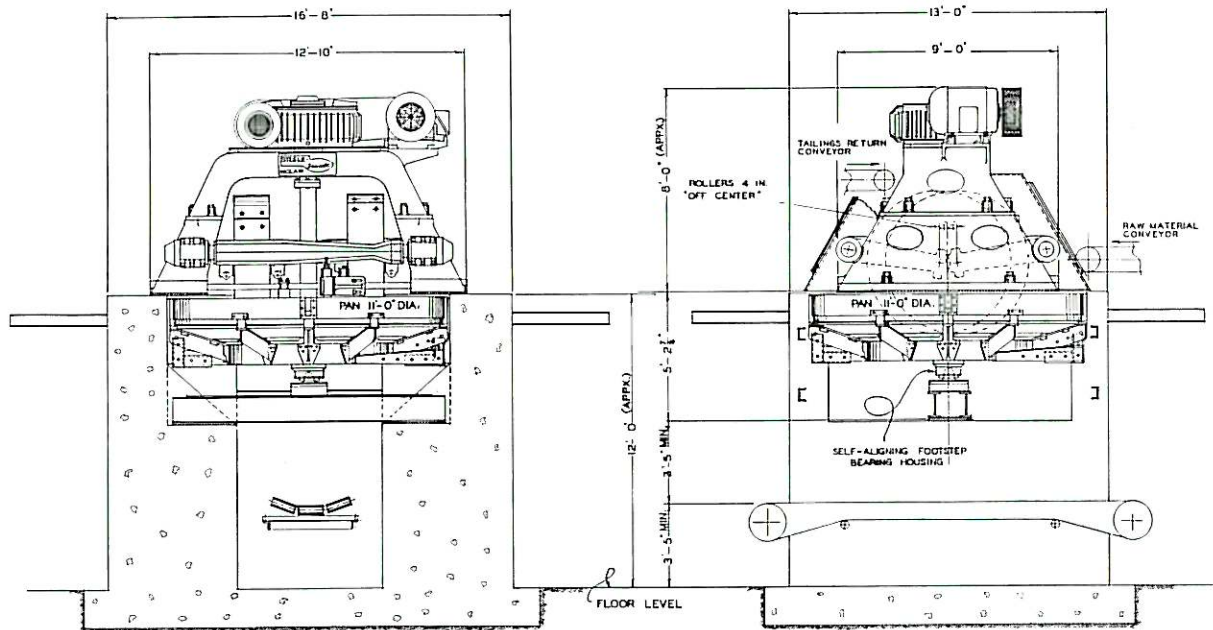


Fig. 19

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