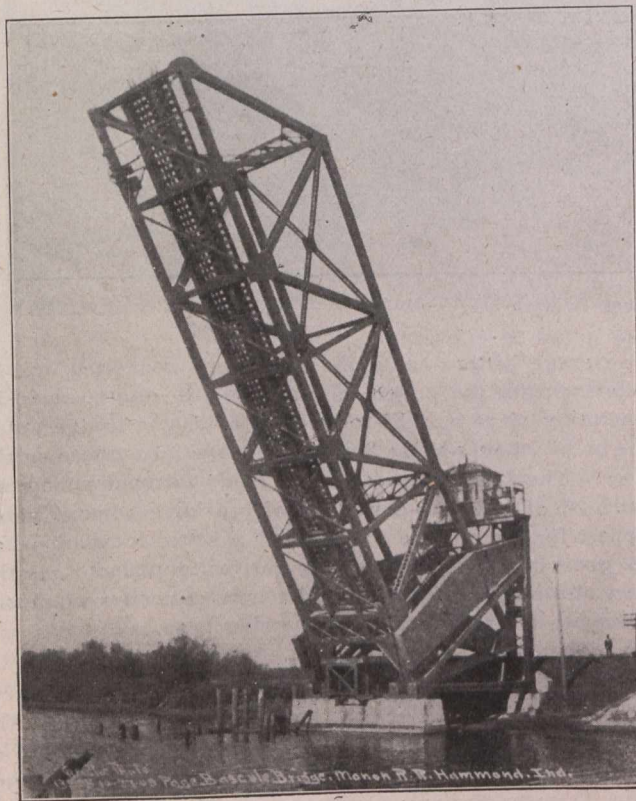


much less liable to derangement than a large solenoid and much simpler to repair in case of trouble.

The equipment for a large swing bridge is somewhat more elaborate than that for a single leaf bascule bridge, owing to the necessity of having a powerful lift or wedge mechanism at each end of the bridge, and the fact that some form of moving rail lock is necessary. Therefore, in addition to the motors required at the centre for swinging the span, a motor is necessary at each end for the lift or wedge mechanism, and an additional motor is usually necessary at each end for the rail locks for the single or double track, as the case may be. On the ordinary swing bridge it is perfectly feasible to use a mechanical brake so that the electric motor brakes and emergency brakes for the swing may be omitted. The operation and control of the wedge motors and rail lock motors is the same as on the bascule spans. The same general arrangement of indicators and automatic stops is applicable to the wedge and rail lock motors.

**Electric Interlocking.**

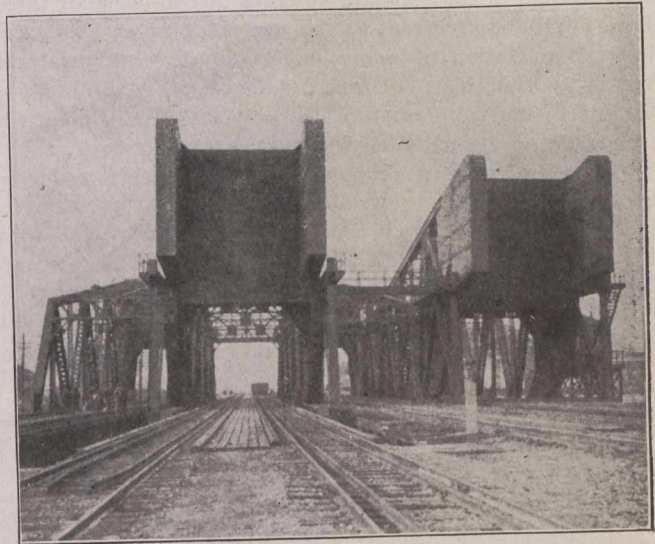
It will be readily seen that to place the operation and control of a massive drawbridge in the hands of an ordinary and usually low-priced operator involves a possibility of trouble and disaster not pleasant to contemplate. He has before him a few small levers, the indicators and the switch-board equipment, but cannot see the actual motion of any of the devices that are operated, except that of the span itself. Unless some provision is made to prevent it, it is always possible for him to attempt one operation before another is completed, which might under some conditions wreck the bridge,



**Page Bascule Bridge; Hammond, Ind.**

or bring disaster to railway traffic. To avoid the possibility of such occurrences, a system of electric interlocking has been developed so that the control of each motion in the entire operation of the bridge shall be completely interlocked with the next preceding and with the next succeeding one, if any,

and with the railway signals in such a way that current cannot be turned on any motor until the preceding motion has actually been performed. In opening, it is impossible for the operator to turn current on to any of the motors on the bridge until such signals and protecting devices as the railway may provide have been set against trains. It is impos-



**Scherzer Eight-Track Bridge at Chicago.**

sible to operate the wedge motors until the rail locks have been drawn. It is impossible to operate the swing motors until the rail locks and wedges have both been drawn. In closing, it is made impossible for the operator to drive the wedges until the span has been swung and is closely enough in line to allow the wedges to be safely entered. It is impossible for the rail locks to be driven until the wedges have all been entered, and impossible for the operator to clear the signals for the passage of trains until all of the wedges and all of the rail locks have been fully driven. To attempt to accomplish these results mechanically by interlocking the several levers with each other, would still make it possible for the operator to attempt one operation after the preceding lever had been moved, but before the operation controlled by it had actually been performed.

The electric interlocking is accomplished by the circuits of any one device being held open at all times on a contactor board by the other devices until the proper time for its safe operation. When the other functions preceding the desired operation have actually been completed, the circuits are restored so that the desired motion can be performed by the operator through the proper controller. The same indicator switches on the several devices are ordinarily used for both the electric indication and electric interlocking, and to as large an extent as possible, the same circuits are utilized for the two purposes.

Little attempt is made at electric lighting on railway structures beyond the illumination of the operator's house and providing a sufficient number of lamp openings near the several machinery parts. The government requirements also have to be complied with; these necessitate having red lanterns on the piers and at specified points on the movable spans. On bascule bridges it is required that the red lights at the front ends of the bridges be changed to green when the bridge has nearly reached the open position. This is sometimes accomplished by a lantern, hung as a pendulum, swinging from behind a red glass to a position behind a green glass as the bridge reaches its nearly open position.