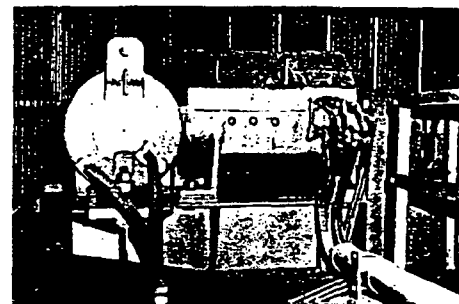


The 450-ton Fairless cranes, designed and built by The Alliance Machine Company, Alliance, Ohio, are of the four-girder type, with the main hoist trolley running on heavy outside girders, and the auxiliary

Elliott mill-type motors on open-hearth ladle crane bridge and trolley drives.



This view of one of the large Fairless cranes shows the elaborate five-story cab in which the operator rides. The main hoist hooks are in the foreground; the two smaller auxiliary hoists can be seen above and behind the main hoist.

The hoisting mechanism of the crane includes a two-motor synchronized worm drive and a double-drum interlocked-type main hoist. The synchronizing shaft employed in the gearing scheme makes possible an additional safety factor in case one hoist motor fails. Under this condition, both worms are driven by the remaining motor. The hoist gearing is so proportioned that full crane capacity can be lifted by one motor without exceeding the quarter-hour rating.

After the hooks, trolleys, girders, etc., had been designed, the total weight of the crane was calculated to be some 1,100,000 pounds. With this as a basis, the maximum wheel loads, and the design of end trucks, wheels, and runway rails were determined. The largest runway rail used for these cranes weighs 175 pounds per yard and the largest rolled steel wheel is 30 in. in diameter. This combination will allow a maximum load per wheel of 123,000 pounds. Six 30-in. diameter wheels were required on each corner, or a total of 24 wheels. In order to obtain good traction, two wheels out of each group of six are driven.

As important as the mechanical design of the Fairless ladle cranes are the steps taken for the safety and protection of the crane operator. He is normally located on the lower floor of a five-story cab which has heat-insulated walls and floor, plus a heat-resistant glass window that can quickly be closed in an emergency.

Eight d-c motors, totaling nearly 1300 hp, are required to operate the various hoist, trolley, and bridge motions of each of the three Fairless hot metal cranes. All are rugged mill-type motors of the so-called "600 Series"; all were made by Elliott's Crocker-Wheeler Division. The tabulation below shows the various crane motions and the C-W motors which power them:

OPERATIONS	SPEED (FT/MIN)	C-W MOTOR
Main Hoist	9.3	2—265 hp, Frame 618
1st Auxiliary Hoist	28.5	1—200 hp, Frame 616
2nd Auxiliary Hoist	42.2	1— 65 hp, Frame 610
Main Trolley	76.0	1— 65 hp, Frame 610
Auxiliary Trolley	127.0	1— 33 hp, Frame 606
Bridge	300.0	2—200 hp, Frame 616

hoist trolley, which is equipped with a 75-ton and a 20-ton auxiliary hoist, traveling on the lower inside girders.

The single-hook 75-ton auxiliary hoist is used principally to tilt the ladle after it has been emptied of molten steel in order to clean out the slag. The smaller 20-ton auxiliary hoist is used to carry various lighter loads incident to the shop operations.