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**INSTALLATION
AND
MAINTENANCE
OF THE
GRISWOLD
AUTOMATIC CROSSING GATES**

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**GRISWOLD SIGNAL CO.
MINNEAPOLIS, MINN. &
LOUISVILLE, KY. U.S.A.**

AUTOMATIC CROSSING GATE MANUAL

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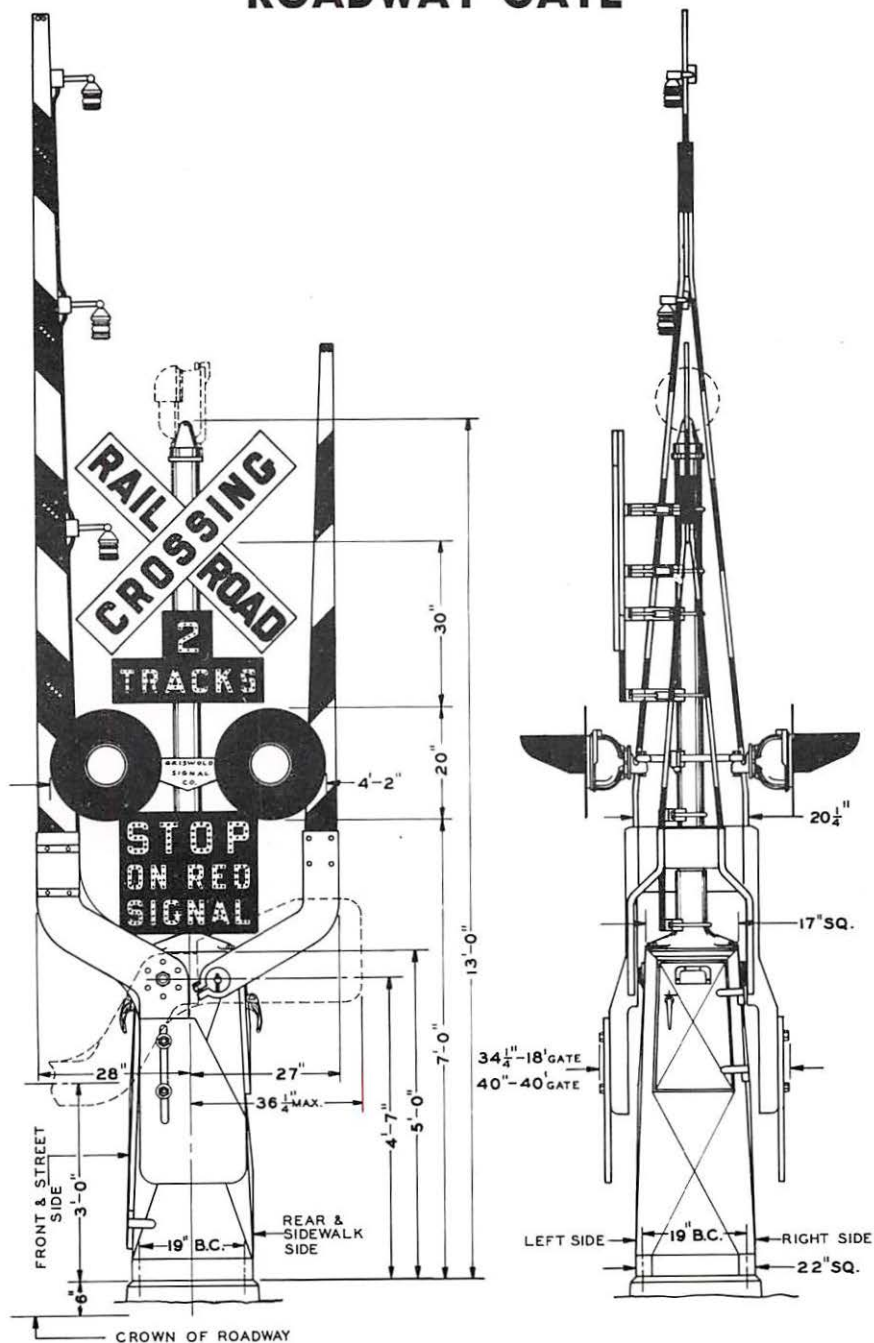
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ROADWAY GATE



INSTALLATION INSTRUCTIONS

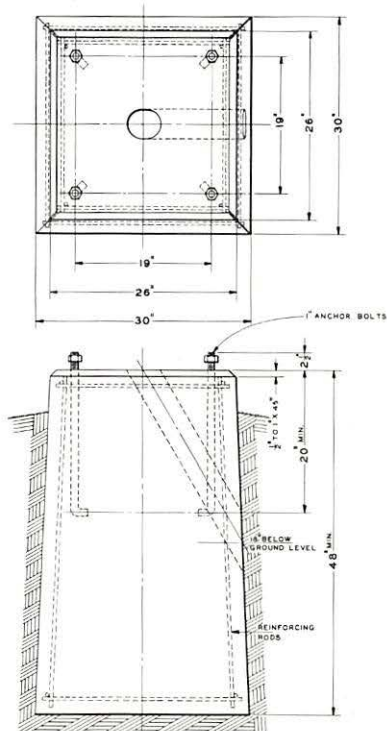
FOUNDATIONS

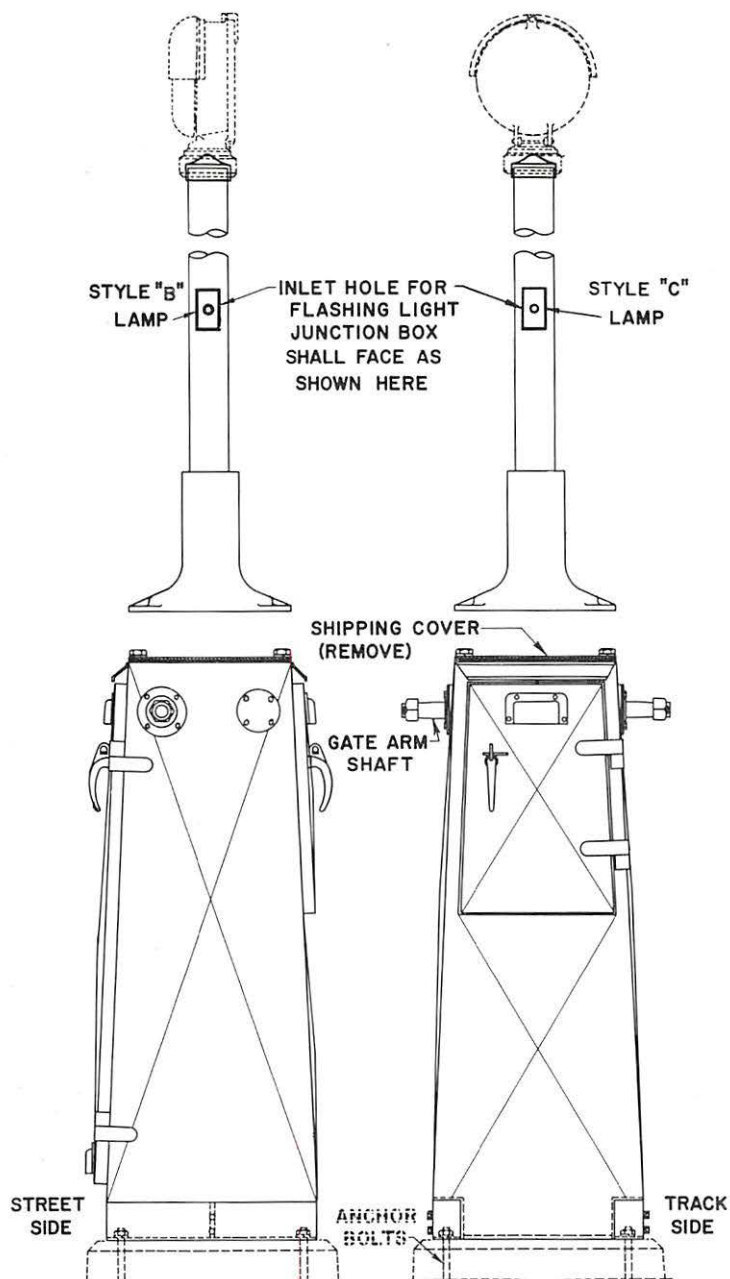
Concrete foundations may be purchased pre-cast or may be poured in the field using dimensions shown below. When poured in the field a "one, two, three" mix at about a four inch slump, using three-quarter to one inch aggregate and a curing time of at least ten days, is recommended.

The standard anchor bolt spacing is 19" x 19". Adapter bars for 11¹¹/₁₆" x 11¹¹/₁₆" bolt spacing will be furnished when requested.

Placing of foundation for standard gate installation shall be as follows:

1. The top of foundation shall be 6" above the crown of highway.
2. If gate is to be at right angles to the road, the foundation must have one side parallel to the road.
3. If gate is to be parallel to the tracks, the foundation must have one side parallel to the tracks.
4. In locating the foundation it must be remembered the gate arm length is figured from the center of the pedestal or foundation.





INSTALLATION INSTRUCTIONS

PEDESTAL MAST & BELL

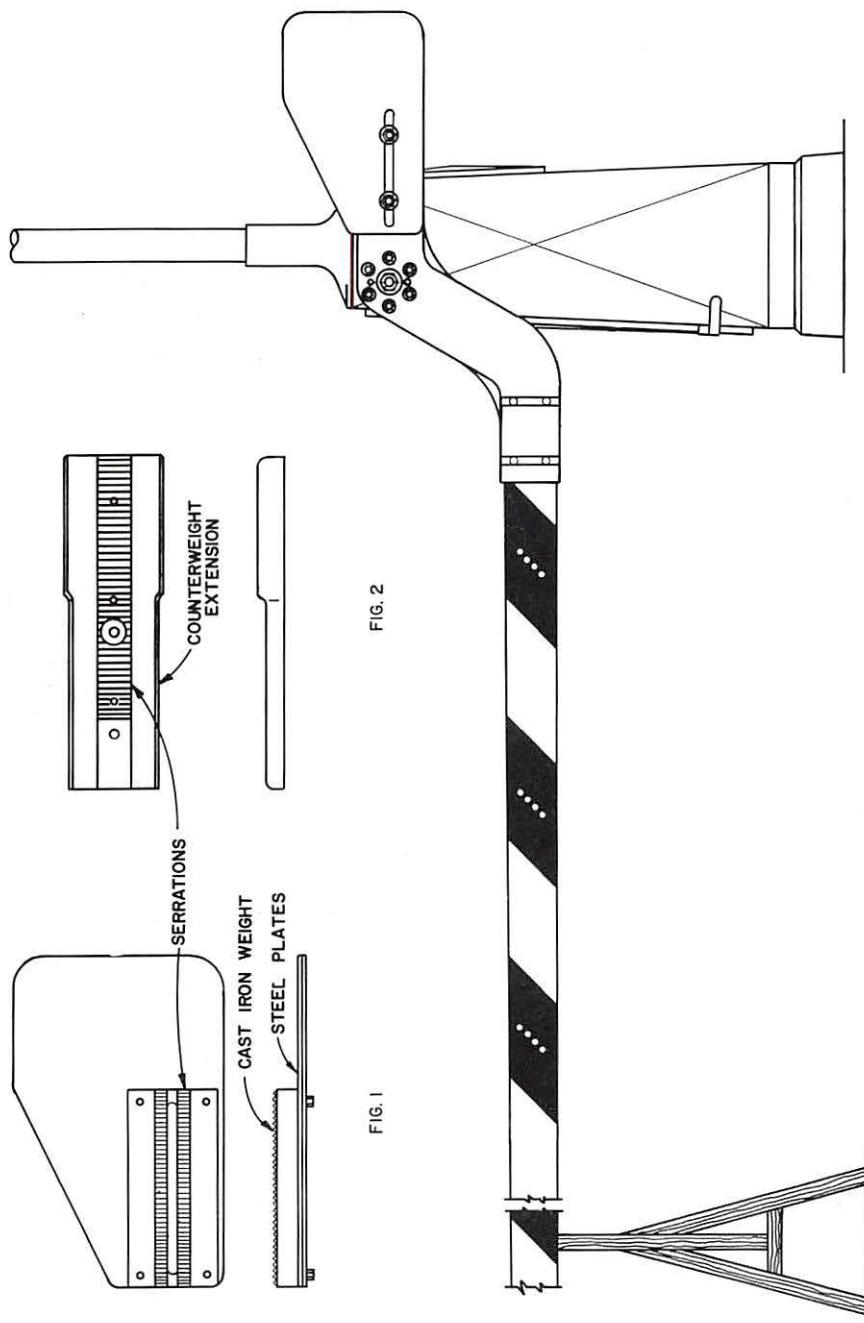
Before setting pedestal on foundation place about one-half inch rounded strip of signal cement or plastic putty on the top of foundation. This strip should be placed in a 19" square so it will flatten and act as a moisture seal between gate and foundation.

Place pedestal on foundation with full length door facing street. If mounted on 19" x 19" bolt spacing foundation, use mounting holes in channel located at the outer edge of pedestal. If mounted on $11\frac{1}{16}$ " x $11\frac{1}{16}$ " bolt spacing foundation, use adapter bars (furnished when requested) under the pull-up boards in the bottom of pedestal. Tighten nuts securely on anchor bolts and install bolt covers over channels.

Bring wires into pedestal through foundation and attach to proper terminals in bottom of pedestal. Hole in foundation should be sealed with signal cement or similar compound before pull-up boards are replaced in bottom.

Remove shipping cover from top of pedestal and install mast. Location of mast hole is dependent on type of lamp unit being used. If lamp units with back mounting, Style "B," Page 7, are used, hole shall face away from tracks. If lamp units with top mounting, Style "C," Page 7, are used, hole shall face away from street. Bolt mast securely to top of pedestal using the same cap screws used to fasten shipping cover.

Bell is next installed on top of mast with gong facing toward street. Connect wires from proper terminals in bottom of pedestal to bell. When connecting wires, be sure to observe correct polarity. If bell is not used, mast shall be capped with pinnacle.



INSTALLATION INSTRUCTIONS

GATE ARM & SUPPORTS

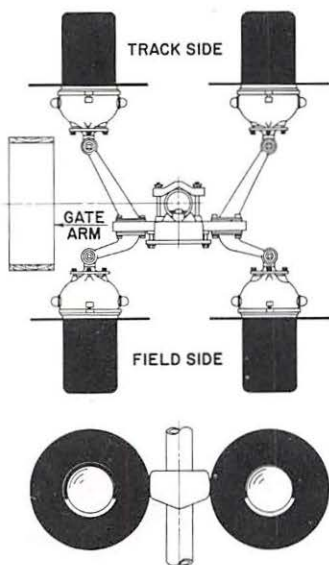
Unwrap tape from ends of gate arm shaft and remove nuts. Place support castings on keyed shaft and replace nuts, but do not draw up tight. Insert gate arm between support castings and bolt in place. The gate arm shall be supported with a sawhorse or equivalent during this time. After gate arm is securely bolted, the nuts on the main shaft shall be tightened. Excessive key wear will result if nuts are not tight.

Gate arm lamps are furnished wired and ready for installation into holes drilled in gate arm. After lamps are bolted to the arm the wire shall enter the pedestal through the fitting located at the top left facing the full length door. Attach wires to proper terminals in bottom of pedestal. Fitting should now be tightened to seal out moisture.

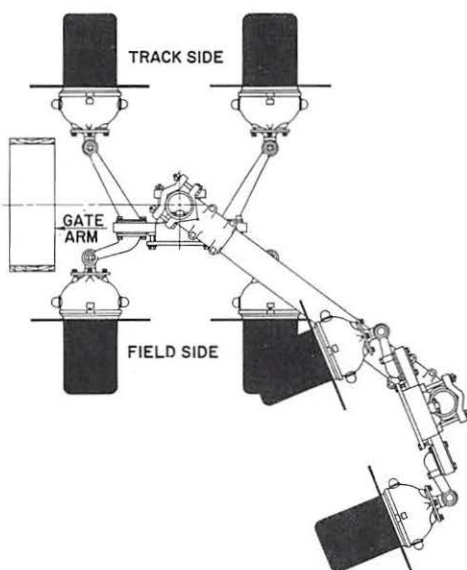
With the gate arm in a horizontal position and still supported on a sawhorse, the counterweight extension, Fig. 2 (furnished only on gate arms over 30 feet in length), can now be bolted to the support castings. Bolt with serrations out or away from the support castings. Weight plates and casting, Fig. 1, shall now be bolted into extension castings, or support castings with serrations interlocking.

The sawhorse shall now be removed and the torque adjustments shall be made as described on Pages 9 and 10.

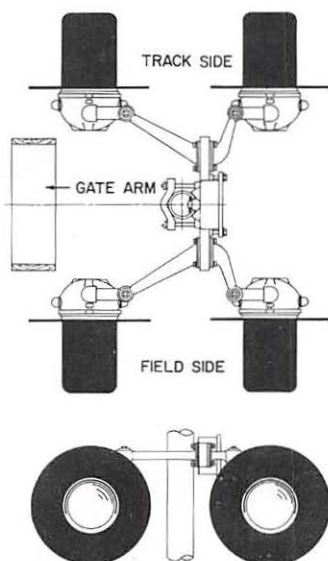
The support castings for the sidewalk gate, if used, are next clamped to the auxiliary shaft. The sidewalk gate arm shall be bolted securely between the castings before the bolts at the shaft are tightened.



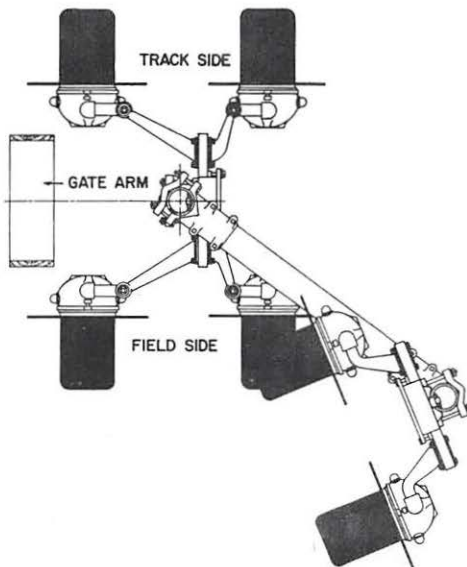
Style "B" Lamps



With Sidelights



Style "C" Lamps



With Sidelights

INSTALLATION INSTRUCTIONS

FLASHING LIGHTS AND SIGNS

Flashing lights are next bolted to mast with junction box entrance over hole in mast. Install backgrounds and visors to lamps with screws furnished. Sidelights (if required) should also be installed at this time.

Remove cover from junction box and bring flashing light wires from pedestal thru mast into junction box and connect to proper terminals.

The alignment of lamps will vary considerably, depending upon local conditions at the crossing as well as requirements of regulatory bodies having jurisdiction over crossing protection. Actually the point of alignment should be properly determined in each case so as to provide the greatest protection for approaching vehicles.

For alignment information see Page 12.

All signs as required and furnished shall next be bolted to the mast. Arrangement of signs as shown on Page 1.

VERTICAL AND HORIZONTAL ADJUSTMENT OF GATE ARM

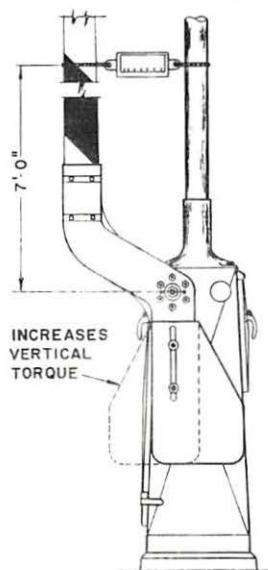
Counter weights used in connection with various lengths of gate arms are for the purpose of partially offsetting the weight of the gate arm itself, so that gate arm can be raised by the motor without excessive current requirements. The counter weights are adjustable in two ways, so that the gate arm will provide a sufficient number of foot-pounds of torque, both in the vertical and horizontal positions. Sufficient torque is important to assure the lowering of the gate arm by gravity in case of an electrical failure, which would prevent the motor from driving the gate downward in the normal operation.

A.A.R. Signal Section specifications for double bearing gates require a torque of 50 foot pounds for any length of gate arm when the gate is in the horizontal position. This torque is for a gate without a sidewalk arm or with the sidewalk arm disconnected. The horizontal torque of 50 foot pounds is measured by lifting the gate arm with a spring scale connected to the gate arm 10 feet from the center of the gate arm shaft. The foot pounds of torque equal the distance (10 feet) multiplied by the reading in pounds on the scale. Thus, the scale should read 5 pounds to equal 50 foot pounds of torque. In taking this measurement, the gate arm should be raised sufficiently to remove pressure from the snubbing spring inside the gate. Proper horizontal torque is obtained by sliding the counterweights backward or forward until a reading of 5 pounds is secured on the scale.

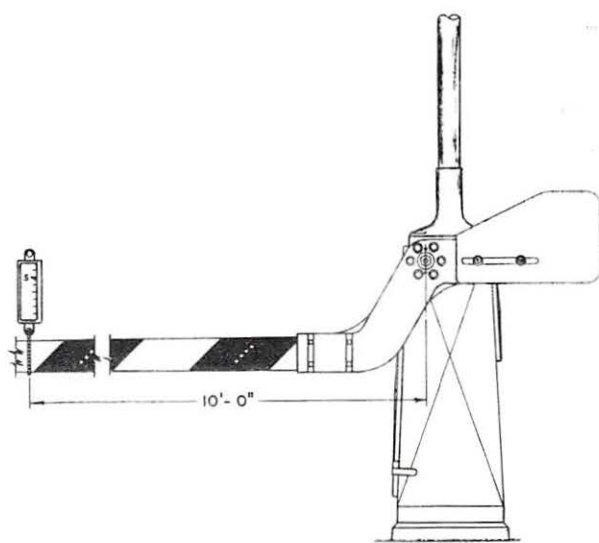
A.A.R. specifications for foot pounds of torque when the gate is in the vertical position vary with the length of the gate. These specifications will be met or exceeded by providing a vertical torque in foot pounds equal to 10 times the length of the gate arm, but not less than 175 foot pounds.

Vertical torque may be measured by fastening a spring scale to the gate arm 7 feet from the center line of the shaft. With the gate in the clear position, the other end of the spring scale should be fastened to the gate mast by means of a heavy wire or rope. Energy should then be disconnected from the gate so that it will begin to descend by gravity until stopped by the pressure of the spring scale. The foot pounds of torque will be the distance (7 feet) times the reading in pounds on the scale. For example, a 28-foot gate arm should have a vertical torque of 280 foot pounds so that the reading on the scale should be 40 pounds.

The proper vertical torque is obtained by reversing the slanted, offset position of one or more of the counterweights as may be required. The vertical torque is increased when the slanted side of the counterweights is toward the street and decreased when it is faced away from the street.



VERTICAL TORQUE ADJUSTMENT



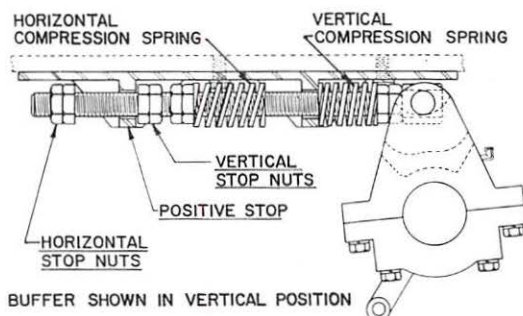
HORIZONTAL TORQUE ADJUSTMENT

BUFFER ADJUSTMENT

The buffer, mounted in the top of pedestal, provides an adjustable positive stop for the gate arm, together with a spring cushioning effective just prior to such stop. This buffer is adjusted at the factory and usually will not require any field adjustments. If field adjustment is necessary, the buffer should be adjusted as follows.

With the gate in a lowered position, the horizontal pair of stop nuts should be adjusted against the positive stop to hold the gate from coming down below horizontal. With the gate in this position the horizontal compression spring should be adjusted to a degree of compression just short of where tension on the spring starts to raise the gate arm. The lock nuts for the positive stop and for the compression spring should be tightened securely.

With the gate in the clear position the vertical pair of stop nuts should be adjusted to approximately $\frac{3}{16}$ " to $\frac{1}{4}$ " away from the positive stop. This clearance will assure the proper opening of the motor contact when the gate reaches the clear position, but will prevent excessive over travel of the gate arm during a heavy wind. With the gate in the clear position the vertical compression spring should be adjusted so that it is just beginning to come under tension. With this adjustment any over travel of the gate arm will further compress the spring before coming up against the positive stop so as to provide proper cushioning action.



ALIGNMENT OF FLASHING LAMPS

To align lamps, continuously light one lamp. Open door of lamp, removing the red lens. Station an observer on the road at the point to which lamp is to be aligned. The ball socket should now be loosened slightly so that the lamp unit can be moved to the approximate desired horizontal and vertical position. Retighten the ball socket. For final adjustment determine the style of lamp furnished and follow instructions below.

If the Style "B" lamp is used, as shown on Page 7, the following final adjustments shall be made. Loosen screws on back of lamp, then tighten the proper screws, moving the lamp to the desired horizontal and vertical position. The light from the lamp unit should now appear as a complete ball to the observer stationed on the road. All screws on the back of lamp unit should be tightened and lamp rechecked for maximum visibility before closing door.

If Style "C" lamp is used, as shown on Page 7, the following final adjustment shall be made. Slightly loosen both screws in elbow at top of lamp. Move lamp unit to desired horizontal and vertical position. The light from the lamp unit should now appear as a complete ball to the observer stationed on the road. Tighten both screws in elbow and check for maximum visibility before closing door.

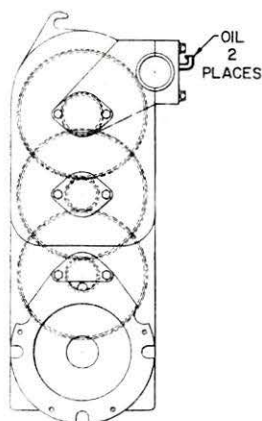
GENERAL MAINTENANCE

(3 to 6 Months)

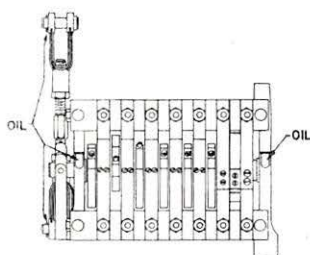
LUBRICATION

Avoid using too much oil. Always remove all surplus oil that may flow over mechanism and collect dust.

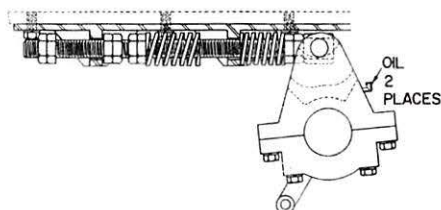
Every three to six months the following lubrication is recommended.

**MECHANISM**

Fill two oil cups located in caps on main shaft with pale semaphore oil. Grease gears with a thin film of Texaco Uni Temp or equivalent grease.

**CONTROLLER**

Fill oil cups at each end of shaft and oil pins in linkage to main shaft with pale semaphore oil.

**BUFFER**

Fill two oil cups located in buffer bracket with pale semaphore oil.

All cups referred to above are accessible from the full length door.

GENERAL MAINTENANCE

(3 to 6 Months)

HOLD CLEAR

The magnet bar and the core face of the hold clear coil, together with the ratchet wheel, should be kept clean and free from foreign substance. Clean with a small amount of carbon tetrachloride or equivalent on a clean white cloth.

CIRCUIT CONTROLLER

Check for dirty or burned contacts. Contacts 2, 4, 6, 12, and 14, should be open $\frac{1}{16}$ inch with the gate in a clear position. Contacts 1, 5, 6, 7, 8, and 10, should be open $\frac{1}{16}$ inch with the gate in a down position. The snap switch contacts 12, and 14, should be checked for quick complete operation on the clearing cycle from 85° to 90° . Contacts 3, 9, and 11 are usually spares used only when special circuits are required.

SPECIALIZED MAINTENANCE**CONTROLLER**

Maintenance of circuit controller is very simple and is limited to the following requirements.

Contact pressure of the individual contacts should be maintained at not less than 16 ounces, and where subject to frost conditions should be maintained with a pressure of 24 ounces to 32 ounces during the winter months. The contact opening should be maintained at approximately $\frac{1}{16}$ inch. Contact pressure and opening may be adjusted when necessary by slightly bending the contact springs. The springs should be removed to make this adjustment if inspection indicates that contact pressure or contact opening is not correct.

If any contact springs are replaced, a check should be made to determine that the new springs have the proper pressure and opening, and that the contact opens or closes at the proper point in the gate operation.

MOTOR

The armature shaft is equipped with ball bearings packed at the factory with a special all weather grease. The bearings are sealed and no lubrication of the motor is required. The brush pressure should be maintained between 8 and 10 ounces. Excessive pressure may result in the brushes wearing too rapidly, while lack of pressure will result in arcing of the brushes, together with loss of power and excessive carbon deposits on the motor commutator. Lack of sufficient brush pressure may also result in failure of the gate to raise if weather conditions have caused frost on the commutator surface. Normally the brush pressure as adjusted at the factory will be retained within proper limits throughout the long life of the brushes.

Other than an occasional check of the brush pressure, the only maintenance required is cleaning the commutator with a lint free cloth if it has become blackened by carbon deposit from the brushes.

HOLD CLEAR

Refer to Up Circuit Page 19

When the gate is raised to within approximately 7° of its clear position, circuit controller contact No. 6 closes the negative circuit of the pick up coil. This energizes the pick up coil which draws the magnet bar plunger upward until the magnet bar itself raises against the core of the hold clear coil. The pick-up coil has a resistance of 4.5 ohms, and will pick up the magnet bar on a minimum of 8.0 volts. (Older models utilized a 5 ohm coil requiring 9.5 volts.) As the gate reaches its clear position the solenoid coil is disconnected through circuit controller contacts No. 6 and No. 12 after which the magnet bar is held closed by the hold clear coil. The hold clear coil has a resistance of 500 ohms, and requires only 25 milliamperes at 12 volts to keep the gate in its clear position. The magnet bar is equipped with residual pins to provide .013" air gap to the core of the hold clear coil.

The hold clear coil should release the magnet bar at a minimum of 2.5 volts. Under normal operation this release value will usually be somewhat higher as pressure of the ratchet wheel against the pawl will tend to cause a quicker release of the hold clear magnet.

When the hold clear is energized, the pawl will engage the teeth of the ratchet wheel and upon release of the hold clear, the pawl will drop away from the ratchet wheel, providing a minimum clearance of $\frac{1}{32}$ ". The bell crank of the hold clear linkage, when energized, is prevented from over traveling by means of a stud, which is screwed into the bronze casting. This provides the proper engagement surface of the pawl with the face of the ratchet wheel teeth.

OPERATION & GENERAL INFORMATION

The Griswold Automatic Gate is powered by a heavy duty series wound motor, designed to operate at its maximum efficiency on eleven to twelve volts DC. Two sets of field windings are used for the motor. One set of field windings (hereafter called the "up field"), when connected in series with the armature, rotates the motor in the proper direction to raise the gate. When the other set of field windings (hereafter called the "down field") is connected in series with the armature, the direction of the motor is reversed to lower the gate.

The power of the motor is transmitted to the main gate arm shaft through a train of gears, providing a ratio of 250 to one. Thus, for each foot pound of energy delivered by the motor, 250 foot pounds of energy is transmitted to the main gate arm shaft. The result of this tremendous power permits a smooth and rapid raising of the gate arm even when such arm may be heavily loaded with snow or sleet.

The gate is held in its clear position by a "Hold clear" assembly which engages a pawl with a ratchet wheel on the motor shaft. The engagement of the pawl with the ratchet wheel is brought about by energizing a solenoid coil which is connected into the circuit when the gate has been raised to within approximately 7° of its clear position. A hold-clear coil then holds the magnet bar closed so that the pawl and ratchet remain engaged and retain the gate arm in its clear position. Control circuits are so designed that upon the approach of a train, energy is removed from the hold-clear coil, dropping the magnet bar and disengaging the pawl from ratchet wheel.

While the gate is normally driven downward to approximately 45° , it is so designed that it will lower entirely by gravity in case of failure in any part of the circuit which would normally drive it down.

The gate arm always moves from 45° to its horizontal position by gravity so that in case it strikes an object such as a stalled automobile, etc., it will readily stop and then continue its movement after the obstruction has been removed.

The following is a description of the operation of the gate.

CLEARING

Refer to Up Circuit Page 19

To raise the gate, energy is applied to the IXY wire, energizing the gate control relay. Positive battery B flows through front contacts No. 1 and 2 of the gate control relay, through circuit controller contact No. 14 to the up field of the motor, through the armature to negative battery C. This circuit rotates the motor in the proper direction to raise the gate. The gate will clear at maximum speed until it reaches a point 80° above horizontal and well above highway vehicles. At this point, circuit controller contact No. 8 closes a snubbing circuit through the down field to front contact No. 3 of the gate control relay, through the drive resistor to negative battery C. This causes the gate to slow down between 80° and 90° bringing it to a smooth stop in the vertical position when circuit controller contact No. 14 opens the motor circuit.

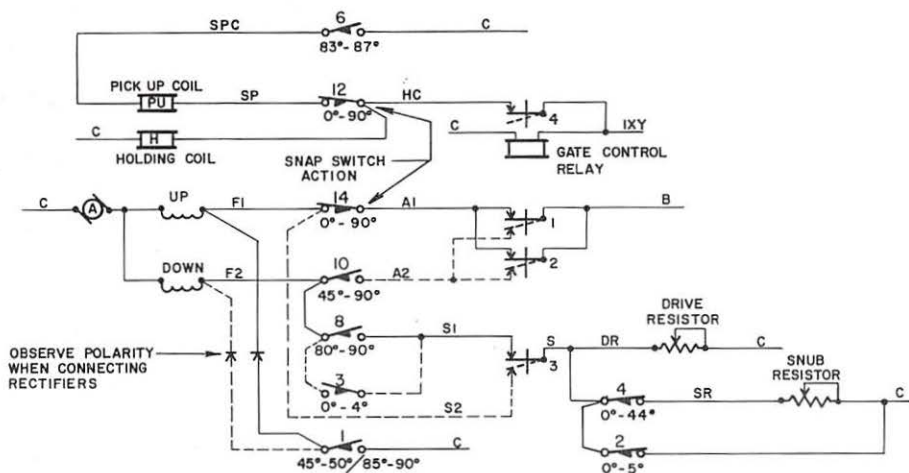
Arcing of circuit controller contact No. 14, which opens the motor circuit at 90° , is prevented by the use of a half wave rectifier bridging the up field of the motor and armature through circuit controller contact No. 1 (closed between 85° - 90°).

When requested, especially on gates of 30 feet in length and longer an optional circuit may be used to provide a raising snub during the initial movement of the gate. A portion of the energy flowing

through the up field of the motor is sent through down field instead of through the armature. This current then flows through contact No. 3 of the circuit controller, through the No. 3 front contact of the gate control relay, through circuit controller No. 2 to negative battery (C). The object of this circuit is to provide an electrical snub on the motor, thus starting the gate smoothly and without jerking. This snub circuit is opened as the gate arm starts up through circuit controller contact No. 3.

The gate arm should clear from a horizontal to vertical position within 5 to 7 seconds.

UP CIRCUIT ROADWAY GATE



CIRCUIT SHOWN WITH GATE AT HORIZONTAL AND BATTERY APPLIED IXY WIRE
UP CIRCUIT

LOWERING

Refer to Down Circuit Page 21

To lower the gate, energy is removed from the IXY wire, deenergizing the gate control relay and the hold clear magnet, permitting the gate to descend. The gate is normally driven down by the motor from its clear position to a point 45° above horizontal. The drive down circuit is from positive B flowing through the back contacts No. 1 and 2 of the gate control relay, through circuit controller contact No. 10 to the down field of the motor through the armature to common C.

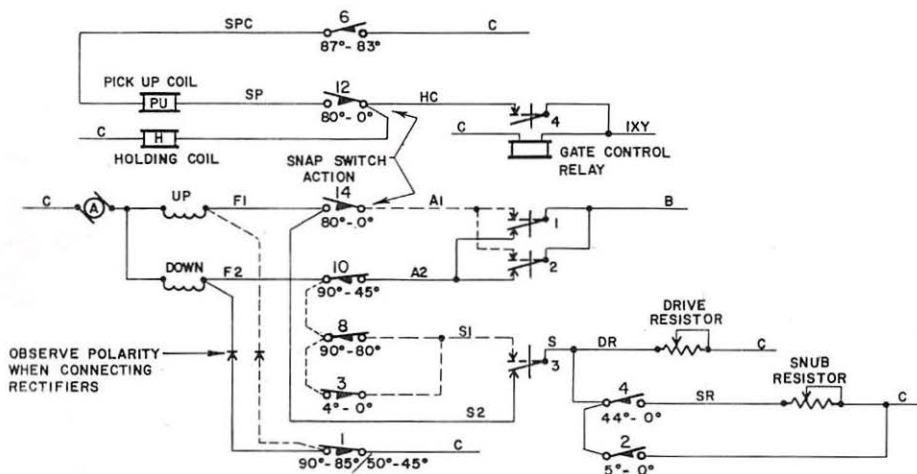
In order to provide an adjustable speed for the descent of the gate, a portion of the current flowing through the down field, flows through the up field, through No. 3 back contact of the gate control relay and the drive resistor to common C. The drive resistor is adjustable so that the speed of the gate can be altered to suit any requirements. Increasing the resistance of the drive resistor will operate the gate faster while decreasing the resistance will slow the gate.

As the gate arm reaches 45° in its descent, circuit controller contact No. 10 opens, after which the balance of the descent is by gravity. The speed during this part of the operation is also controlled by a snub circuit which utilizes regenerative potential between the up field and the armature of the motor. This circuit is from the armature to up field of the motor, through back contact No. 3 of the gate control relay, through circuit controller contact No. 4 (which closes at 44°) to the snub resistor and common C. Increasing the resistance of the snub resistor will operate the gate faster while decreasing the resistance slows the gate. The gate is brought to a smooth stop at the horizontal position through a bypass circuit which cuts out the snub resistance. This circuit

is completed through circuit controller contact No. 2 which closes just before the gate reaches the horizontal position.

Arcing of circuit controller contact No. 10, which opens the motor circuit at 45° , is prevented by the use of a halfwave rectifier bridging the down field of the motor and the armature through circuit controller contact No. 1 (closed between 45° and 50°).

DOWN CIRCUIT ROADWAY GATE



CIRCUIT SHOWN WITH GATE AT VERTICAL AND BATTERY REMOVED IXY WIRE
DOWN CIRCUIT

GEAR TRAIN

The gear train is a series of steel gears completely mounted in a cast iron housing. Each of the gear shafts operate on ball bearings, which are factory packed with all weather grease and do not require any further lubrication. The gear teeth are coated at the factory with all weather grease, which should be renewed as described on Page 13.

The gear on the end of the motor shaft, which engages the balance of the gear train, is a fibre gear and is fastened to the motor by a shock absorbing coupling requiring no maintenance.

MOTOR

The Griswold motor is designed to operate the longest gate arms smoothly and rapidly, even when such arms may be loaded with sleet or snow or when they are operating in heavy winds. For most efficient operation the voltage at the motor terminals should be not less than 11 or 12 volts during the heaviest load. The current requirement of the motor in raising the gate should be between 6 amperes and 9 amperes, depending upon the length of the gate arm, torque adjustment, etc. On gates where an optional electrical raising snub is used to provide a smooth start for the arm, as previously explained, there will be an initial surge of current above this figure. There will also be an additional current drain during the final 10° of gate movement because of the electrical snub designed to slow down the gate and provide a smooth stop in the clear position.

HOLD CLEAR MECHANISM

The hold clear mechanism is designed to hold the gate in its clear position with a minimum amount of electrical current. This hold clear mechanism consists of a hold clear coil, mounted on a laminated iron core, together with a solenoid coil, a magnet bar and plunger, a ratchet wheel, pawl and necessary linkage. The ratchet wheel is mounted on the end of the motor shaft and contains a coil spring within the wheel to provide a cushioning effect for relieving the shock and reducing wear. The balance of the hold clear mechanism is mounted on a bronze casting, which bolts directly to the motor, providing accurate clearance between the ratchet wheel and the pawl.

CIRCUIT CONTROLLER

The circuit controller is bolted to the side of the pedestal and connected to the main gate arm shaft by an adjustable connecting rod. The No. 12 and No. 14 contacts might be considered as the master contacts of the circuit controller. The cam for adjusting these contacts is keyed to the circuit controller shaft and is not adjustable on that shaft. Built into this cam is a snap switch for operating contacts No. 12 and No. 14. The snap arrangement is operated by a spring assembly which causes the contact to snap open as the gate arm reaches a vertical position of 90°. This snap action provides positive and quick opening of the hold clear and motor circuit. During the descent of the gate arm contacts No. 12 and No. 14 are held open until the gate is lowered to approximately 80°.

The clear position of the gate is easily adjustable by means of the circuit controller connecting rod. This connecting rod utilizes left hand threads at one end and right hand threads at the other end, so that the rod may be shortened or lengthened as required, simply by

turning clockwise or counterclockwise. If, in clearing, the gate arm does not rise to the full vertical position, the connecting rod should be shortened slightly, which will cause the No. 12 and No. 14 contacts to remain closed longer. This will result in the gate traveling further before stopping. If, on the other hand, the gate clears beyond the vertical position, then the connecting rod should be lengthened, causing the gate to stop sooner. After making either of these adjustments it is necessary to operate the gate to determine if the adjustment is proper to cause the gate to stop in a vertical position.

Following is a description of the use and adjustment of each of the other circuit controller contacts:

Contact No. 1—This contact is operated by a notched cam, which is designed to close the contact between 45° and 50° and again between 85° and 90° . The purpose of this contact is to connect the proper half-wave rectifier across the motor armature and field circuit, so that the rectifier will provide arc suppression when contact No. 14 (at 90°) opens the motor circuit clearing the gate, and contact No. 10 opens the motor circuit (at 45°) lowering the gate.

Contact No. 2—This contact bypasses the snub and drive resistors. It provides a direct snub from the up field of the motor to the common side of the armature. This contact should be adjusted to close just before the gate reaches its full horizontal position ($0^{\circ} - 5^{\circ}$).

Contact No. 3—This is a spare contact which may be adjusted and used for any additional circuit. On gates where an electrical raising snub is used this contact is adjusted to be closed at 0° to 4° , to provide a raising snub during the initial movement of the gate.

Contact No. 4—This contact is adjusted to close from 44° - 0° . When closed it connects the snub resistor into the motor circuit through the back contact of the gate control relay. Thus, the regenerative energy set up between the up field and the armature of the motor, is used to control the descent of the gate arm.

Contact No. 5—This contact is normally adjusted to be closed from 10° to 90° and is for the purpose of cutting off the crossing bell by opening this circuit when the gate arm has reached a position just 10° above horizontal. The use of this arrangement is optional with the railroad and, if not used, this contact is another spare.

Contact No. 6—This contact is adjusted to close at approximately 83° to 87° and open again at 88° to 90° . The closing of this contact during the raising of the gate arm energizes the solenoid coil, which picks up the hold clear magnet bar, causing the pawl to engage with the ratchet wheel. During the raising of the gate arm, this contact must close in sufficient time to give the magnet bar a chance to seat itself against the core of the hold clear coil. If the contact does not close soon enough, the magnet bar may not remain energized, in which case, the gate will pump instead of being held in its clear position. On the other hand, if this contact closes too soon, it will simply result in unnecessary ratcheting of the pawl and cause additional wear of the pawl and ratchet wheel.

Contact No. 7—This contact is adjusted to close between 80° to 90° and is normally used to energize a gate repeater relay. Such relay, as used by most railroads, causes the flashing lights and gate

arm lights to continue operating during the raising of the gates until the gates have reached a position of 80° above horizontal.

Contact No. 8—This contact is adjusted to close between 80° and 90° . It is used to provide an electrical snub by connecting the drive resistance across the down field and common side of the armature. The snubbing circuit causes the gate arm to slow up, so that it comes to a smooth stop at 90° .

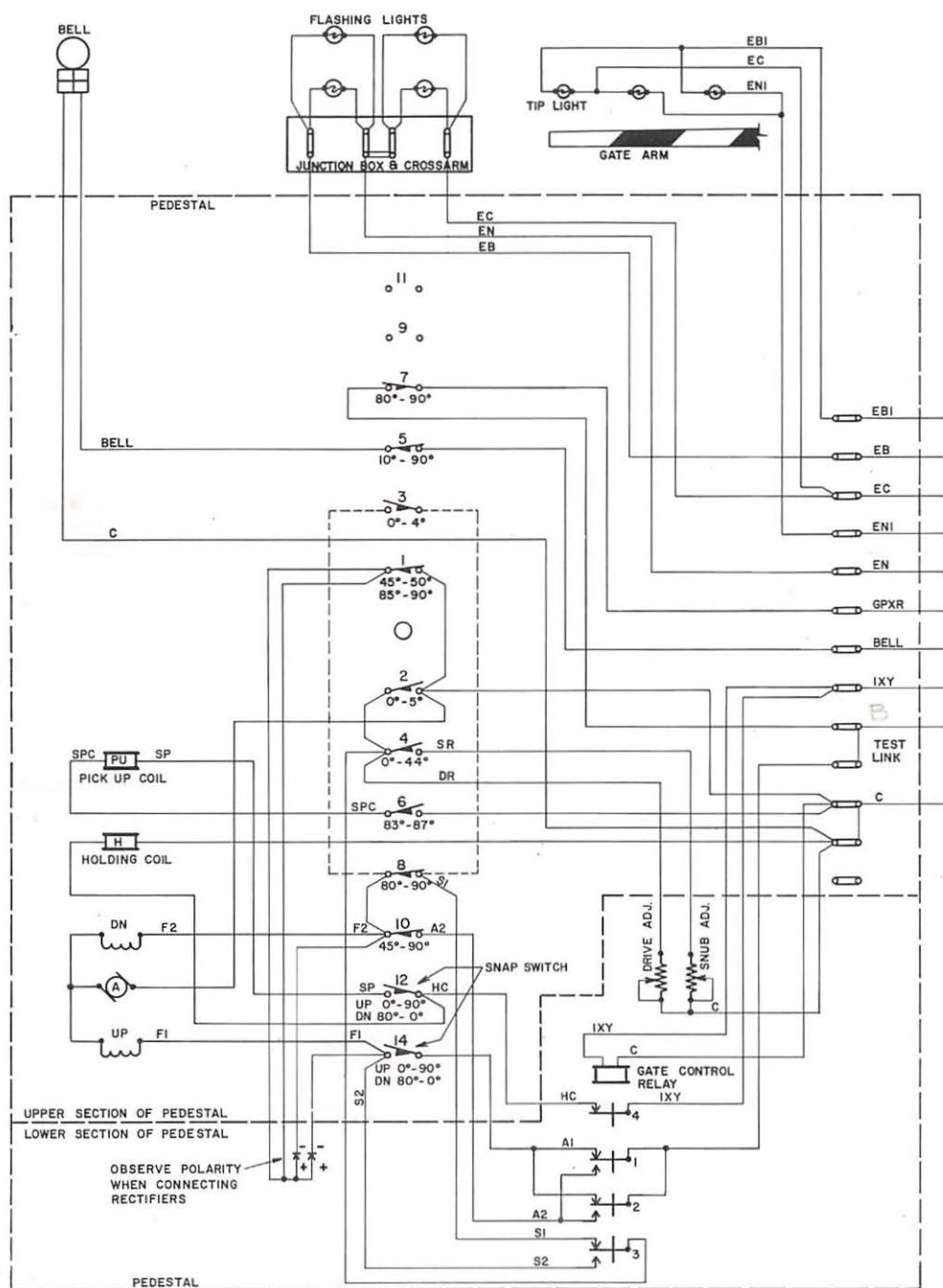
Contact No. 9—This is a spare contact which may be adjusted, and used for any circuit desired.

Contact No. 10—This contact is adjusted so that it is closed between 45° and 90° . It controls the motor circuit, driving the gate down, and opens such circuit at 45° , so that thereafter the descent of the gate is by gravity.

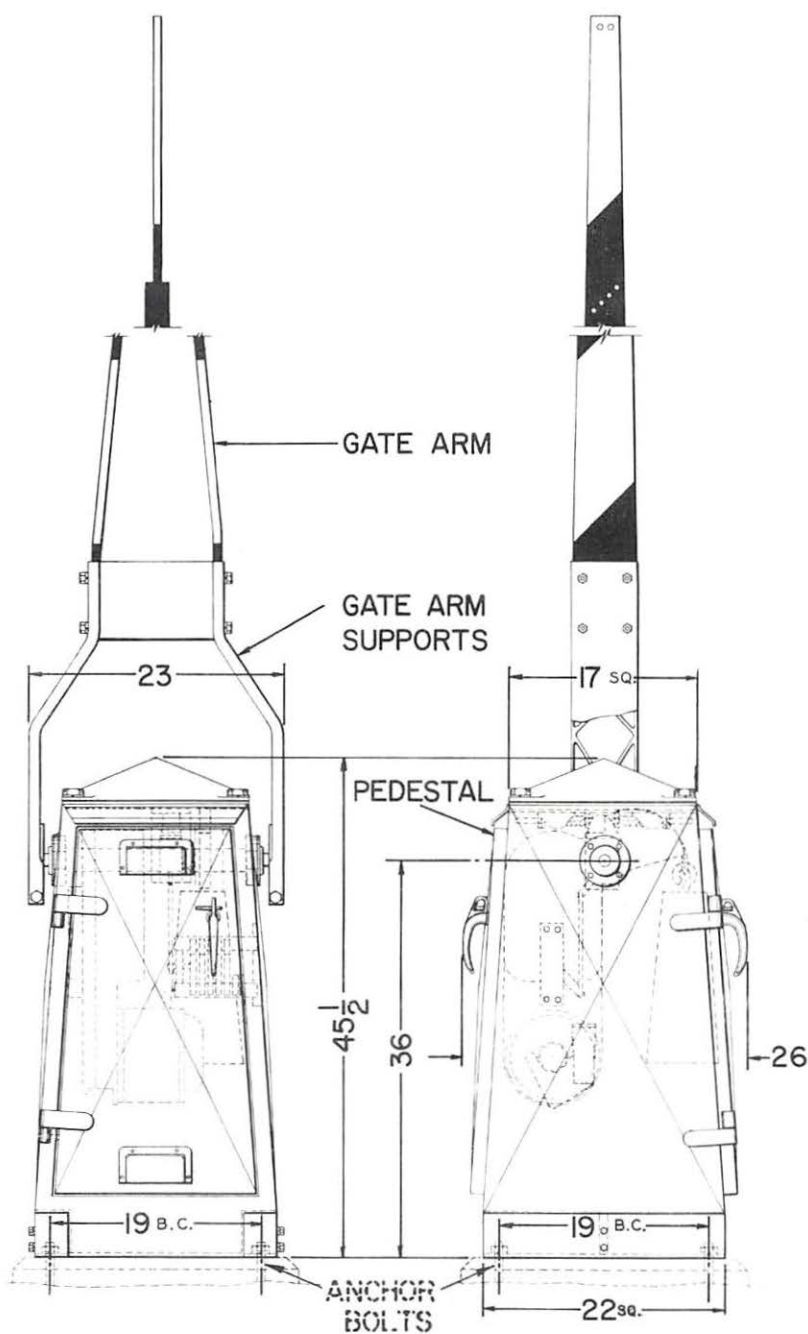
Contact No. 11—This is a spare contact that may be adjusted and used for any circuit desired.

Contact No. 12—This contact is not adjustable and is operated by means of a center drive cam driving a connecting bar which connects contact No. 14 to contact No. 12. The No. 12 contact is closed or opened during the same portion of the operation as the No. 14 contact. It is used to open the positive control circuit of the hold clear pick up coil at the time the gate reaches its clear position. Visual inspection should be made of this contact occasionally to insure that it snaps open together with the No. 14 contact when the gate comes to a stop in a vertical position. Failure of this contact to open could result in the coil remaining energized, which eventually would damage the coil because of its low resistance.

WIRING DIAGRAM — AUTOMATIC ROADWAY GATE



SIDEWALK GATE



SIDEWALK GATE

INSTALLATION INSTRUCTIONS

FOUNDATIONS

Foundation dimensions and locations as per Page 2.

PEDESTAL

Before setting pedestal on foundation place about one-half inch rounded strip of signal cement or plastic putty on the top of foundation. This strip should be placed in a 19" square so it will flatten and act as a moisture seal between gate and foundation.

Place pedestal on foundation with pedestal facing in direction shown on Page 29. If mounted on 19" x 19" bolt spacing foundation use mounting holes in channel located at outer edge of pedestal. If mounted on 11-11/16 x 11-11/16 bolt spacing foundation use adapter bars (furnished when requested) under the pull-up boards in bottom of pedestal. Tighten nuts securely on anchor bolts and install bolt covers over channel.

Bring wires into pedestal thru foundation and attach to proper terminals in bottom of pedestal. Hole in foundation should be sealed with signal cement or similar compound before pull up boards are replaced in bottom.

SIDEWALK GATE GATE ARM AND WEIGHT INSTALLATION

The gate arm weight which is shipped separately is to be installed inside the pedestal. The eyebolt on top of the weight shall be hooked into the eye of the cable and the cable guide.

The gate arm support castings shall next be clamped to the shaft. Insert gate arm between support castings and bolt in place. After gate arm is bolted securely, the bolts in the support castings shall be tightened at the shaft.

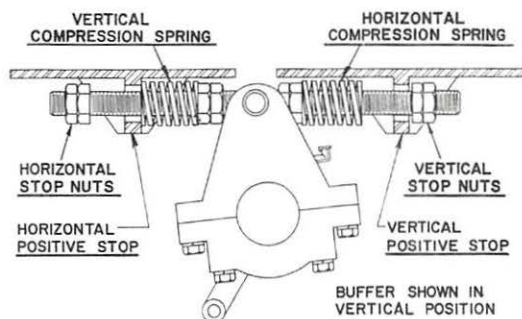
BUFFER ADJUSTMENT

The buffer mounted in the top of pedestal provides an adjustable positive stop for the gate arm, together with a spring cushioning effective just prior to such stop. This buffer is adjusted at the factory and should not require any field adjustment. If it should be necessary to adjust the buffer, adjustment should be as follows.

With the gate in a lowered position the horizontal stop nuts should be adjusted against the positive stop to hold the gate from coming down below horizontal. With the gate in this position the compression spring should be adjusted to a degree of compression just short of where tension on the spring starts to raise the gate arm. The lock nuts for the positive stop and for the compression spring should be tightened securely.

With the gate in the clear position the vertical lock nuts should be adjusted to approximately $\frac{3}{16}$ " to $\frac{1}{4}$ " away from the positive stop. This clearance will assure the proper opening of the motor contact

when the gate reaches the clear position, but will prevent excessive over travel of the gate arm during a heavy wind. With the gate in the clear position the vertical compression spring should be adjusted so that it is just beginning to come under tension. With this adjustment any over travel of the gate arm will further compress the spring before coming up against the positive stop so as to provide proper cushioning action.



GENERAL MAINTENANCE

(3 to 6 Months)

Lubrication

Refer to Page 13

Hold Clear

Refer to Page 14

Circuit Controller

Check for dirty or burned contacts. The snap switch contacts 1 and 3, should be checked for quick and complete operation on a clearing cycle for 85° to 90°. Contacts 1, 3, 4, 5, and 6, should be open $\frac{1}{16}$ with the gate in a clear position. Contacts 5, 7, 8, and 9, should be open $\frac{1}{16}$ " with gate in a down position. Contacts 10 and 11 are usually spare, used only when special circuits are required.

SPECIALIZED MAINTENANCE

Controller

Refer to Page 15

Motor

Refer to Page 15 and 16

Hold Clear

Refer to Page 16

Operation and General Information

Refer to Page 17 and 18

CLEARING

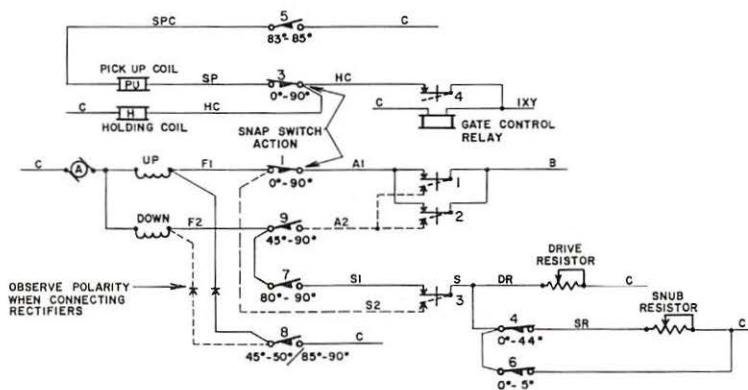
Refer To Up Circuit Bottom of Page

To raise the gate, energy is applied to the IXY wire, energizing the gate control relay. Positive B flows through front contacts No. 1 and 2 of the gate control relay, through circuit controller contact No. 1 to the up field of the motor, to the armature and common C. This circuit rotates the motor in the proper direction to raise the gate. The gate will clear with maximum speed until it reaches a point 80° above horizontal. At this point, circuit controller contact No. 7 closes a snubbing circuit through the down field, front contact No. 3 of the gate control relay through the drive resistor to negative battery C. This causes the gate to slow down between 80° and 90° bringing it to a smooth stop in the vertical position when contact No. 1 opens the motor circuit.

Arcing of circuit controller contact No. 1, which opens the motor circuit at 90° , is prevented by the use of a half-wave rectifier bridging the up field of the motor and armature through circuit controller contact No. 8, (closed between 85° - 90°).

The gate arm should clear from a horizontal to vertical position in 5 to 7 seconds.

UP CIRCUIT SIDEWALK GATE



CIRCUIT SHOWN WITH GATE AT HORIZONTAL AND BATTERY APPLIED IXY WIRE
UP CIRCUIT

LOWERING

Refer To Down Circuit Page 36

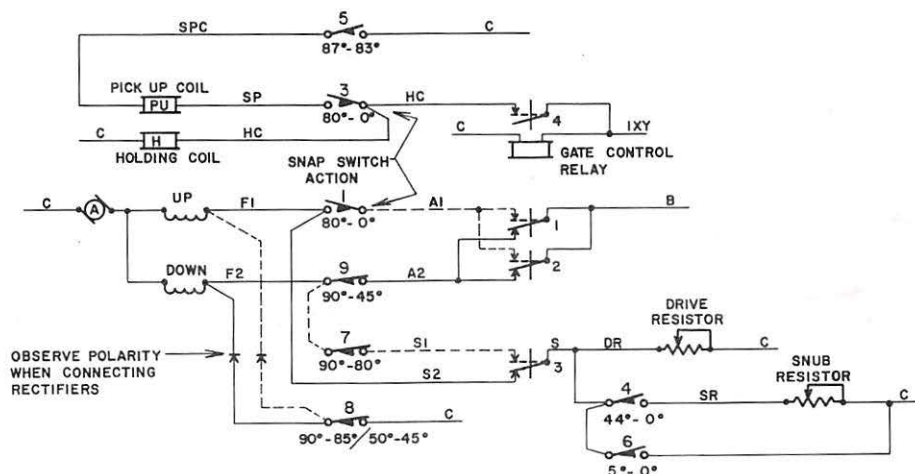
To lower the gate, energy is removed from the IXY wire deenergizing the gate control relay and the hold clear magnet, permitting the gate to descend. The gate is normally driven down by the motor from its clear position to a point 45° above horizontal. The drive down circuit is from positive B flowing through back contacts No. 1 and 2 of the gate control relay, through circuit controller contact No. 9 to the down field of the motor through the armature to common C.

In order to provide an adjustable speed for the descent of the gate, a portion of the current flowing through the down field, flows through the up field through No. 3 back contact of the gate control relay and the drive resistor to common C. The drive resistor is adjustable so that the speed of the gate can be altered to suit any requirements. Increasing the resistance of the drive resistor will operate the gate faster while decreasing the resistance will slow the gate.

As the gate arm reaches 45° in its descent, circuit controller contact No. 9 opens, after which the balance of the descent is by gravity. The speed during this part of the operation is also controlled by a snub circuit which utilizes regenerative potential between the up field and the armature of the motor. This circuit is from the armature to field of the motor, through back contact No. 3 of the gate control relay, through circuit controller No. 4 (which closes at 44°) to the snub resistor and common C. Increasing the resistance of the snub resistor will operate the gate faster, while decreasing the resistance slows the gate. The gate is brought to a smooth stop at the horizontal position through a bypass circuit which cuts out the snub resistance. This circuit is completed through circuit controller contact No. 6 which closes just before the gate reaches the horizontal position.

Arcing of circuit controller contact No. 9, which opens the motor circuit at 45° , is prevented by the use of a half-wave rectifier bridging the down field of the motor and the armature through circuit controller contact No. 8 (closed between 45° and 50°).

DOWN CIRCUIT SIDEWALK GATE



CIRCUIT SHOWN WITH GATE AT VERTICAL AND BATTERY REMOVED IXY WIRE
DOWN CIRCUIT

Gear Train

Refer to Page 22

Motor

Refer to Page 22

Hold Clear

Refer to Page 23

Circuit Controller

Contact No. 1—This contact is connected to contact No. 3 by means of a connecting bar. The cam for adjusting these contacts is keyed to the shaft and is not adjustable on the shaft. Built into this cam is a snap switch for operating contacts No. 1 and No. 3. The snap arrangement is operated by a spring assembly, which causes the contact to snap open as the gate arm reaches a vertical position of 90° . This snap action provides positive and quick opening of the hold clear and motor circuit. During the descent of the gate arm, contacts No. 1 and No. 3 are held open until the gate is lowered to approximately 80° .

Contact No. 3—This contact is not adjustable and is operated by means of a center drive cam driving a connecting bar which connects contact No. 1 to contact No. 3. The No. 3 contact is closed or opened during the same portion of the operation as the No. 1 contact. It is used to open the positive control circuit of the hold clear pick up coil at the time the gate reaches its clear position. Visual inspection should be made of this contact occasionally to insure that it snaps open together with the No. 1 contact when the gate comes to a stop in a vertical position. Failure of this contact to open could result in the coil remaining energized, which eventually would damage the coil because of its low resistance.

Contact No. 4—This contact is adjusted to close from 44° - 0° during the descent of the gate arm. When closed it connects the snub resistor into the motor circuit through the back contact of the gate control relay. Thus, the regenerative energy set up between the up field and the armature of the motor, is used to control the descent of the gate arm.

Contact No. 5—This contact is adjusted to close at approximately 83° to 87° and open again at 88° to 90° . The closing of this contact during the raising of the gate arm energizes the solenoid coil, which picks up the hold clear magnet bar, causing the pawl to engage with the ratchet wheel. During the raising of the gate arm, this contact must close in sufficient time to give the magnet bar a chance to seat itself against the core of the hold clear coil. If the contact does not close soon enough, the magnet bar may not remain energized, in which case, the gate will pump instead of being held in its clear position. On the other hand, if this contact closes too soon, it will simply result in unnecessary ratcheting of the pawl and cause additional wear of the pawl and ratchet wheel.

Contact No. 6—This contact bypasses the snub and drive resistors. It provides a direct snub from the up field of the motor to the common side of the armature. This contact should be adjusted to close just before the gate reaches its full horizontal position (0° - 5°).

Contact No. 7—This contact is adjusted to close between 80° to 90° . It is used to provide an electrical snub by connecting the drive resistance across the down field and common side of the armature. The snubbing circuit causes the gate arm to slow up, so that it comes to a smooth stop at 90° .

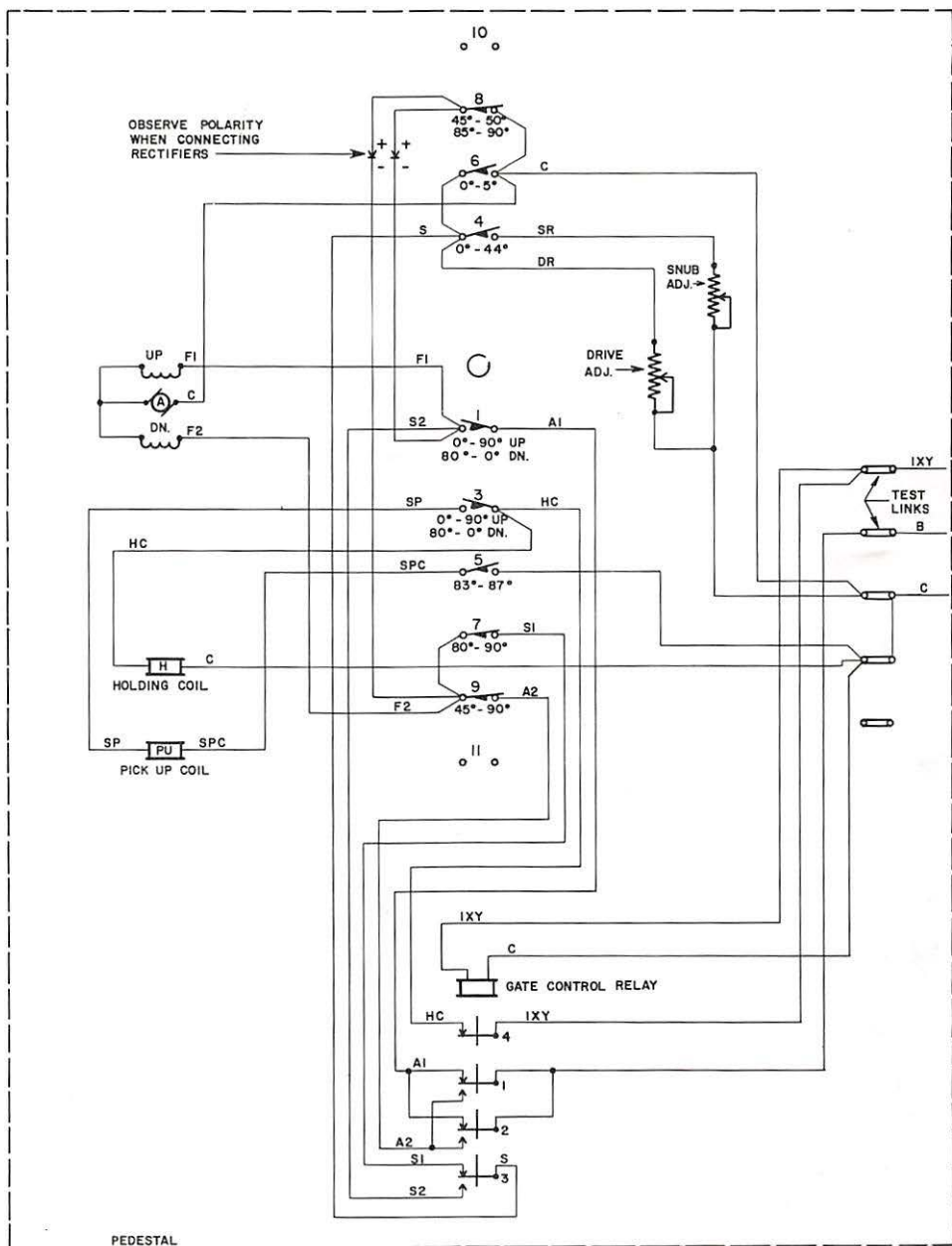
Contact No. 8—This contact is operated by a notched cam, which is designed to close the contact between 45° and 50° and again between 85° and 90° . The purpose of this contact is to connect the proper half-wave rectifier across the motor armature and field circuit, so that the rectifier will provide arc suppression when contact No. 1 (at 90°) opens the motor circuit clearing the gate, and contact No. 9 opens the motor circuit (at 45°) lowering the gate.

Contact No. 9—This contact is adjusted so that it is closed between 45° and 90° . It controls the motor circuit, driving the gate down, and opens such circuit at 45° , so that thereafter the descent of the gate is by gravity.

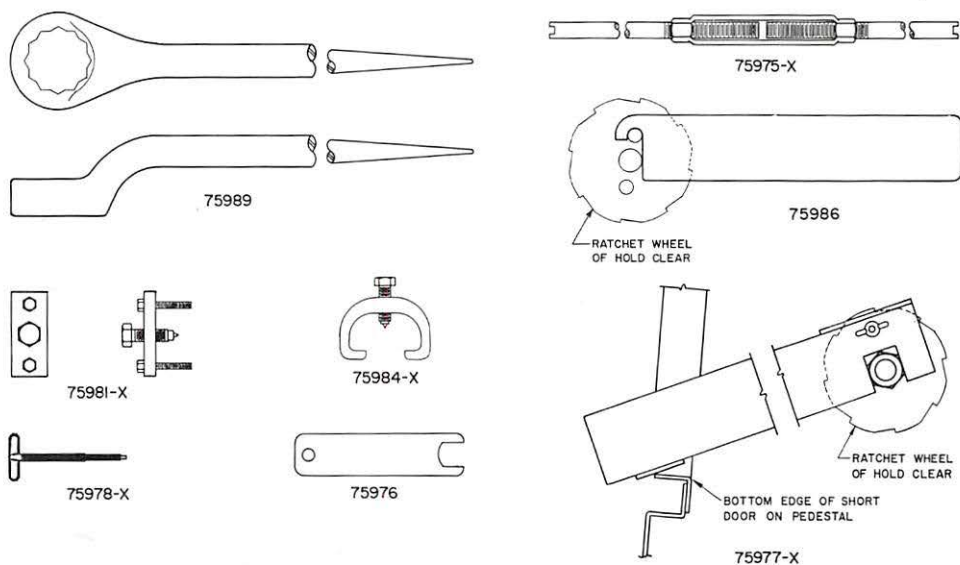
Contact No. 10—This is a spare contact, which may be adjusted and used for any additional circuit as desired.

Contact No. 11—This is a spare contact, which may be adjusted and used for any additional circuit as desired.

WIRING DIAGRAM — SIDEWALK GATE



TOOLS



- 75989 Wrench — Main Shaft Nut
- 75981-X Gate Arm Support Hub Puller
- 75984-X Ratchet Wheel Puller
- 75978-X Controller Cam Adjusting Wrench (Furnished)
- 75976 Buffer Wrench (Furnished)
- 75975-X Gate Arm Support Spreader
- 75986 Ratchet Wheel Holder
- 75977-X Gate Arm Holder

SERVICE NOTES

