Inter-Control of Electric and Mechanical Functions at Interlocking Plants

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An interlocking machine for the control of both mechanical and power operated functions should be flexible in its applications. The design should be such that any mechanical or power operated device used at an interlocking plant may be controlled from the machine and that any lever may be interlocked with any other as desired, the locking to be accomplished in the most simple and efficient manner possible. The size and strength of the locking parts are determined by the use of mechanical levers in the machine; the electric levers,

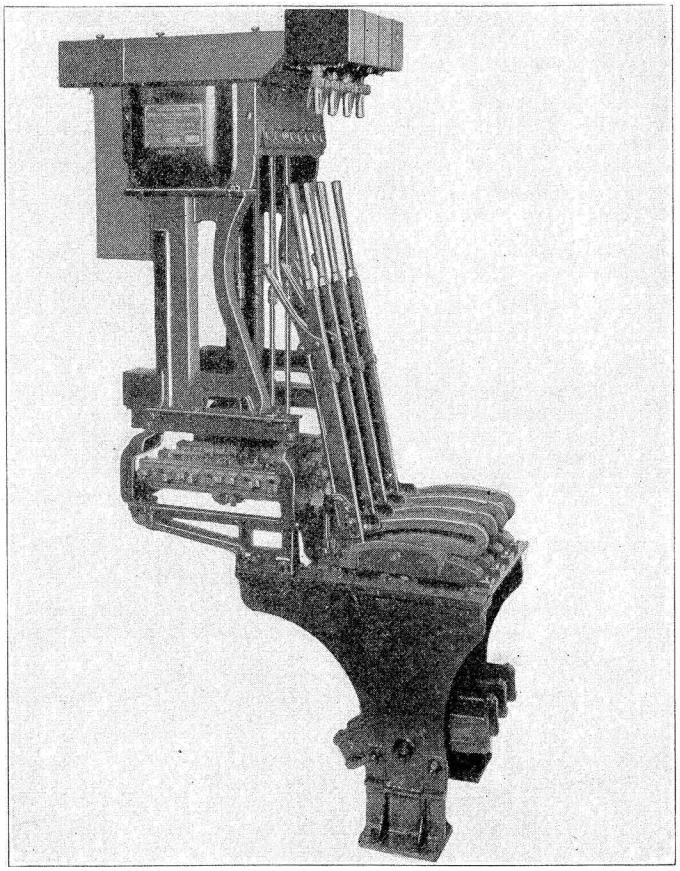

Fig. 1—New Design Electro-Mechanical Interlocking Machine

with their supports and the connections to the locking bed, should therefore be sufficiently strong and of such appearance as will conform with the other parts of the machine.

The S-8 electro-mechanical machine as manufactured by the Union Switch and Signal Company consists of a standard Saxby and Farmer machine, above the locking bed of which electric levers are supported and arranged as shown in Fig. 1. The electric levers are made in individual units, spaced at 5-in. centers, thus providing for the same number of units as there are mechanical levers and spaces. The units are mounted on supporting frames of four and eight lever sections which may be located on any part of or extend full length of the machine, as desired. Each electric unit consists of two main parts, the master unit and the circuit controller. The master unit is that part which is mounted directly upon the supporting frame and includes a lever, lever shaft and one, two or three magnets; also a latch

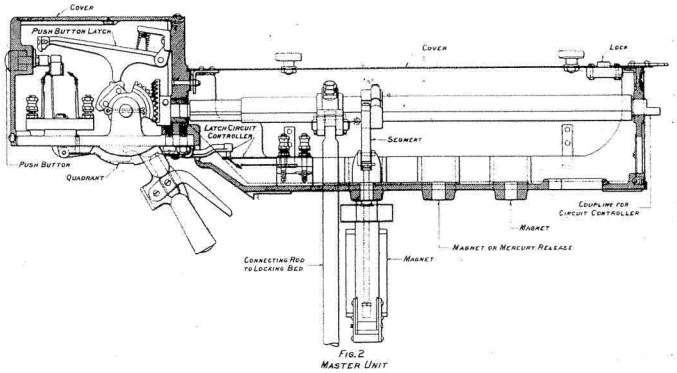

Fig. 2—Master Unit Is Mounted Directly on Supporting Frame

circuit controller, stick push button or mercury release if desired. These are shown in Fig. 2. Circuit controllers are furnished with either 12 contacts in horizontal position or 24 in the vertical position, with a 16 contact extension to the latter when necessary. When but one

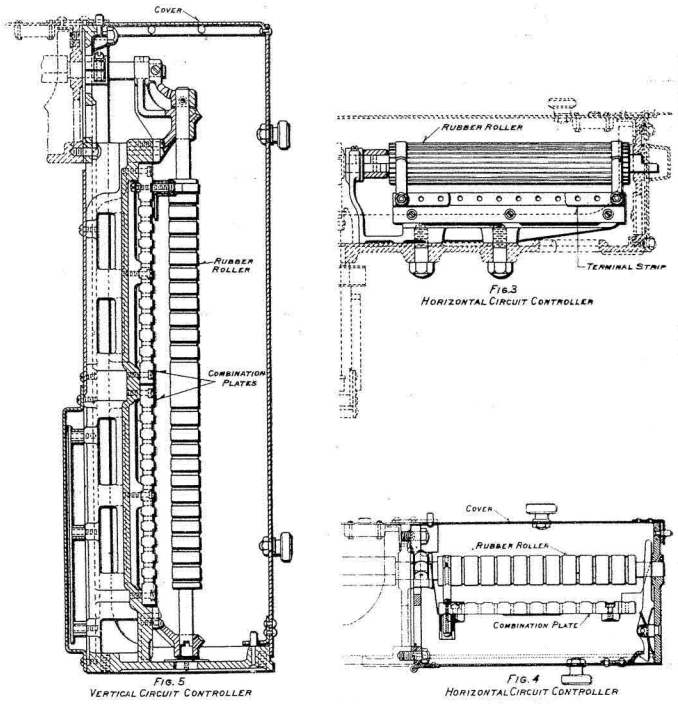

Fig. 3—Horizontal Contacts Mounted Inside Master Unit
Fig. 4—Horizontal Contacts Bolted to End of Master Unit
Fig. 5—Vertical Controller Mounted at End of Master Unit

magnet is required the 12 horizontal contacts may be mounted inside the master unit as per Fig. 3. When two or three magnets are necessary the 12 horizontal contacts

are bolted to the end of the master unit as shown by Fig. 4, the 24 vertical contacts being mounted in a similar manner as shown by Fig. 5, each of which is provided with a coupling. The controllers shown in Fig. 4 and 5 are interchangeable. The master unit, the horizontal controller and the vertical controller are each provided with

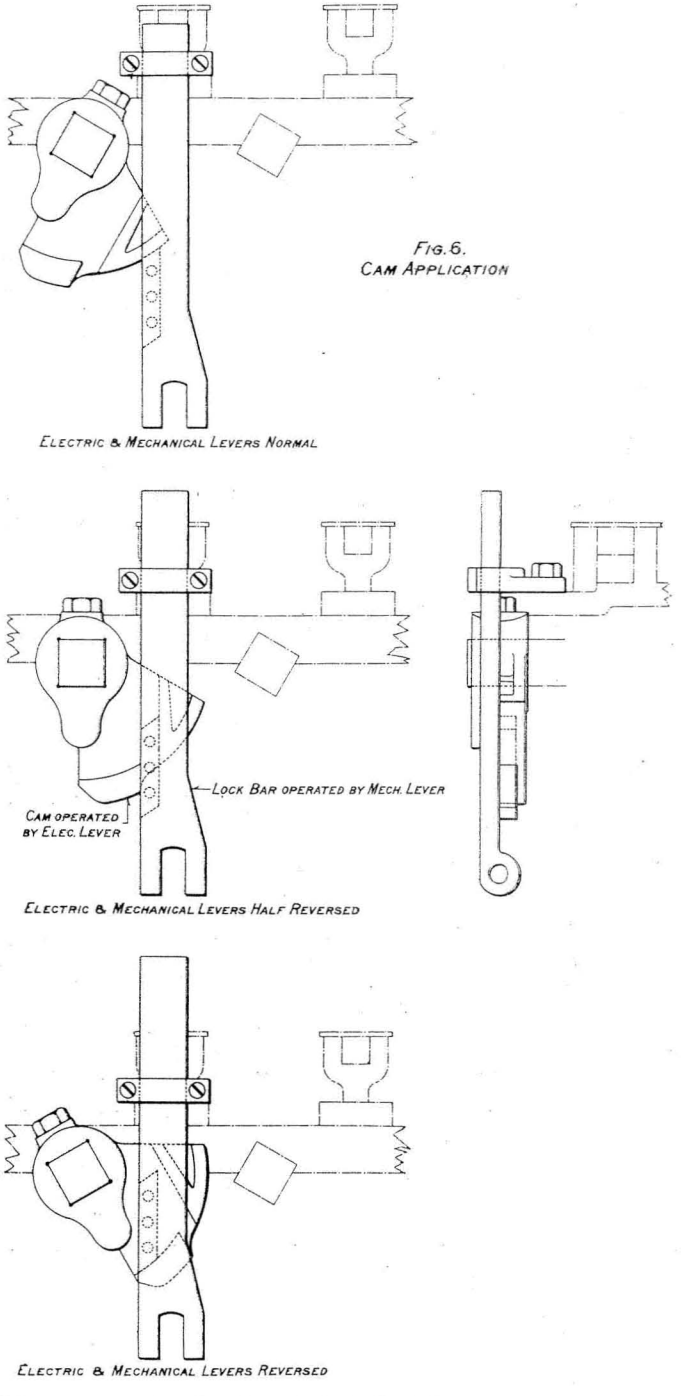

Fig. 6—Cam Application Effects Locking Between Electric and Mechanical Levers

an individual cover. A cylinder lock on the master lever unit cover secures covers in place.

Electric levers are connected to the locking bed by means of crank arms on the lever shafts and adjustable connecting rods, the latter extending down through the locking brackets between bars *10* and *12* or *22* and *23* to crank arms on mechanical lever shafts, or to loose sleeve drivers rotating on split journals supported by the mechanical lever shafts. The last mentioned arrangement permits a locking bar to be operated without affecting the function of the shaft supporting the driver. The loose sleeve drivers are made in various lengths so that a selection of locking bars may be obtained. In a 40-bar bed 24 bars may be operated by the rack type driver and 38 bars by the jaw type driver.

Operation of Electric Levers

Each electric lever is capable of controlling any function which can be controlled from an electric or electro-pneumatic interlocking machine, or it may be used as an indication lever for a mechanically operated switch or for electric detector locking when it is desired to retain the use of a mechanical facing point lock but eliminate

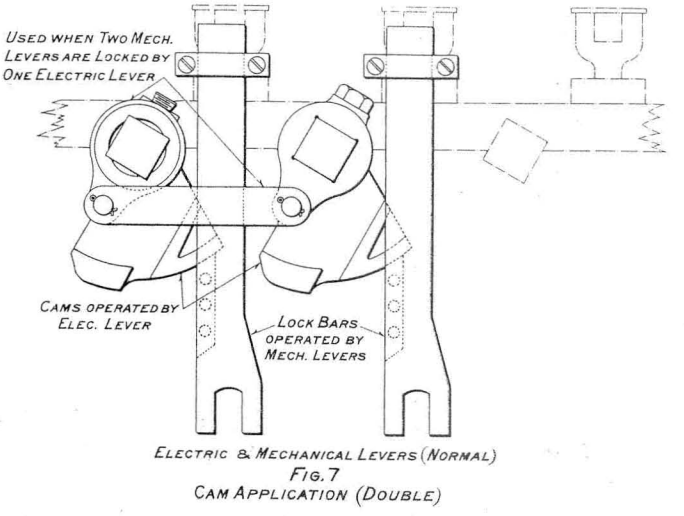

Fig. 7—Double Cam Application Used When Two or More Mechanical Levers Are Locked By One Electric Lever

the detector bar. When used for either of the purposes last mentioned the locking between the electric lever and the mechanical lever is obtained by a cam device on the end of a mechanical lever shaft. The shaft being operated by a connecting rod from the electric lever, and the cam engaging a lock bar connection on the rocker link of the mechanical lever as shown in Fig. 6. With this arrangement the mechanical lever is locked normal when the electric lever is in the normal position. Moving the electric lever to the center position releases the mechanical lever so that the latter may be reversed. Reversing the mechanical lever releases the electric lever which can then be fully reversed. Completing the stroke of the electric lever locks the mechanical lever in the reverse position. Similar manipulation is necessary when returning both levers to the normal position.

Two or more mechanical levers may be locked by one electric lever by equipping the locking shaft of each additional lever with a locking cam supported by, but operated independently of the locking shaft, the cams being joined together by the connecting link shown in Fig. 7.

The electro-mechanical machine, therefore, not only retains all of the functions of a mechanical machine, but also includes the additional functions of a power machine, combining the two in such a way that the interlocking of all levers is accomplished in a common locking bed, which bed, without change, is a standard part of all S. & F. machines. An existing mechanical machine can be readily converted into an electro-mechanical. The replacing of mechanical signals by electric, the elimination of detector bars at switches, the addition of one or more power operated switches within the limits of the plant, the operation of an outlying switch by low voltage movement, route locking, traffic control, or any other special feature can be taken care of by the addition of S-8 units.