the same reason it is not possible to fit the solenoid brakes in the usual manner on the end shield, but the solenoid brake has been turned through 45 deg. This arrangement prevents the solenoids beng in a horizontal position when the bridge is open. The solenoid brakes are provided with release attachment and automatic trip.

For the operating motors two controllers geared together have been used.

The two end locks are motor-operated by a 2-h.p., 1,200-r.p.m., 550-volt, 60-cycle motor. This motor is fitted with solenoid brake, and operates the end locks through worm gearing. The motor only operates in the horizontal position, but as it moves with the bridge, it has been necessary to provide it with special bearings. Provision was also made for operating the end locks by hand, by means of a lever in the operator's cabin. When the end locks have been withdrawn, they are held back by means of catches, and remain in that position during the whole time the bridge is raised. Provision is made for the catches to be knocked out by a stop as the bridge again reaches the nearly closed position. The position of the end locks is indicated in the operator's cabin by means of an indicating lamp, operated through a lock signal switch.

Emergency Brake.—The emergency brake is operated by means of a 3-h.p., 550-volt, 60-cycle motor, which is geared to a crank disc. A pin on this disc is connected to a lever, which releases the brake mechanism. The brake is normally set by a spring. There is a small solenoid brake on the motor which sets when current is applied, and releases when current is off, thus operating in the reverse manner to the usual solenoid brake. A drum type limit switch, mounted on top of the motor and driven by a sprocket chain from the back shaft of the motor, is used to make proper connections. The operation is as follows

Assuming the main brake is set to release the brake, the triple pole line switch on the emergency brake current is closed. The motor immediately starts and makes a few revolutions, bringing the crank disc pin to the upper position. When it reaches this point, the limit switch opens the motor circuit and at the same time energizes the solenoid, thus setting the brake on the motor. This holds the motor and prevents it from rotating backwards. So long as the solenoid brake is energized, the main brake is kept in release. To set the brake, the triple pole switch is opened. This de-energizes the solenoid, and releases the brake on the motor. The force of the spring on the main brake then immediately pulls around the crank disc and resets the brake.

Operation of the Motor and Interlocking System.—When the bridge is closed and ready for traffic, the arm of the lock signal switch and the arm of the bridge signal switch are in the position marked "closed" and the contactors in the circuits of the main operating motors and the lock are open. To open the bridge the first step required is to set the railroad signals at "danger." Until this is done, the lock motor contactors remain open and the end lock cannot be withdrawn. Until the end locks are withdrawn, the contactors of the operating motors remain open and these motors cannot therefore be started.

The action of moving the lever to set the railroad signals at "danger" closes the switch in the railway signal cabin. When this switch is closed, the contactor coils of the lock motors are energized and close the contactors. The circuit breaker is then closed, the controller handle of the lock moved around and the lock withdrawn. As the lock bar moves out it operates the lock signal switch, and this in turn changes the signal lights in the railway signal cabin from white to red, thus indicating that the bridge is

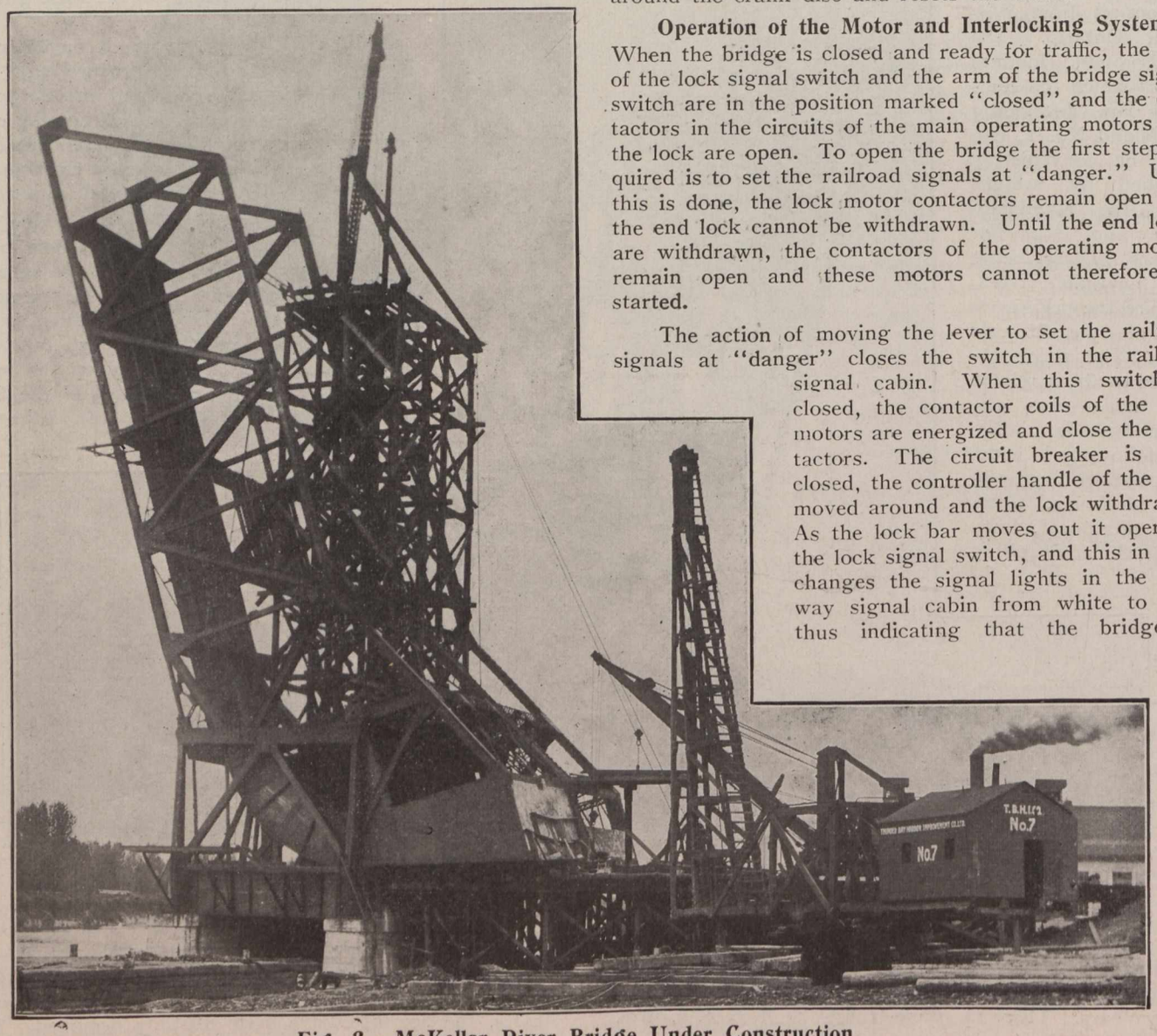

Fig. 2.—McKellar River Bridge Under Construction.