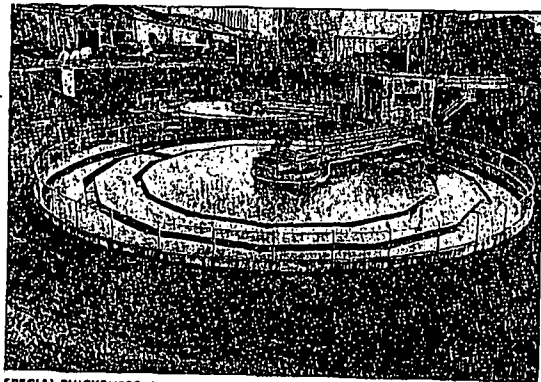
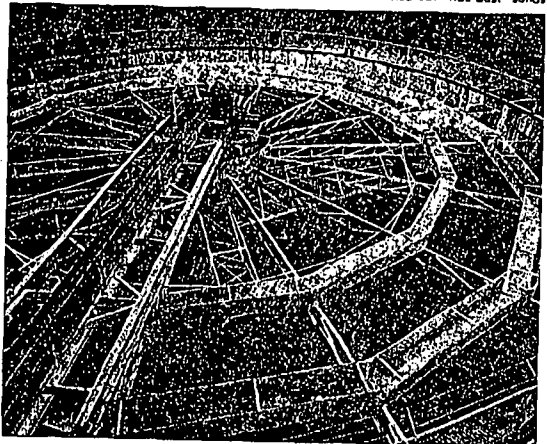


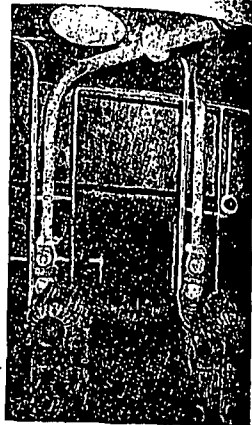
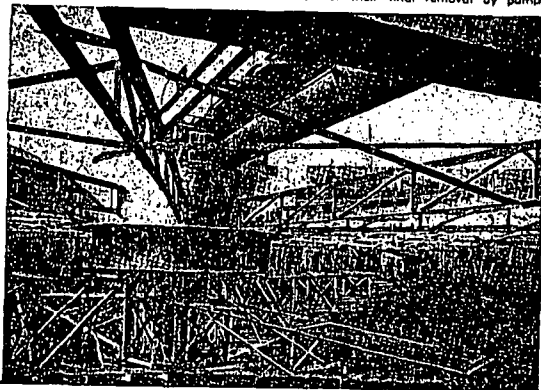


SPECIAL THICKENERS, 105-ft.-dia, Walker Process, take up to 16,000 gpm of effluent water from blast-furnace-gas scrubbers, loaded with washed-out flue-dust solids

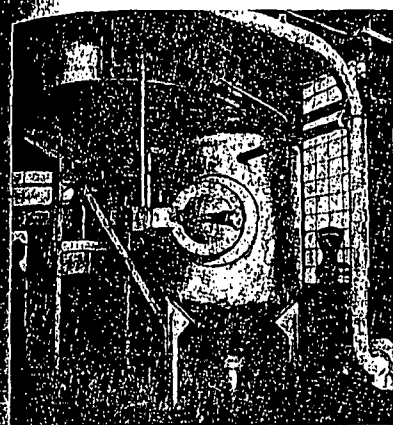


GAS-SCRUBBER wash water enters the thickeners, above, through a center distribution well; clarified water then leaves at surface by way of the two ring weirs

SLUDGE-RAKING ARMS at bottom of thickeners scrape the settled-out solids from the scrubber effluent to the thickener center for their final removal by pumps



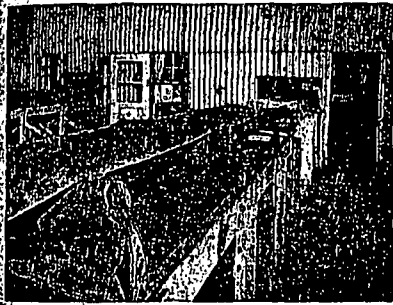
RUBBER-LINED slurry pumps in tunnels below thickeners remove collected sludge



OVERHEAD receiver tank gets sludge output from pumps, left, and feeds it into one of the two ejector tanks shown above



DISK-TYPE filters receive collected slurry from ejector tanks at about 50% solids concentration and filter it to a cake form



FILTER CAKE, at around 22.5 to 25% moisture content, travels by conveyor to hopper in the 800-ton-per-hr sintering plant



VACUUM PUMPS produce the required vacuum for the disk-type filters shown above; some 1690 cfm each at 20 in. vacuum

Steel Mills Continued

Water treatment of blast-furnace-gas scrubber output can stop stream pollution

duced at a rate of approximately 65 tons in eight hours (wet basis), goes to a sintering plant with a rated capacity of 100 tons per eight hours.

The original dust-collection system consisted of gravity flow of wash water from the blast-furnace area to a large U-type settling lagoon where a large percentage of the solids settled out before the water overflowed into the plant sewer. This method was expensive in that it required continual claim shelling of the muck from the lagoon and loading it into railroad cars for the trip to the sintering plant, where it was dumped wet with other sintering-plant ore.

The completely new plant, designed by

Dravo Corp in cooperation with Jones & Laughlin's engineering dept, has two Walker Process Clariflow thickeners, photos, left, p 96, sludge-pumping facilities, vacuum filter plant, and dry-cake-handling facilities. The plant utilizes the existing gravity-flow system from the washers at the blast furnace, which eliminates the need of a booster pumping station for handling the dirty water from the washer stage.

Heart of the plant, two 105-ft.-dia Walker Process thickeners, handles a 16,000-gpm flow. One important feature is the intake arrangement: Influent enters an annular ring around the large center well and then flows to the center well through multiple tangential diffu-

sion ports that produce a pronounced rotational movement. This diffusion energy causes a circular motion in the large center well, which displaces downward and enters the tank's floor region. Such a radially flowing current, with equal-acting vectors of flow displacement, gives balance and lateral distribution in the tank. Further, it serves to concentrate the solids within the liquid. This denser mass, leaving the bottom of the center well with a circular motion, fans out along the tank floor.

In turn, clarified water—that is, water free of settleable solids—displaced above this strong, moving current, rises upward and flows over into a multiple, balanced overflow weir system. This

weir system runs uniformly around the entire surface area of the clarification zone. Velocity of approach to the weirs, though, is low because of the mass of water displaced. The low-velocity level prevents reaching back and drawing up previously settled solids into the weir system. Velocity is so low and uniform, in fact, that previously settled precipitate particles, introduced near the overflow weir, settle back countercurrent to the flow and do not overflow into the weirs to cause any clogging.

Recirculation of previously precipitated solids, by withdrawing them from the sludge hopper and pumping them back to the center well of the thickener. (Continued on page 218)