care that a lens or roundel receives. In fact, in order to insure absolute uniformity of product, we have established a lantern globe specification, fixing rigid limits for chilling and photometric tests analogous to the standard signal lens and roundel specifications.

COLLATERAL RESULTS.

"Our optical laboratory makes no boast to cover a broad field of investigation. We believe that more can be accomplished by confining our work mainly to problems involving color and light projection. It may be of interest to note that as an incident to our study of signal yellow, we recently developed a special pale yellow glass of unusual properties which, by absorbing the violet end of the spectrum, largely eliminates the glare from a high power headlight without impairing its usual range, and in fog or smoke actually increases the range by reducing back-glare. Improvement in the art of manufacturing pressed lenses has rendered possible the use of relatively large sizes for headlight service, both with and without auxiliary reflectors. Such applications in connection with electric headlights of different types have become quite numerous. Thus the study of the signal glass problem by laboratory methods has led to a wider range of results than we foresaw at the start, and the future doubtless has others in store."

RECONSTRUCTION OF TOWER "A"

As noted on page 68, of *The Signal Engineer,* for March, tower "A" at North Station, Boston, on the Boston & Maine, was recently destroyed by fire. This tower contained a 119-lever electro-pneumatic interlocking machine which controlled the yard and drawbridge in the immediate vicinity and negotiations for new machine were entered into before the fire was extinguished.

Final decision regarding size of machine with arrangement of track was settled, and the order for a machine to have 131 levers was placed with the Union Switch & Signal Company on January sixteenth, and was shipped by express from their factory on February fourth.

As the new machine was larger than the old one it involved, in addition to the actual building, the making of a complete new dog chart, locking and combination sheets, and the design of a new track model, for the layout of the yard had been changed somewhat since the old machine was installed.

The new machine left Pittsburg at 9 A. M. February fifth and arrived in Boston on the morning of February sixth and at 10:45 A. M. the first crate went into the tower window, a time interval of 25 hours and 40 minutes after it left Pittsburg.

The machine was set up by the signal department of the Boston & Maine and all switches and signals connected thereto, tested out and placed in service at 9 P. M. on February eighth.

The loss of the old machine so reduced the capacity of the yard and tracks governed, that it was necessary for the railroad to annul 279 suburban and local trains temporarily until the old Fitchburg station could be opened for traffic, taking care of the Fitchburg division trains, and making it necessary to give up the use of tracks that had been used for freight. In addition to this Portland division, eastern route trains were sent out by what is known as the back way through the Portland division freight yard, interfering more or less with the freight traffic on that division.

The electric pneumatic switches in the terminal were operated by manipulating the valves by hand which required a large force of extra men. As these men became familiar with their duties, trains were gradually restored and were operated on a subnormal basis in less than a week.

Thousands of passenger fares were lost the first few days, owing to the fact that it was necessary for suburbanites to use the electric line. But gradually, as suburban trains were restored and additional stops put on through trains, better conditions were reached, and extra cars were sent on all such trains that were running.

INTERLOCKING IN THE SEVENTIES.

BY M. R. SHUMARD.

Perhaps many men in the signal field to-day have not had an opportunity to see some of the earlier types of interlocking machines and, particularly the old wheel machines.

This installation is located on one of the side lines of the Grand Trunk system, and is known as the Wheel machine or Capstand type. From the best information obtainable, it appears to be among the very first of the interlockings installed in the United States. It was built by the Union Switch and Signal Company along in the early 70's and exhibited by them at the centennial, which was held at Philadelphia in the year 1876. Afterwards the machine which consists of five wheels was purchased by the owners of the present Michigan Air Line and placed in service at Jackson, Michigan, where the Michigan Central crosses the Michigan Air Line during the year 1878.

Notwithstanding the fact that the machine is one of the early types of interlockers and is of crude construction, compared to

Fig. 1. A Northbound Home Signal at a Side Ttrack, Showing the Method of Operation, Wire Connection, Etc.

the modern lever type, it is stated by the old timers who have been in close touch with this plant that it has never caused a train delay by being out of service during the 36 years in operation. L. Cline, the present towerman, partially substantiates this statement by saying that it has not been out of service during the past 23 years in which he has served as operator at this plant.

At a recent inspection, the Michigan Central officials stated that this was, in their opinion, as safe as any interlocking plant in the state of Michigan, at the present time.

However there is to be a new interlocker installed at this place in the near future and the old Capstand will be replaced by a modern Saxby and Farmer machine. It might be of interest to note though, that it will take 15 levers in the new machine to handle the work of the old five wheels. As the plant stands each of the wheels has three functions, namely, one derail and detector bar, a home signal, and a distant signal. The wheel is turned and the functions follow in their order, as a water bucket follows the turning of the windlass at the top of the well.

When the wheel is set in motion, the derail and detector bar

move into first place, the home signal comes next, and then the distant signal clears. All of these movements are obtained by the winding up of one wheel. The wheels are interlocked much the same as the levers of the Saxby and Farmer type but more securely, as each wheel, when turned to the proper position, is bolt locked by a floor push. The bolt lock is made possible by the insertion of a flat piece of iron in the drive chain which rotates over the gear attached to each wheel. This flat piece runs down through the floor of the tower and has holes at about

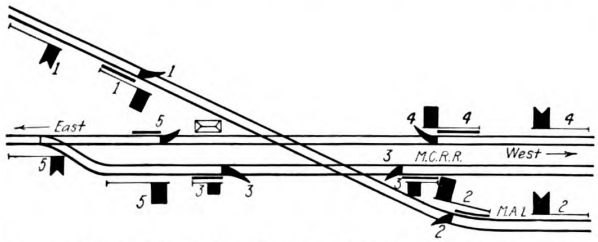

Fig. 2. Manipulation Sheet for the Michigan Air Line and Michigan Central Crossing.

10-inch intervals to receive the bolt of the lock. The drive chain has letters of the alphabet attached to links at certain intervals to show the operator that the particular function for which the letter stands has been performed.

For instance: We will presume that the operator wishes to line up for an eastbound train, and, as in the case at Jackson, Michigan, there are single tracks. Let "A" represent the eastbound derail, "B" the home signal, "C" the distant signal, and "D" the westbound derail, "E" the home signal, and "F" the

Fig. 3. Northbound Split-Point Derail, Showing Wire Connections, Motion Plate and Detector Bar.

distant signal. For the eastbound train, the wheel that controls the westbound trains must be turned first, to "D" and bolt locked, then the eastbound wheel is turned to "C" and bolt locked. The eastbound train can then proceed through the plant.

One of the peculiarities of this interlocking situation is the wire connected derails. All functions are wire connected, the derails of course have a motion plate and the connection from the plate to the rail is of pipe. A good idea of this may be had

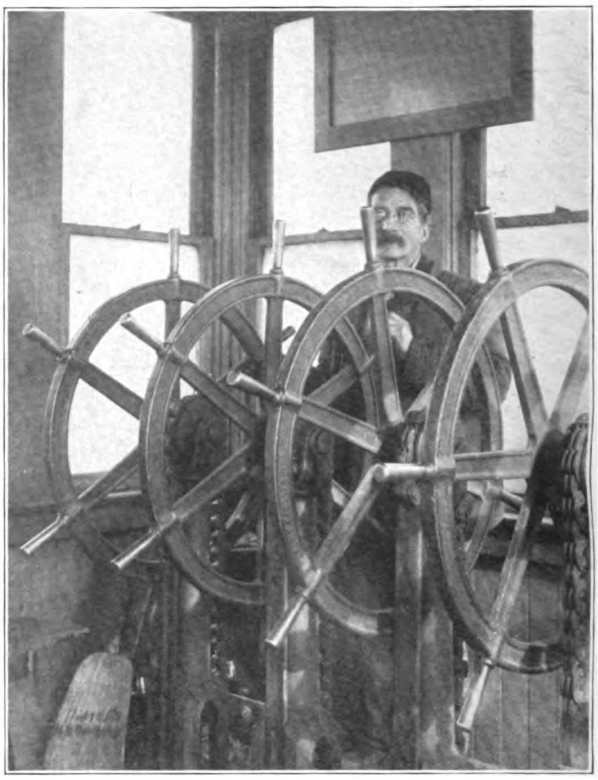

Fig. 4. Exposed Portion of Interlocking Machine, Showing Individual Locking Plate, Wheels, Drive Chain Stand, and the Towerman.

from one of the accompanying pictures, which shows a derail and its motion plate with wire connections from the tower and on to the home and distant signals.

GROUND HOG DAYS.

The New York Central was recently tied up by a groundhog. The little animal bored his way into a conduit at the main street crossing, Tarrytown, N. Y., shortcircuiting all signals. The Wildey street semaphore board flopped up and down, alternating between "danger" and "clear." Then it was noticed that all the signals were doing a dance.

The gateman at the crossing looked into the conduit and saw the groundhog. Laborers were summoned and a fire was started to smoke out the animal.

The towerman at the south of the station, seeing the smoke, thought the crossing was on fire and stopped all northbound trains, including fast western expresses. After a while the groundhog capitulated and traffic was resumed.

CARING FOR THE TRACK CELL.

In mixing the solution of sodium hydroxide (caustic soda) a bond-wire or stick is most often used. If, instead, the tinned wire disc forming the positive pole of the cell is raised and lowered in the solution, it will be found that a vigorous mechanical action takes place. The caustic soda is lifted from the bottom of the jar and is dissolved much more rapidly than if a stick had been used, without the liability of breaking the jar from a sharp rap with bond-wire or stick.