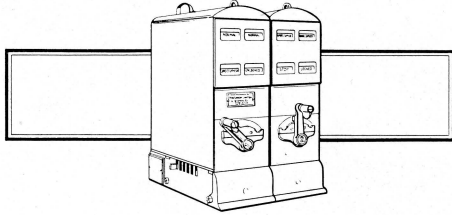


The Table Interlocker

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Union Switch & Signal Co.
SWISSVALE, PENNSYLVANIA

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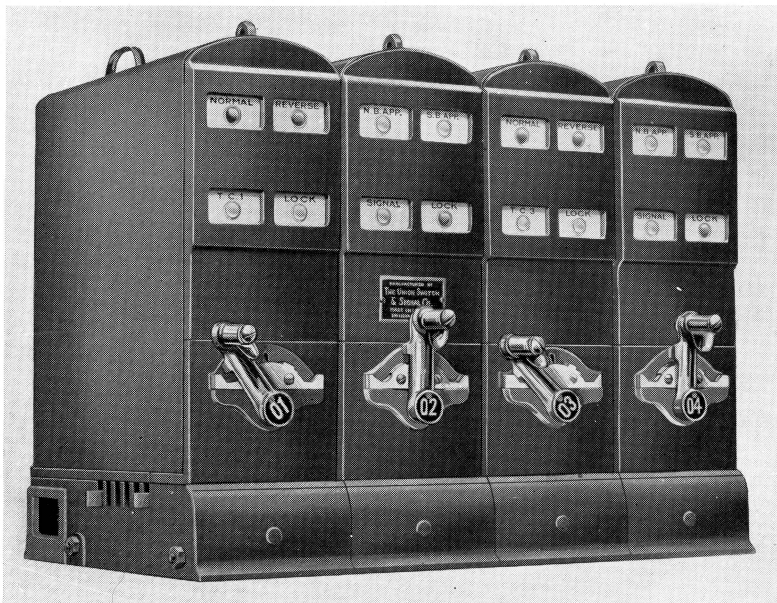


Table Interlocker for a. c. operation, equipped with two switch and two signal levers. Cover plate removed from end of wire cavity at left.

TABLE INTERLOCKER

ECONOMIES in railway operation resulting from remotely controlled outlying switches and signals have received increased recognition. This increased recognition has prompted the installation of more extensive systems and the development of an improved machine for controlling them. Such a machine is typified in the new Union Table Interlocker.

Despite the fact that this new and improved mechanism possesses many of the advantages of a modern power interlocking machine, it only invades the latter's field in the smaller and more special installations. The interlocked circuit controller described in our Bulletin 72 may still be employed in the simpler applications of switch and signal control.

Realizing that this Table Interlocker should be capable of expansion, it has been designed in separate lever units which, when associated together, present the appearance of a single mechanism. This, together with its small bulk, makes it altogether feasible for this machine to be considered where a few switches and signals are to be controlled from a central point, and where there is table space available in a block tower or station office.

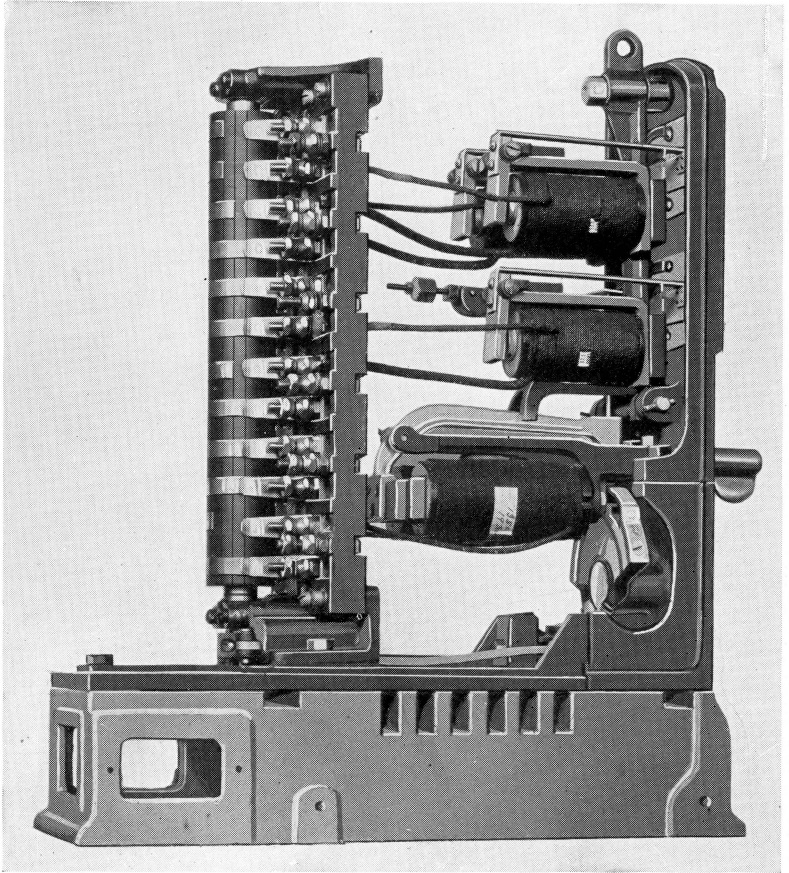
Substantial construction of parts, accessibly assembled in units, provide for that degree of flexibility, endurance and ease of maintenance so desirable in this class of equipment. Other desirable features which cause this improved Table Interlocker to be highly recommendable for the service are:

- (1) Indicators prominently displayed, keep the operator informed regarding conditions existing at the location of the remotely controlled functions.
- (2) A. R. A. Clearances have been maintained throughout the unit and A. R. A. Terminals provided for all external connections.
- (3) The contact band roller is driven through an arc of 120° and has been made $1\frac{3}{4}$ " in diameter. Contact adjustment is therefore readily made and maintained.
- (4) The lever motion is through an arc of 90° , resulting in a lock segment motion of the same value, as the locking segment is mounted directly on the lever shaft. Further, this long stroke allows ease of manipulation and the position in which the lever is standing is shown at a glance.
- (5) A forced drop lock feature applied to the lever lock affords protection against unusual circumstances.
- (6) An auxiliary circuit controller may be added to any unit to increase the capacity of the main circuit controller, where conditions demand. This auxiliary circuit controller carries twelve contacts and is operated directly from the shaft of the main roller, thus giving to each unit, a total capacity of 24 bands. It is mounted underneath the main unit.
- (7) The design accommodates either direct or alternating current systems of control, the difference being in the type of lock magnet coils and indicators.
- (8) A Mercury actuated lock attachment has been developed to introduce a time element in lever operation.

This Time Release, when required, is mounted under the unit, immediately below the lock segment to which it is linked.

- (9) The same size locking bars and dogs are used to interlock these units as are used in power machines for locking between levers.
- (10) All external connections to the machine are carried to a terminal board which acts as a barrier between such connections and the working parts of the unit, thus assuring that the working parts are not disturbed during installation or inspection.
- (11) While the motion of the lever must of necessity be transmitted to the circuit controller roller, mercury time release and locking bars, lost motion has been avoided by simplifying the means of connection between these points.
- (12) Each one of the units is provided with a metal cover, which, when removed exposes the two sides, top, and rear of the mechanism. This cover is provided with a means for locking it in place with a standard padlock. These separate covers protect all units individually so that should one unit require attention, it is only necessary to expose the mechanism of that unit.

A study of the detail parts that enter into this unit will reveal how carefully the design has been devised to meet the needs of the railroad man as to application and maintenance. Therefore an itemized discussion of the various parts will prove of interest.



Single mechanism unit for d. c. operation complete with sub-base. Covers removed to show working parts. Note full size locking bed for twelve bars, standard roller and springs and ample space about the various functions.

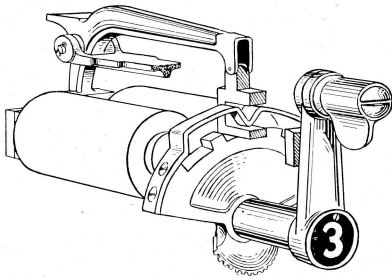
Direct Current Mechanism

In its simplest form, this unit can be used as a single combination circuit controller and indicator outfit to control one signal or switch. It is arranged so that it can be mounted on a table without the sub-base ordinarily supplied when interlocking between units is required. In this form the controller would be equipped with the lock and indicators and have available twelve contacts for controlling various circuits. The indicators may number four or less, in harmony with the indications desired.

In every way this unit would be the same as the units in a group assembly and therefore could be expanded into such an assembly should the growing needs of an installation demand.

Circuit Controller: The controller member of this unit needs no explanation as it in every way follows the well-known structure of a combination roller on a power interlocking machine with the exception that A.R.A. Terminal Posts are used throughout. The quick switch can be supplied on this roller.

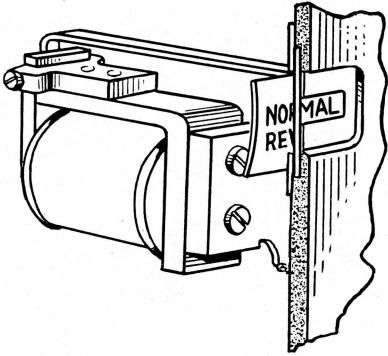
Lock Element: The design of the Model 12 Electric lock has been followed closely in the magnet and mechanical structure of this element. The quadrant to which it is connected is arranged with a depressor cam to insure that the latch drops into the engaging notches of the quadrant.



By using this depressor cam it is possible to arrange the quadrant and circuits so that a two-fold indication is necessary for the completion of the lever's stroke, thus approximating very closely interlocking machine conditions. Inas-much as the lever and quadrant are virtually of one piece, the utmost safety is obtained.

An indicator has been provided to repeat the positions of the lock. This indicator, when used, is placed in the right hand indicator space immediately above the lock. The vane is operated directly from the arm of the lock.

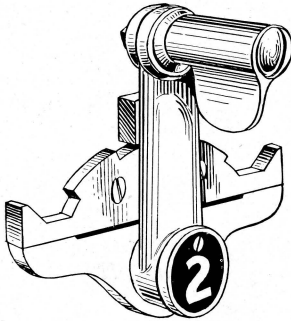
The Indicator Unit: The d. c. indicator unit is the



simplest form of magnetic indication possible. It comprises a single coil magnet operating an armature, an extension of which carries the indicating vane. This vane moves in front of a window on the face of the unit so that in the energized and de-energized

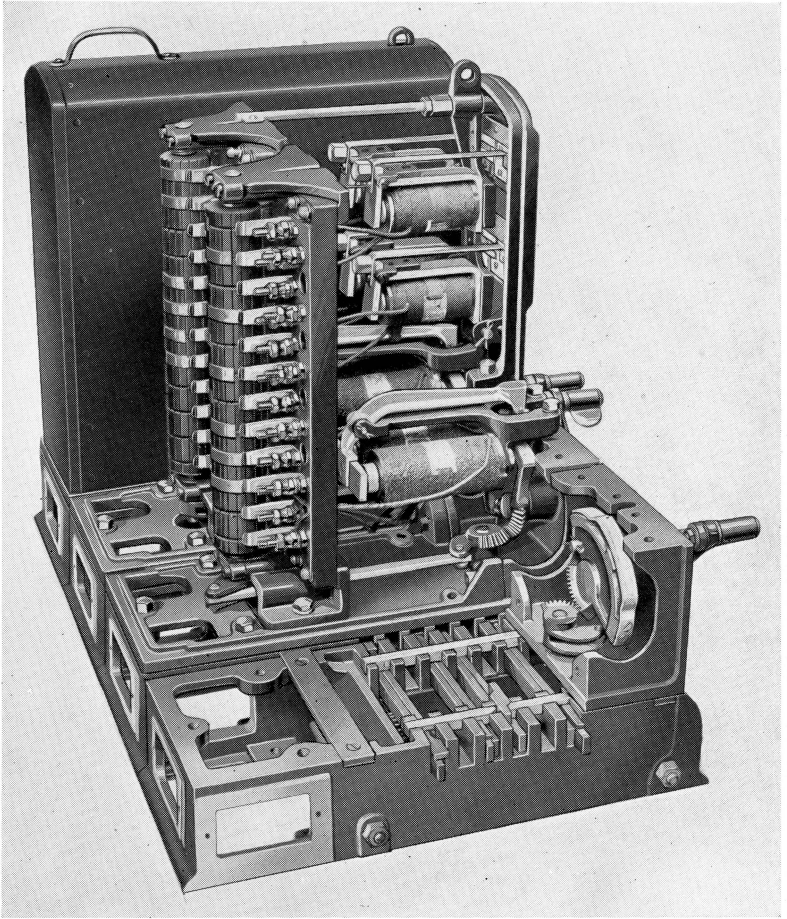
positions, the different indications are exposed through this window. These vanes may be lettered to convey any desired information such as "Occupied" and "Unoccupied" when the indicator is used to repeat track sections, or "Normal" and "Reverse" when used to repeat operated functions. The four indicators available above the lever on each unit occupy about the same space as would a single tower indicator mounted in the same position.

Operating Lever and Latch Quadrant: Because the operating handle in this unit performs the same functions and is operated in the same way as on large power interlocking machines, the design has been made a copy of the lever used in the Union Model 14 Power Interlocking machine. The butterfly latch handle which has become so popular is also used.



Switch levers are arranged so that the butterfly handle must be restored to normal as it passes the center position. This insures that the latch on the lever is brought into an engaging position with the indication notch on the quadrant thus providing a positive check that the lever is stopped at the indicating position.

Unit With Sub-Base: By adding the sub-base to the unit, it is put in a form to be associated with other units by means of interlocking, as this sub-base carries the necessary racks for the locking bars. The base also carries its section of a multiple unit conduit that is arranged for the convenience of wiring. This conduit has nearly the capacity of No. 16 trunking, and therefore is adequate to house all wires brought to the machine from the outside and such other wires as may be necessary to interconnect one unit with another.



A four-unit d.c. mechanism in various stages of assembly. Locking bars, cross locks and dogs of the standard power machine size are plainly visible in the unit nearest the observer; also the gear drive for the bar should be noted mounted on the lever shaft under locking bed and driving left-hand bar.

General Assembly of Units:

A glance at the view showing a four unit d. c. mechanism in various stages of assembly, brings out clearly, how accessible all the parts of this device have been made. In the unit next to the observer, the sub-base is shown with the lever-quadrant assembly mounted in place. The shaft for driving the mechanical locking is also in position.

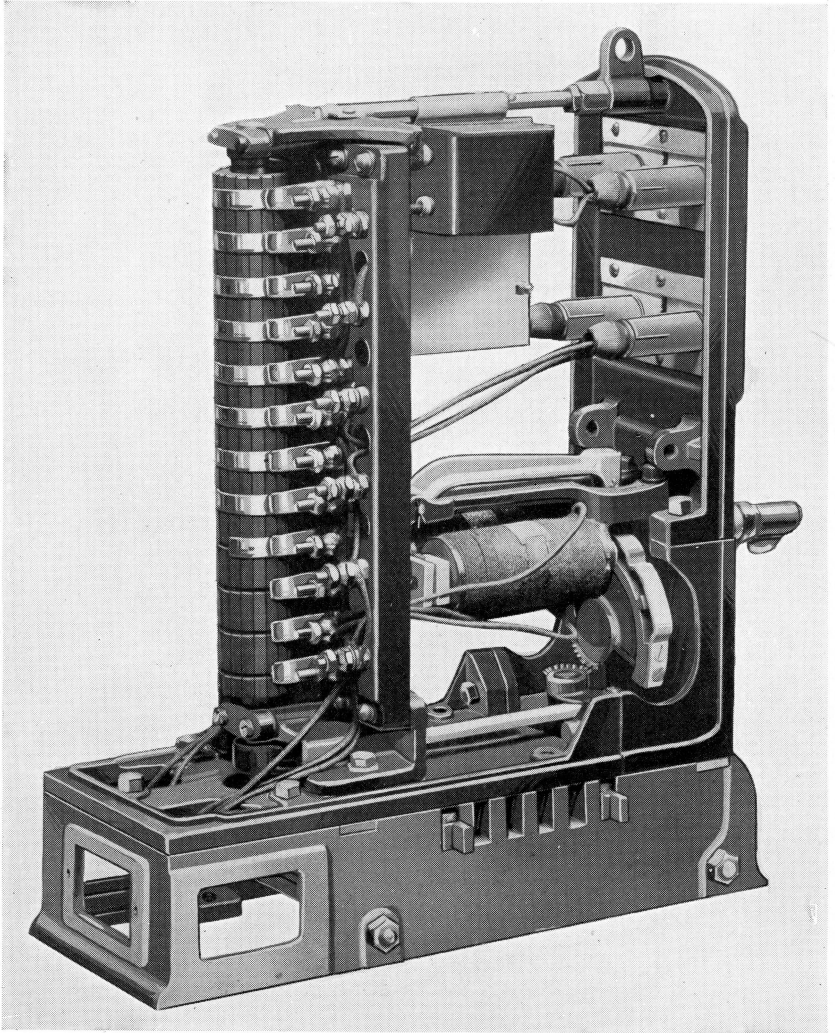
In the next stage of assembly as shown in the second unit from the observer; the contact roller and lock element have been put in place. The bevel gear and link for driving the contact roller are clearly shown.

The third unit in this group shows all the parts assembled except the cover. In other words this unit includes the parts in the second unit, plus the group of indicators which are mounted on a section of the front plate and bolted in place by two cap bolts, one of which is clearly shown. The rod at the top of this unit is simply an additional support for the indicator member.

In the a.c. Mechanism, this indicator unit would have the lights and transformers in place of the magnetic indicators.

The cover has been put on the last unit to show how completely it encloses all the working parts of the mechanism. It also shows very plainly the means of locking that is provided for each individual cover.

By glancing along the left hand end of the sub-bases in this picture, a good idea will be gained of the space provided for the accommodation of incoming and inter-connecting wires. This cavity is closed by plates on the ends of each unit, and on the exposed side of the end units so that it becomes a complete protection for the wires and presents a very attractive appearance when installed.



End unit of an a. c. assembly with cover removed. Note the step-down transformers for three indicator lights, Interconnecting wires from controller shown entering wire cavity at rear of sub-base.

A. C. Mechanism

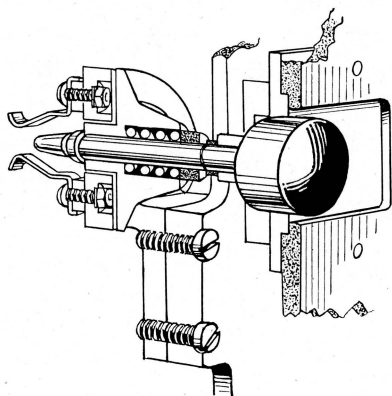
The a.c. unit design follows closely that of the d.c. Mechanism just described in all details except the indicating elements. In other words the contact roller, lock and mechanical parts are practically the same.

The indicators, however, are in the form of lights similar to those used on the illuminated track models of our make. In order to provide the necessary low voltage for the lights, we arrange to equip each unit with a sufficient number of transformers to allow one for each lamp. These indicating lights may display any distinctive color and may be labeled with any desired legend.

Lock: While the lock on the a.c. unit has the same appearance as the d.c. type, it is designed to operate efficiently on alternating current and can be furnished for any standard frequency and voltage.

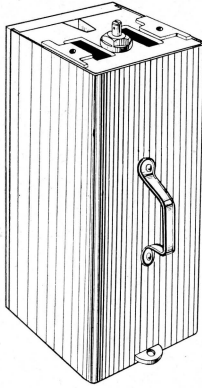
Accessory Equipment

Push Button: Push button circuit controllers are



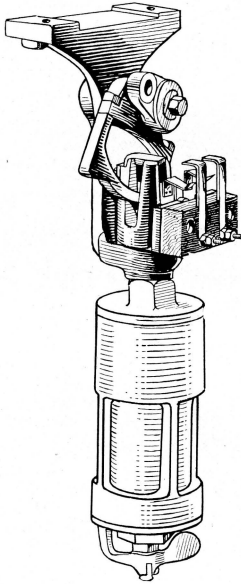
available for insertion in the indicator window in place of an indicator if so desired. This push button arrangement can be added to units already installed, by the simple expedient of removing indicator parts and bolting the push button unit in place.

Auxiliary Circuit Controller: When conditions demand a greater capacity of bands than the twelve provided on the main roller, an auxiliary circuit controller is available that may be clamped under the sub-base. This auxiliary unit carries the same number of bands and springs as the main controller, and has A.R.A. clearances and binding posts. It is housed in an independent case and so located that wires from the main unit may be carried through the table to it.



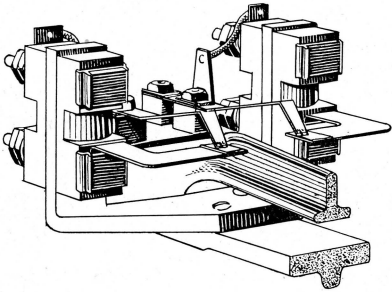
The unit is provided with a cover that can be locked with a padlock.

A Mercury Time Release Unit is available to introduce a time interval of one minute or less between the restoring of a signal to danger and the unlock of the lever. The unit is complete in itself and can be added or omitted as desired. It clamps below the sub-base in a similar manner as the auxiliary controller and is linked to the locking quadrant. The utmost safety is obtained through simplicity of design.



The time interval of the unit is readily adjusted by means of the key shown at bottom of the mercury chamber.

Contact on Electric Lock: When conditions demand,



the electric lock can be furnished with two contacts operated by the armature. These contacts can be arranged to open or close the circuits they control when the armature is energized.

Ordering

In as much as a group of these units bears the same relation to an installation as does an inter-locking machine, orders for such outfits should be accompanied with the following information:

- (1) A numbered track plan.
- (2) Circuit plan of proposed installation including the voltages of the various circuits.
- (3) A full description of the type of indicators desired, and the legend each indicator should display. Also whether these indicators are to be of the magnetic type or light type. If the indicators are to be of the light type, the color these lights shall display should be indicated.

With this information before us we will prepare the necessary locking and combination sheets and will wire the units all ready for connecting to outside wires.

A copy of the combination and locking will be submitted for approval before being used.



Table Interlocker of two switch and two signal lever units for d.c. operation. Note cover over end of wire cavity at rear of sub-base.

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