STUDENT HANDOUT

PROCEDURE FOR FLOW CONTROL VALVE AND DOOR CUSHIONING ADJUSTMENT

Relief valve adjustment and door cylinder rod length adjustment must be correct to get the proper results from the following procedure.

1. Close the doors.

2. Raise platform to a working height.

3. Open the balancing valves wide.

4. Back off the cushioning adjustment needle four turns.

5. Remove the acorn nut and loosen the stem lock nut.

6. Turn the stem down until it seats; then back off three turns and tighten the lock nut.

7. Loosen the lock nut on the needle and turn the needle down until the top of the needle is flush with the locknut.

8. Turn the needle out two turns and tighten the locknut.

9. Operate the doors while checking the timing of each sequence. 10 seconds open; 8 seconds closed.

   NOTE: The timing relays must be properly adjusted before overall door timing can be adjusted correctly.

   If one door leads in closing, close the balancing valve on the fast door and back out one and one-half turns. Adjust this valve until the doors close together.

10. If doors do not close fast enough the #1 Pump and Pressure Relief Valve should be checked as outlined in "PROCEDURE FOR ADJUSTING PRESSURE RELIEF VALVES AND CHECKING PUMP FAILURE."

11. Adjust opening speed of doors with needle (inner spindle) until time requirements are met.

    NOTE: The flow control valves on the same door must be set alike.

12. Turn the cushioning needles in (keep the bevel facing the head end of the cylinder if it is H.P.M. cylinder) until excessive slam is eliminated when doors reach their stops.

STUDENT HANDOUT

PROCEDURE FOR ADJUSTING DOOR CYLINDERS ROD LENGTH

1. Start with doors open.

2. Raise elevator to working height.

3. Remove pin from bearing block of cylinders.

4. Install jumper across terminals 10 and 38 in relay control cabint or move 5 or 6LS away from its cam so switch is not operated.

5. Energize the "Doors Open" circuit to bottom the door cylinders. (Run motor 10 seconds)

6. Turn off all power to elevator.

7. Turn the bearing block to align the hole in the block and the hole in the linkage and insert the pin.

8. Remove the pin and turn the bearing block $2\frac{1}{2}$ turns counter clockwise. (Lengthen the piston rod)

8a. Maintain this adjusted length.

9. Remove the pin that connects the long and short operating linkage arms.

10. Re-connect the door operating cylinder.

11. Open the top bleeder valve;using the short arm linkage as a lever retract the cylinder enough to reconnect the linkage.

12. Reconnect the operating linkage and close the bleeder valve.

13. Remove jumper or reset 5 or 6LS.

STUDENT HANDOUT

PROCEDURE FOR REBUILDING HPM DOOR CYLINDERS

USING CUP REPLACEMENT KIT NE-11343

1. These instructions and the kit furnished as described below are to be used for replacing the piston cups in HPM 5" hydraulic cylinders. This kit should be used for either cylinders NE-40305 and NE-40306 furnished with the NIKE Elevator units with the following serial numbers (check Power Unit rameplate):

Serial No. 11720-1 thru 11720-25
" " 11745-1 thru 11745-100
" " 1000 thru 1202

or for cylinders NE-40311 and NE-40312 furnished with the units with serial numbers 1203 thru 1262.

2. This kit contains the following:

2 each NE-10971 Cup Packing, Impregnated Leather
2 each NE-11101-Ring
2 each NE-10996 Gasket, Copper-Asbestos

Note that after the cups are replaced in the cylinder as specified in these instructions, either two O-rings or two gaskets will be left over depending on which type of cylinder was repaired. These parts can be saved for future maintenance.

3. In following these instructions, refer to Fig. 35 in the NIKE Elevator Technical Manual (dated 4 Feb 55) (with red cover). Cylinders NE-40305 and NE-40306 are identical to the one shown in Fig. 35. Cylinders NE-40311 and NE-40312 are similar but they are furnished with different cylinder end caps (Items 25 and 34) designed to provide for an O ring between the cover caps and the outside diameter of the cylinder tube. On cylinders NE-40311 and NE-40312, the outside diameters of the cylinder tubes at the ends are machined to a smooth finish to mate with the cover caps and O-rings.

4. With doors open but propped out to provide working space, disconnect and remove the 5" hydraulic cylinders from the door operating linkage.

5. For making this modification, the cylinders should be removed to an area where a work bench, vice and tools are available and which is free from dirt and dust. Completely disassemble the cylinder and clean all parts.

6. Loosen and remove the nuts from one end of the four tie rods (Item 31). Remove the head and cylinder cover (item 34). Remove the cylinder tube (Item 32) from the piston assembly.

(2) Install the new O-ring NE-11101 (provided with this kit) into the O-ring groove on each end cover cap. To hold the O-ring in place while the rest of the cylinder is being assembl d, it will be found helpful to stick the O-ring in place with a small amount of heavy grease (free of dirt). Care should be observed in the handling of the O-ring, that it is not cut or scratched. Inspect the O-ring before installation to be sure that it is free of cuts and scratches.

(3) Reassemble the end caps, cylinder tube and the piston and rod assembly with the four tie rods. Before inserting the piston assembly into the cylinder, it may be found helpful to apply some dirt free grease to the piston assembly. Inspect the cylinder tube ends and remove any burrs or cuts that may exist so that the new O-ring will not be damaged in assembly. Some additional grease applied to the O-ring will ease the assembly of the cylinder tube into each cylinder cover. Reasonable care should be observed in this assembly operation. Before starting to tighten the rods, check to see that the end caps are positioned properly to make a right or left hand cylinder as required (see note at bottom of Fig. 35). Until it is certain that the assembly has gone together properly, tighten the nuts evenly only by hand. Check end caps for alignment.

10. Before the final tightening of the tie rods, obtain a torque wrench (calibrated to 100 ft/lbs.). Start to tighten each rod in small increments, proceeding from one rod to the next. It is important that the rods be tightened evenly. In the final tightening, using the torque wrench, each nut shall be tightened to 100 ft/lb torque. This is extremely important to insure that the cylinders will be free from leakage in the future.

11. If, prior to removing the cylinder from the door linkage, there was evidence of leakage from around the rod packing, this would indicate worn chevron packings. This is the time to replace that packing with new chevrons. Extreme care must be used when installing the packing to avoid damaging it. Install packing one ring at a time and oil each ring. Tighten only hand tight until after several cycles of operation.

12. If a high pressurehand pump is available, it would be advisable to test this repaired cylinder assembly prior to re-installing it into the door linkage. A test pressure of 1500 psi should be satisfactory. In no case should the test pressure exceed 2000 psi. No external leakage should be observed from between the end caps and the cylinder tube. If leakage should be observed, it would probably indicate insufficient tightening of the tie rods or improper installation of the copper gasket (cylinders NE-40305 and NE-40306) or that the O-ring was damaged during assembly (cylinders NE-40311 and NE-40312).

13. Careful and conscientious following of these instructions is extremely important and should insure future satisfactory door operation and leak and trouble free cylinder performance.

14. The cylinder should now be reinstalled. Clean and grease all pins and bearings. Use extreme care in cleaning pipe unions. Make proper rod length adjustment; bleed the cylinder and adjust cushioning to correspond with the other cylinders.

STUDENT HANDOUT

ATKOMATIC VALVE ADJUSTMENT PROCEDURE

To achieve maximum efficiency and dependability, and allow the power unit to perform smoothly, without inducing shock or heavy loads on the pumps, motors and associated equipment, the valves must be properly adjusted. To do this effectively the following step by step procedure should be followed:

1. Close off the hand valve between solenoid valve SA1 and the tank. This step is necessary to eliminate any possible flow through SA1 valve while adjusting S5 valve.

2. Seat the SB and S6 pilot adjusting screws. This will allow maximum flow through the main body of these valves and reduce any restriction at those points to a minimum.

S5 Valve: Seat the adjusting screw on S5 valve and back out $\frac{1}{4}$ turn. Start #1 Pump by activating the "Up" control button. Observe when the elevator begins moving upward. There should be a very slight time lag between the time #1 Motor shifts to "run" and the elevator starts to rise under the influence of #1 Pump. Adjustments to S5 valve should be made in increments of 1/8 turn, on the pilot adjusting screw, until above operation is obtained. Any further adjustment in a CCW direction will only impose excessive starting load on the pumps and motors by restricting flow through the main body of the valve.

SB Valve: Back off the pilot valve adjusting screw to $\frac{1}{4}$ turn from its seat. Press "Doors Close" button observing when doors begin to close. As with S5 valve, there should be a very slight time lag between the time #1 Motor shifts to "run" and the doors begin to close. Doors should start off smoothly from their wide open position with virtually no shock imposed on the system. Adjustments to SB valve are made in increments of 1/8 turn until above operation is obtained. Any further adjustment in a CCW direction will only impose excessive starting load on the pumps and motors by restricting flow through the main body of the valve.

S6 Valve: The only positive method of securing the proper adjustment on the S6 valve is by the use of an ammeter on the #1 Motor circuit. This insures that the valve is not imposing a heavy load on the pump and motor by restricting flow through the main body of the valve, and still is within its operating range. While using an ammeter on the #1 Motor, back off the adjusting screw on S6 valve until the current on #1 Motor begins to rise sharply. The point where the current begins its sharp rise is the proper adjustment on S6 valve. The ammeter should read between 45 and 48 amperes with both pumps delivering their flow to the elevator. If the current on #1 Motor is over 50 amps when both pumps are delivering their flow to the elevator, a thorough investigation should be made to determine the cause.

SA1 Valve: Open the hand valve between solenoid SA1 and the tank. This valve is adjusted in exactly the same manner as was the S5 valve. (Do not disturb previous adjustments to SB, S5 and S6.)

SA2 Valve: This valve should be adjusted in exactly the same manner as outlined in S5 adjusting procedure except that #2 Pump and Motor are now concerned.

S3 Valve: Set pilot valve adjusting screw to a $\frac{1}{2}$ turn from its seat. Raise elevator to a point six (6) feet above the magazine level. Momentarily depress stop button, observing drift of elevator when stop button is released. Ideal operation of S3 valve is a compromise between excessive drift and violent closing of the valve (evidenced by shock and hydraulic hammer) when the "Stop" button is released. Adjustments should be made in increments of 1/8 turn on the pilot adjusting screw. The manual throttling valve must be wide open during adjusting procedure. If the valve has been properly adjusted, the valve will close with very little shock induced in the system and only slight drift when the stop button is released.

S4 Valve: Set the pilot valve adjusting screw to $1\frac{1}{2}$ turns from its seat. Be sure the throttling valve is wide open and left in that position. Time the elevator through its lowering cycle. Adjust the pilot valve adjusting screw to allow the platform to lower from the locking bars to the pedestals in 32 seconds from the time the "Down" control button is activated.

STUDENT HANDOUT

ADJUSTING ROD LENGTH OF LOCKING BAR CYLINDERS

1. Start with doors closed.
2. Raise elevator to a working height.
3. Turn off all power to the elevator.
4. Remove bolt from rod end of cylinder.
5. Reassemble the linkage without the short spacers leaving the cylinder free.
6. Push locking bars back and lock the operating linkages over center, against their stops.
7. Bottom the locking bar cylinders by manually shifting the 4-way valve.
8. Turn the eye of the cylinder until the bolt can be inserted through the linkage and the eye of the cylinder.
9. Shorten the piston rod by turning the eye clockwise two complete turns. Maintain this adjusted cylinder length.
10. Open bleeder ports and manually extend cylinder.
11. Assemble linkage.

NOTE: Locking bar limit switch adjustment should follow this procedure.

STUDENT HANDOUT

ADJUSTMENT OF LOCKING BAR LIMIT SWITCHES

1. Start with Doors Closed.

2. Raise elevator to a working height.

3. Turn off all power to elevator.

4. Adjust angle of arm on limit switch.

   a. On limit switches that ride top of cam (9 thru 12 LS) the arm will normally angle downward (30°) and will operate when arm reaches the horizontal.

   b. On limit switches that ride under the cam (13 thru 16 LS) the arm will normally angle upward (30°) and will operate when arm reaches the horizontal.

5. With locking bars fully retracted and <u>locked over center</u> adjust switches as follows:

   a. On switches that ride above the cam (9 thru 12 LS) adjust so that switches will have 1/16" free travel after they have operated on the return stroke of operating arm.

   b. On switches that ride under the cam (13 thru 16 LS) adjust by moving switch upward, with arm riding its cam, until the switch operates plus 1/16".

6. After switches have been adjusted securely tighten all limit switch mounting bracket bolts.

7. Repeat on remaining locking bar limit switches.

8. Check switch adjustments by operating elevator through several cycles.

NOTE: Locking bar cylinder rod length adjustment is a prerequisite for this procedure.

STUDENT HANDOUT

INSTALLATION INSTRUCTIONS

Equalizer Cable Sheave Assembly Modification Kit NE-11372

1. This kit contains the following parts for modifying four equalizer cable sheave assemblies on Nike elevators, Types B, B-3, and C:

4 each	NE-11010, Cable Retainer
4 each	NE-11011, Sheave Pin Assembly
8 each	NE-11013, Cotter Pin

2. The purpose of this kit is to provide a means of lubricating the sheave and pin assembly, to prevent the pin from turning within the assembly, and to prevent the possibility of a cable slipping out of its sheave groove.

3. Stop the platform at some convenient intermediate position for working on the equalizer cables and sheave assemblies.

4. Disconnect one end of each cable on one side of the platform only. This is important so that the platform is maintained level by the two cables on the other side of the platform, while this work is taking place. Remove these cables from the two sheaves.

5. On one of these sheave assemblies, remove the two existing cotter pins NE-1155 and disassemble the sheave NE-30005 and sheave pin NE-10062 (See Figure 75, Nike Elevator Manual). Now assemble (as shown in attached Figure 87) sheave NE-30005 and the new cable retainer, NE-11010 (supplied with this kit) in place, using pin assembly NE-11011 and cotter pins NE-11013 (both supplied with this kit). Note that to make this assembly, it will be necessary to first slip the cable retainer into place, engaging the projection on the side of the sheave bracket into the slot on the cable retainer. Now holding the retainer in place, start to insert the grease fitting end of the pin thru the cable retainer and sheave bracket on the opposite side from that with the projection. Slip the sheave into place and continue to push the pin thru the whole assembly until the flat on the pin engages into the flat on the cable retainer. Now install the cotter pins.

6. Using a grease gun, with a suitable fitting for the fitting on the sheave pin, lubricate the sheave and pin assembly with a good grade of grease, such as Lubriplate or equivalent.

7. Repeat "5" and "6" above for the sheave assembly on the opposite end of the platform.

8. Reinstall and adjust the two cables on this side of the platform.

9. Now repeat "4" thru "8" above for the opposite side of the platform.

10. Lubricate each pin assembly regularly following this installation, at least once a month.

PROCEDURE FOR SHIMMING

GUIDE ROLLER ASSEMBLY

1. PREREQUISITES

   a. Bolsters have been shimmed on vertical face according to recommended procedure.

   b. The guide rail is plumb

2. MATERIALS

   a. Shims, Caster Bracket Assembly
      (1) Lower - NE-10470 and NE-10471 (as req.)
      (2) Upper - NE-10472 and NE-10473 (as req.)

   b. Shims, Guide Roller Assembly
      NE-10474 and NE-10475 (as req.)

3. PROCEDURE

   a. Shim Caster Bracket Assembly
      (1) Remove at least 1/4 inch of shims from each of the eight guide rollers.
      (2) Place the elevator on the locking bars.
      (3) Align vertex of guide rollers with vertex of guide rail by inserting or removing shims behind the guide roller brackets.
      (4) Shim guide rollers to 1/16 inch clearance from guide rails.
      (5) Lower elevator and tighten all bolts.
      (6) Place elevator on locking bars and check adjustments. Make any necessary corrections as outlined above.

   b. The elevator should now settle evenly on each end. If the elevator does not settle on both ends simultaneously, the equalizer cables must be adjusted according to the recommended procedure.

   c. Adjust the pedestals so that the elevator settles onto all four at the same time.

ELECTRICAL SCHEMATIC DIAGRAM

M.028-20 (1-57)

1. WHAT IS A SCHEMATIC DIAGRAM? a wire diagram.

2. HOW ARE CONTACTS REVERSED IN A: mechanical movement of the lever arm

   a. Limit Switch

   b. Control Relay energized electricity

   c. Timing Relay energized electricaly - reversed by timing.

3. SYMBOL REPRESENTATIONS ON "ELEVATOR WIRING DIAGRAM"

a.  Relay Coil

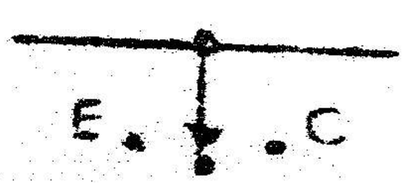
b.  Contacts open

c.  Contacts Closed

d.  Valve Solenoid

e.  Push Button switch

f.  Selector switch

g. 

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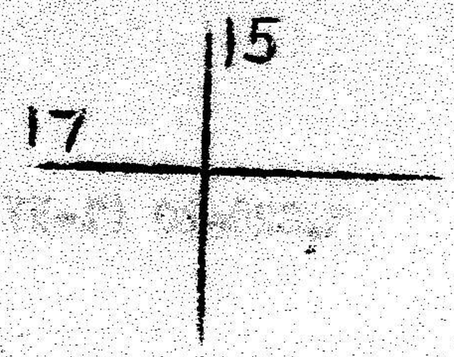
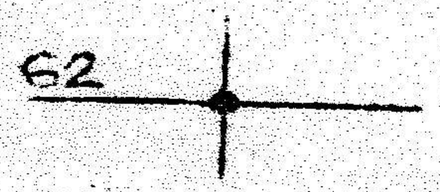
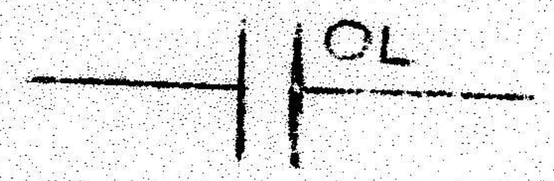
h. 

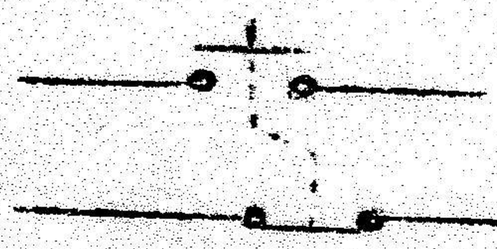
not connected

i. 

Connected

j. 

overload contacts

k. 
double push button mechanical control

4. POSITION OF ELEVATOR WHEN LIMIT SWITCHES ARE ON THE CAM & FUNCTION OF EACH LS

a. 17 LS upper limit stops elevator up. #1 mot.

b. 18 LS Slows Down ~~energize S3~~ de-energize S-4

c. 19 LS slows up #2 mot.

d. 20 LS floor level leveling

e. 21 LS Premission what?

f. 22 LS Preventive what?

field in #2 & 3 [illegible]

5. POSITION OF DOORS WHEN DOOR LIMIT SWITCHES ARE ON THE CAM & FUNCTION OF EACH LS

a. 5 LS & 6 LS Door open so what?

b. 1 LS & 2 LS Door motor shutoff ?

"DOOR CLOSE CIRCUIT"
in
Master Station

1. TO CLOSE DOORS

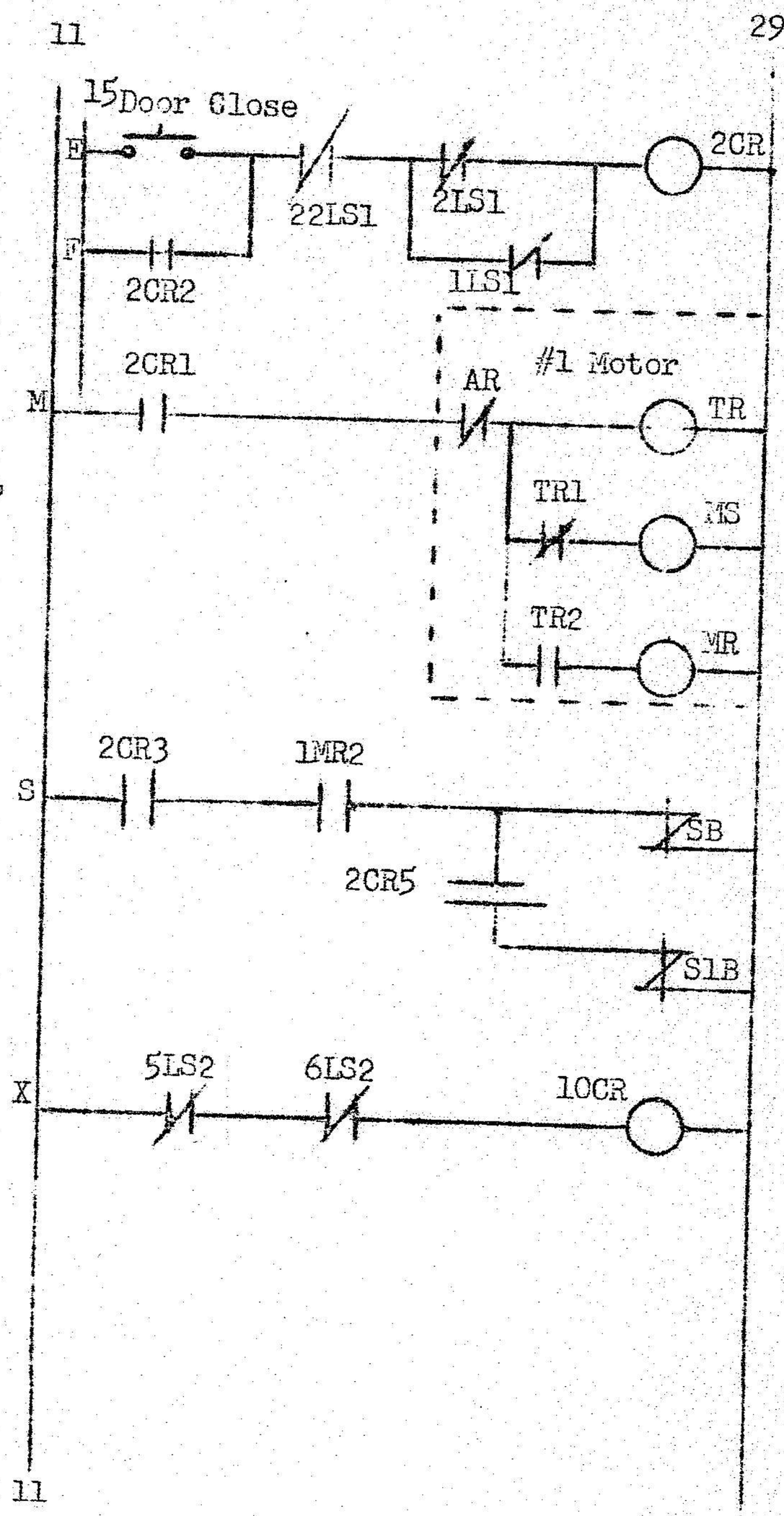
a. Pressing door close button will:
   (1) pick up 2CR relay
   (2) start #1 Motor thru 2CR1

b. When motor #1 switches to the run 1MR2 closes and:
   (1) SB & S1B are energized
   (2) Doors start to close; 5LS & 6LS are released
   (3) 10CR drops out

c. Doors continue to close and when both doors are fully closed, 1LS1 & 2LS1 open and:
   (1) 2CR de-energized
   (2) 2CR1 stops #1 motor
   (3) 2CR3 de-energizes SB & S1B valve
   (4) Equipment comes to rest

NOTE: As soon as either door starts to close 10CR is dropped out by 5LS2 or 6LS2

NOTE: 4CR is the only relay that is now picked up



"DOOR OPEN CIRCUIT"

IN

M.028-21 (1-57)

Master Station

(Button is not pushed on this Dwg)

1. TO OPEN DOORS

a. Press "OPEN" Button
   (1) 1CR & 1TR Energized
   (2) Rings Gong
   (3) Start Motor #1

b. Valves SB & S1A are energized after 5 Sec thru (1TR2)

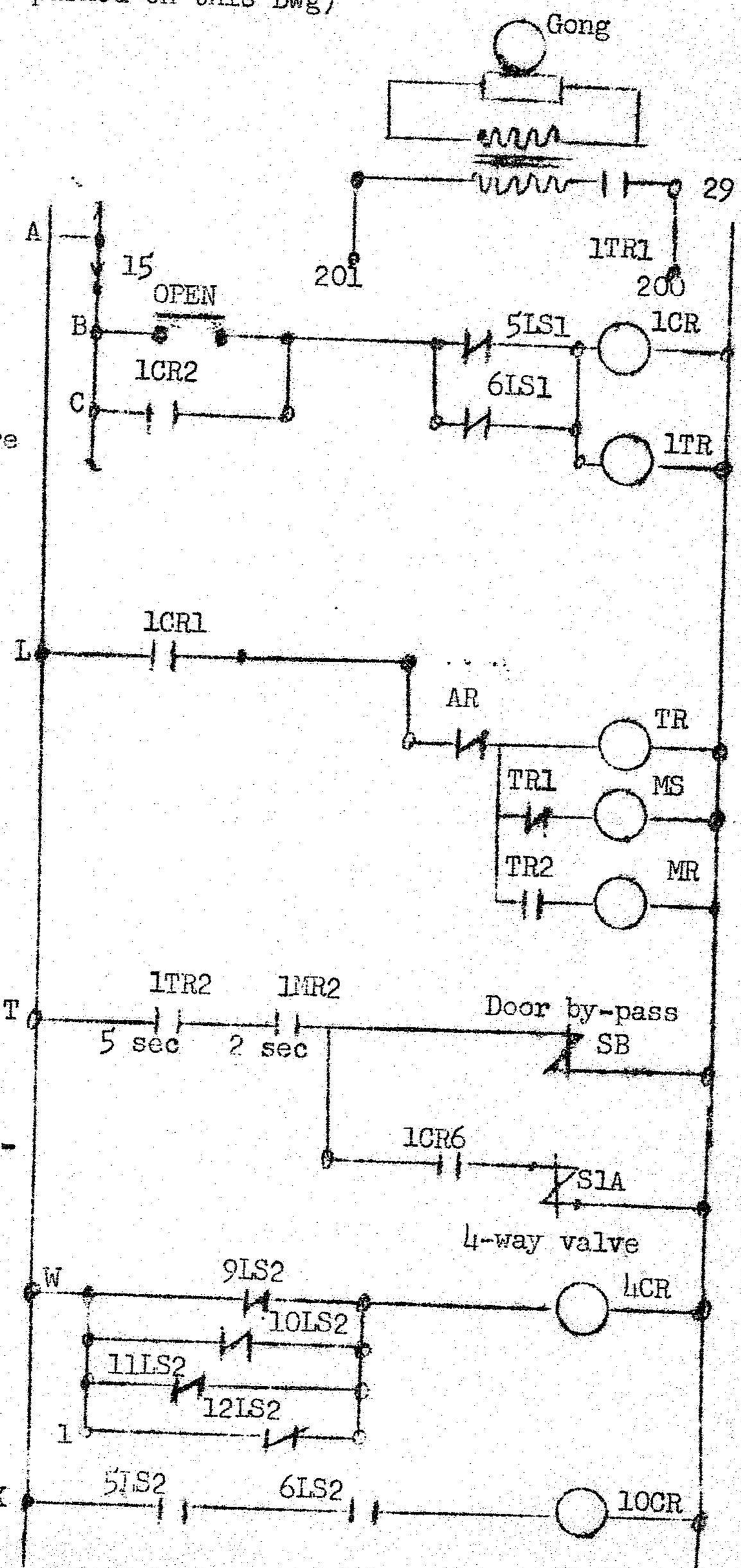
c. Limit switches 1LS1 & 2LS1 are released

d. When doors are fully opened, 5LS & 6LS are depressed and:
   (1) 1CR & 1TR drop out
   (2) Motor #1 stops
   (3) Gong stops ringing
   (4) Valves SB & S1A are de-energized
   (5) Equip at rest

(4CR & 10CR are still picked up)

NOTE: 4CR is picked up when the power is turned on

NOTE: 10CR is picked up when both doors are completely open. This will enable the elevator to rise above intermediate position.

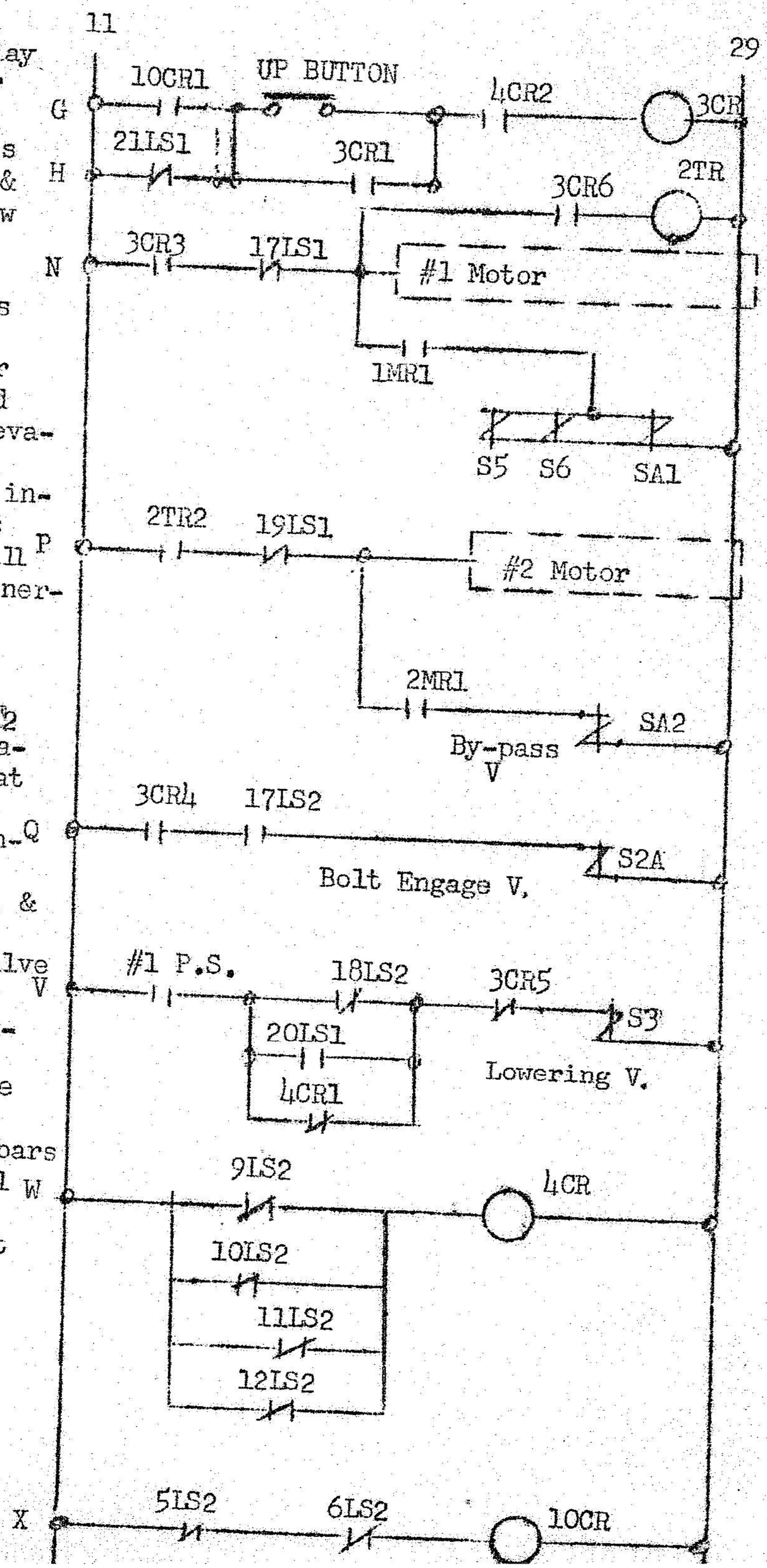


"ELEVATOR UP CIRCUIT"
in
Master Station
(with doors open, Elevator on pedestals)
(Button has not been pushed on this Dwg)

M.028-25

1. TO RAISE ELEVATOR
   a. Press "UP" button
      (1) Will pick up 3CR relay
      (2) 3CR3 starts #1 Motor
      (3) 3CR6 picks up 2TR
   b. When 1MR1 picks up, valves S5,S6,&SA1 are energized & the elevator rises at slow speed
   c. 2TR2 starts #2 Motor two seconds after motor #1 has started
   d. Two seconds after #2 Motor starts valve SA2 is closed thru 2MR1 contact, and elevator rises at full speed
   e. When elevator rises above intermediate level, 21LS1 is opened but current can still come thru 10CR1 to still energize 3CR relay
   f. When Elevator reaches the upper slow down (19LS) the #2 Motor is stopped and SA2 is de-energized. The elevator will continue to rise at slow speed.
   g. Upper limit switch 17LS contacts cam and:
      (1) Motor #1 stops, S5,S6, & SA1 de-energized
      (2) 17LS2 energizes S2A valve to engage locking bars
      (3) When all bolts have engaged fully 4CR drops out which will energize S3 valve and elevator will level on locking bars
      (4) #1 pressure switch will de-energize valve S3
      (5) Equipment comes to rest

NOTE: Relay 10CR is left energized



a. Pressing down button will:
   (1) Pick up 5CR relay
   (2) Start #1 Motor thru 5CR3
   (3) Locking bar retract valve S2B is energized thru 5CR4 & 6CR2

b. After two sec. 1MR1 closes and energizes S5,S6,&SA1 valves. The elevator begins to rise and the locking bars start to retract. Relay 4CR is picked up.

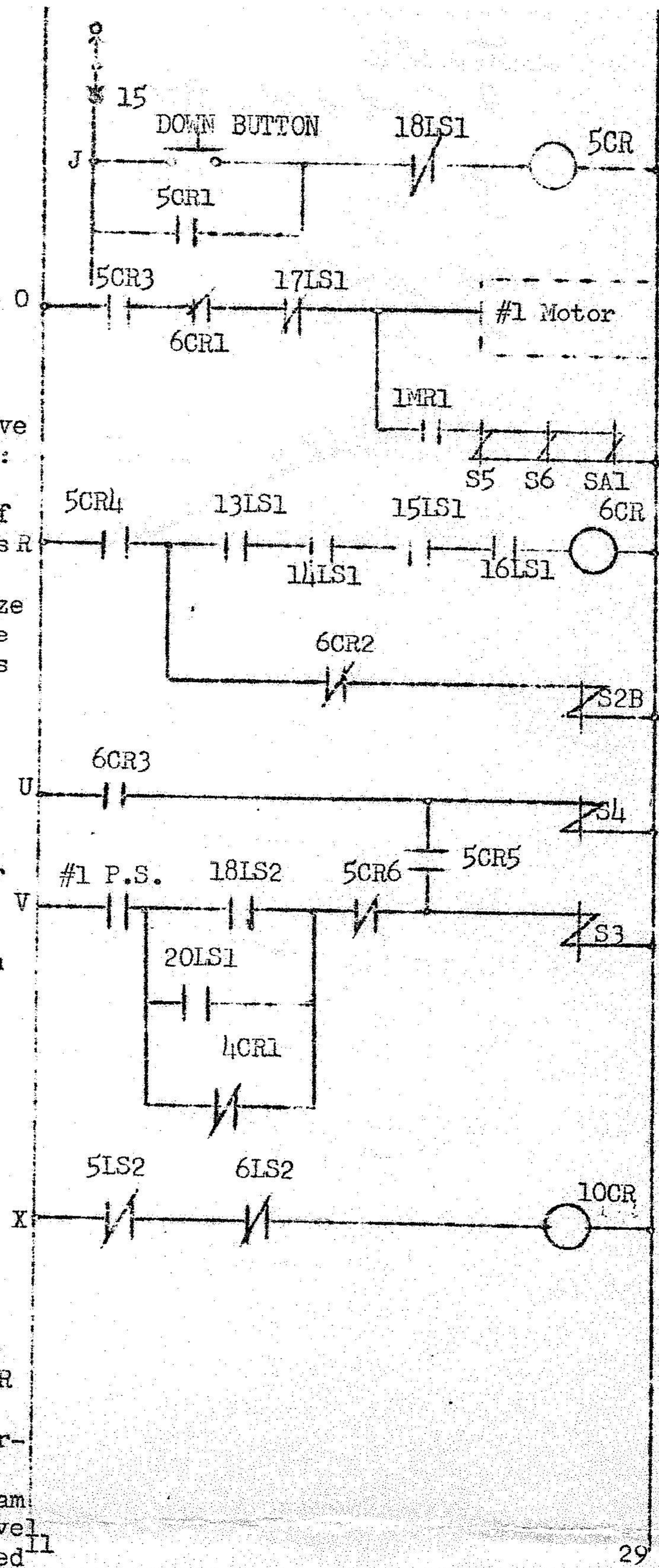
c. When all of the locking bars have retracted, 6CR is picked up and:
   (1) Motor #1 stops: 17LS1 will stop #1 motor if reached before locking bars retract.
   (2) Valves S5,S6,&SA1 de-energize
   (3) 6CR2 de-energizes S2B valve
   (4) 6CR3 energizes S3&S4 valves

d. Elevator now lowers at full speed until lower slow down 18LS1 cuts out 5CR relay and:
   (1) 5CR4 cuts out 6CR relay
   (2) 6CR3 de-energizes S4 valve
   (3) 18LS2 keeps S3 valve energized to level the elevator to the pedestals

e. When the pressure decreases to approx 75 P.S.I. pressure switch #1 opens and:
   (1) S3 valve de-energized
   (2) Equipment comes to rest

NOTE: 4CR & 10CR are still energized

NOTE: Pressing stop button slightly above floor level will:
   (1) Drop out 4CR,5CR,6CR and 10CR
   (2) When stop button is released,4CR and 10CR are picked up.
   (3) S3 valve will be energized thru 20LS1 which is now on thecam and elevator will level until 20LS is released from cam. *this cam is set so that the elevator will be at floor level when released.



"ELEVATOR DOWN CIRCUIT"
in
Master Station
Elevator on Locking Bars

1. TO LOWER ELEVATOR:

a. Pressing down button will:
   (1) Pick up 5CR relay
   (2) Start #1 Motor thru 5CR3
   (3) Locking bar retract valve S2B is energized thru 5CR4 & 6CR2

b. After two sec. 1MR1 closes and energizes S5,S6,&SA1 valves. The elevator begins to rise and the locking bars start to retract. Relay 4CR is picked up.

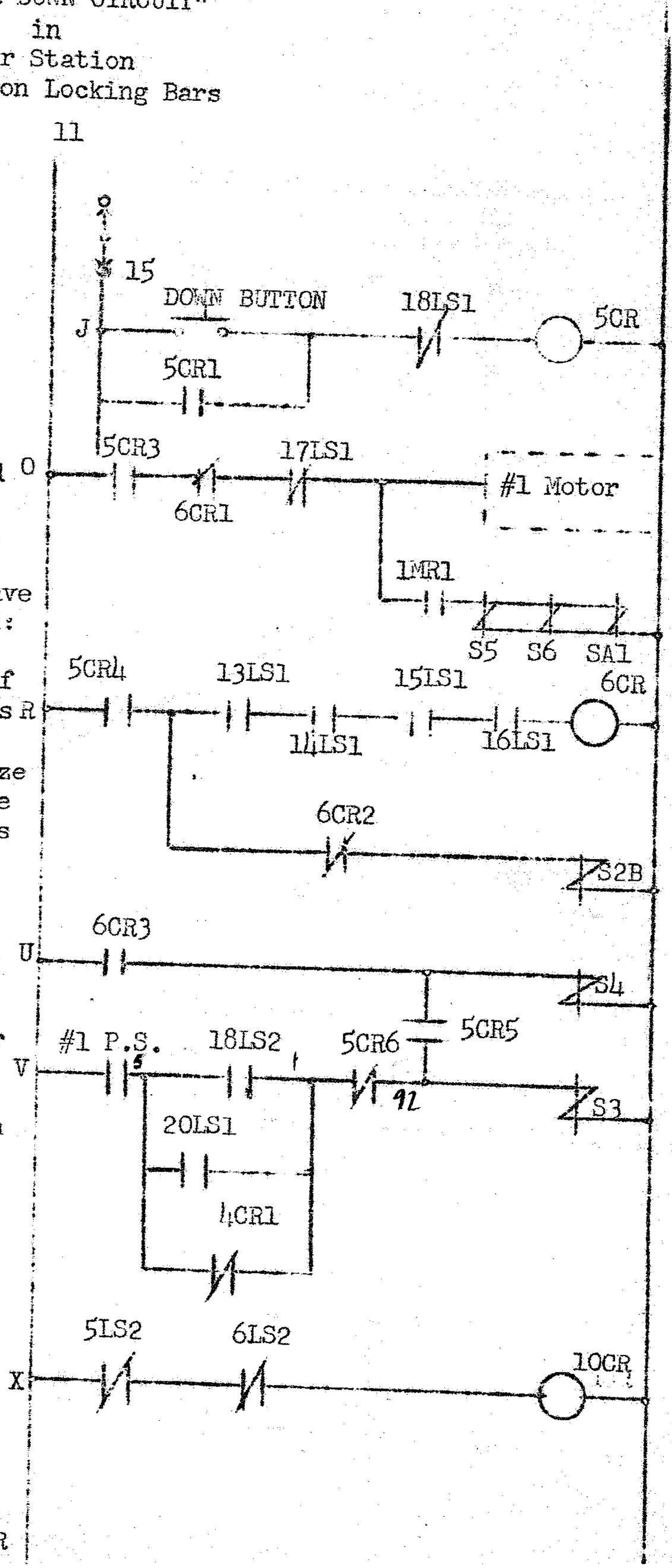
c. When all of the locking bars have retracted, 6CR is picked up and:
   (1) Motor #1 stops:
   17LS1 will stop #1 motor if reached before locking bars retract.
   (2) Valves S5,S6,&SA1 de-energize
   (3) 6CR2 de-energizes S2B valve
   (4) 6CR3 energizes S3&S4 valves

d. Elevator now lowers at full speed until lower slow down 18LS1 cuts out 5CR relay and:
   (1) 5CR4 cuts out 6CR relay
   (2) 6CR3 de-energizes S4 valve
   (3) 18LS2 keeps S3 valve energized to level the elevator to the pedestals

e. When the pressure decreases to approx 75 P.S.I. pressure switch #1 opens and:
   (1) S3 valve de-energized
   (2) Equipment comes to rest

NOTE: 4CR & 10CR are still energized

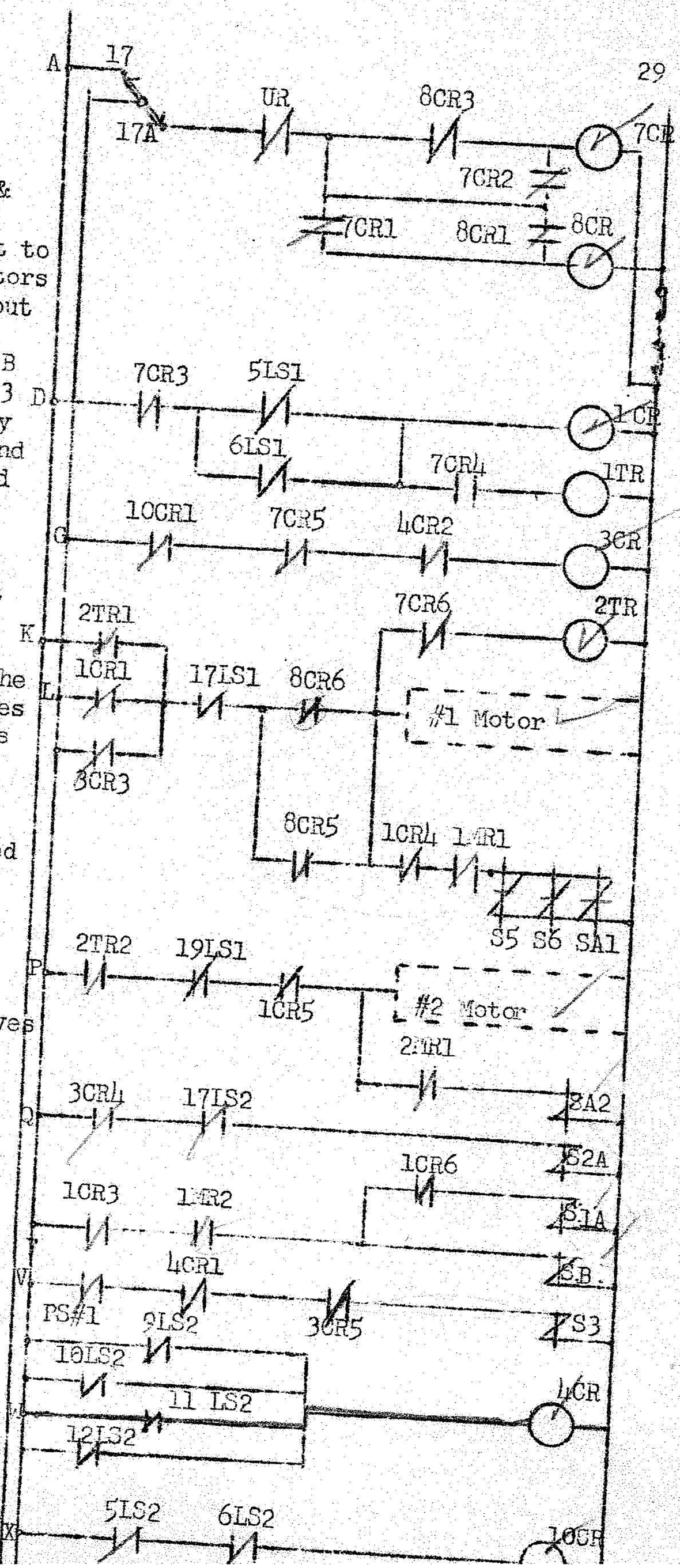
NOTE: Pressing stop button slightly above floor level will:
   (1) Drop out 4CR,5CR,6CR and 10CR
   (2) When stop button is released,4CR and 10CR are picked up



- TO OPEN DOORS & RAISE ELEVATOR
  - a. Switching "UP"switch will:
    - (1) Pick up 7CR
    - (2) 7CR1 picks up 8CR
    - (3) 7CR3 picks up 1CR
    - (4) 1CR1 picks up #1 motor & 2 TR (thru 7CR6)
    - (5) 2TR1 will enable current to by-pass 1CR1 to keep motors running when 1CR drops out
  - b. After two seconds:
    - (1) 1MR2 closes and valves SB and S1A pick up thru 1CR3
  - c. Doors start to open, when they have both fully opened 5LS1 and 6LS1 drop out 1CR and 5LS2 and 6LS2 pick up 10CR and:
    - (1) 10CR1 picks up 3CR
    - (2) 1CR4 picks up S5,S6,&SA1 and the elevator rises at slow speed.
    - (3) 1CR5 picks up, Motor #2 starts, 2 seconds after the #2 motor starts it switches to run. 2MR1 closes picks up SA2 the elevator rises at full speed.
  - d. Elevator will rise at full speed until 19LS is contacted by cam. 19LS1 opens and #2 motor stops.
  - e. Elevator will rise slow until 17LS is contacted by cam then:
    - (1) #1 motor stops
    - (2) De-energize S5,S6,&SA1 valves
    - (3) Drop out 2TR
    - (4) 17LS2 will energize S2A valve
  - f. When all locking bars have engaged:
    - (1) 4CR drops out
    - (2) S3 valve energized thru 4CR1 and elevator levels to locking bars
  - g. #1 pressure switch de-energizes S3 valve
  - h. Elevator comes to rest

NOTE: When 4CR dropped out 3CR was de-energized by 4CR2.

NOTE: 10CR is left energized, and console relays - 7CR & 8CR are also energized.



"DOWN REMOTE"

Console Operation

M.028-29

(Toggle switch has not been switched on this Dwg)

1. TO LOWER ELEVATOR & CLOSE DOORS

a. Switch remote button to down will:
   (1) Pick up 9CR thru 8CR4
   (2) 9CR1 will pick up 8CR
   (3) 9CR3 will pick up 5CR
   (4) 5CR3 will start #1 Motor
   (5) 5CR4 energizes locking bar Ret V.S2B

b. After 2 Sec 1MR1 will energize S5,S6,&SA1 valves and the elevator starts to rise and the bolts retract simultaneously.

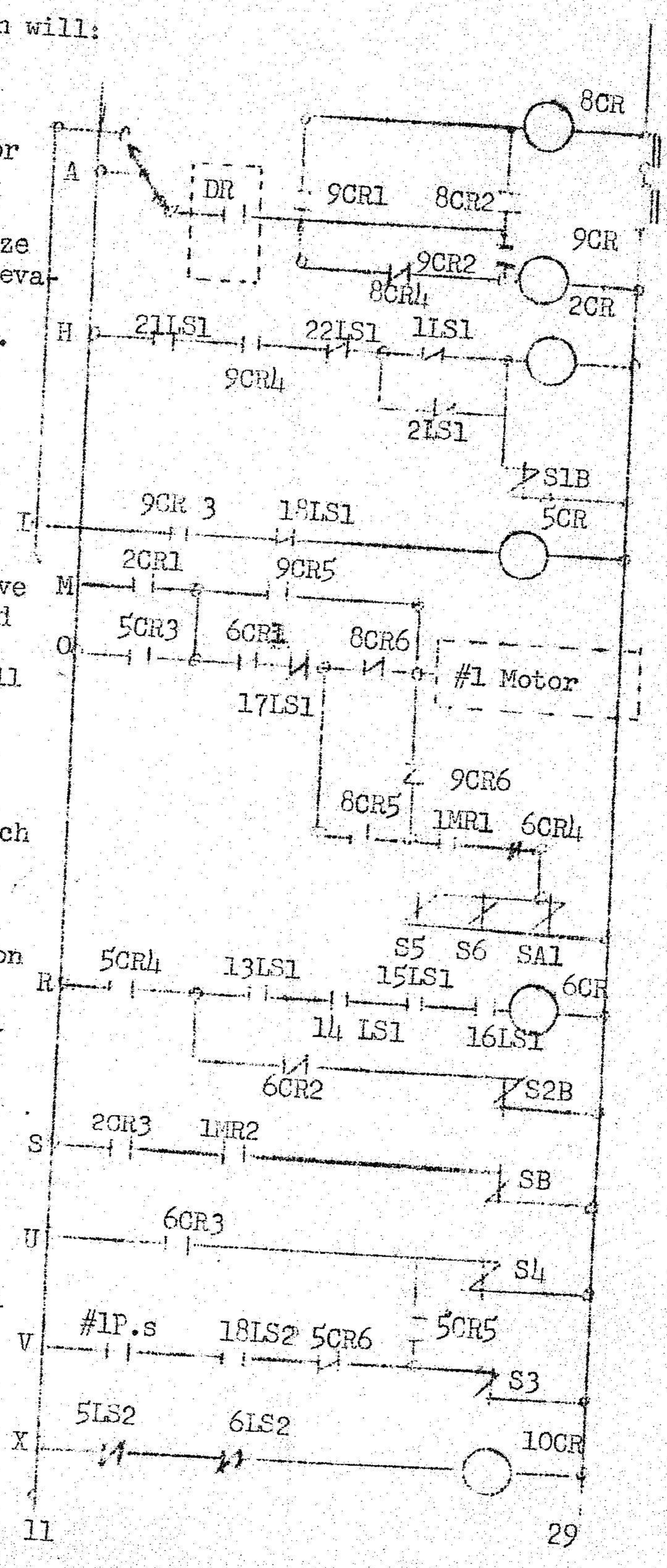
c. When all of the locking bars have retracted:
   (1) 6CR is picked up
   (2) 6CR1 &6CR4 open which drops out S5,S6,&SA1
   (3) 6CR2 de-energizes S2B valve
   (4) 6CR3 will energize S4 valve
   (5) Valve S3 is also energized thru 6CR3 and 5CR5

e. Elevator will now lower at full speed until 18LS is depressed and 18LS1 will:
   (1) Cut out 5CR
   (2) 5CR4 cuts out 6CR
   (3) 6CR3 cuts out S4 valve which slows the lowering of the Elev
   (4) Elevator will continue to level thru 18LS2 and rest on pedestals
   (5) When the pressure switch #1 opens S3 valve is de-energized

f. When 21LS1 was depressed above intermediate level, 2CR and S1B valve were picked up which will: (1) 2CR3 will energize SB valve
   (2) Doors will start to close

g. When doors are fully closed 11LS1 and 2LS1 will cut out 2CR & SIB v. which will:
   (1) Stop #1 motor
   (2) 2CR3 will de-energize SB valve

h. Equipment comes to rest



NOTE: The function of the 9CR5 contact is to keep the motor #1 running when 17LS1 or 6CR1

NOTE: The 9CR6 contact is

LIMIT SWITCHES

M.028-19 (1-57)

1. Symbols

2.

	SWITCH LOCATION	CAM AND LOCATION	FUNCTION IN CKT.
1, 2 LS	ON BUMPER		Doors close offmotor
5, 6 LS			Doors open offmotor
9, 10, 11, 12 LS	Beside Locking Bar	ON Locking Bar Linkage	Locking Bars engaged
13, 14, 15, 16 LS	Beside Locking Bar	Locking Bar Linkage	Locking Bars retracted
17 LS	top Rear of Elevator	rear of Elevator	Upper Limit
18 LS	Rear of elevator	rear of elevator	Slowdown
19 LS	under 17	rear of Floor	Stop
20 LS	front of elevator	left side rail	Leveling upper level
21 LS	rear of elevator	Right side rail	Preventive
22 LS	rear of elevator	Right side rail	Preventive

3. Description of Operation

   a. Lever Arm (incl Adjustments)

   b. Contacts

4. Maintenance

   a. Housing

6. POSITION OF LOCKING BARS WHEN LOCKING BAR LIMIT SWITCHES ARE TRIPPED AND FUNCTION OF EACH L S

a. 9 LS Thru 12 LS Locking bars engaged - limited to L-B

b. 13 LS Thru 16 LS Locking bars retracted - shut of motor & LOWERING

7. HOT LINES WHEN SELECTOR SWITCH IS ON:

a. Elevator Station

b. Master Station

c. Console Station

8. SAMPLE CIRCUIT

DOOR SEQUENCE

M.028-21 (1-57)

1. HYDRAULIC SEQUENCE FOR DOORS OPEN

a. How Long is Oil By-passed Back to Tank? 5 sec.

b. When Does the Motor Switch to The Run Position?

c. What Valves are Used to Open The Door? SB & S1A

(1)

(2)

d. What is the Time For a Doors Open Sequence? 11 sec.

2. ELECTRICAL SEQUENCE FOR DOORS OPEN

a. What CR is Energized when the Doors open Button is Pushed?
1CR

b. What Relay Causes Gong to Ring? 1HR

c. What L.S.'s De-Energize the Circuit When The Doors are Fully Open? - 5 & 6

3. HYDRAULIC SEQUENCE FOR DOORS CLOSE

a. What Valves Are Used

(1) SB

(2) S1B

b. How Long is a Door Close Cycle? 6 sec.

4. ELECTRICAL SEQUENCE FOR DOORS CLOSE

a. What CR is Energized When the Doors Close Button is Pushed?
2CR

6. POSITION OF LOCKING BARS WHEN LOCKING BAR LIMIT SWITCHES ARE TRIPPED AND FUNCTION OF EACH L S

a. 9 LS Thru 12 LS Locking bars engaged - limits L-B

b. 13 LS Thru 16 LS Locking bars retracted - shut of motor & LOWERING

7. HOT LINES WHEN SELECTOR SWITCH IS ON:

a. Elevator Station

b. Master Station

c. Console Station

8. SAMPLE CIRCUIT

b. What L.S.'s De-energize The Circuit? - 1 & 2

c. Why are 1 LS1 and 2 LS1 Tied in Parallel?

so 2CR will not be de-energized
both doors are fully closed.

6. POSITION OF LOCKING BARS WHEN LOCKING BAR LIMIT SWITCHES ARE TRIPPED AND FUNCTION OF EACH L S

a. 9 LS Thru 12 LS Locking bars engaged - limits L-B

b. 13 LS Thru 16 LS Locking bars retracted shut off motor & LOWERING

7. HOT LINES WHEN SELECTOR SWITCH IS ON:

a. Elevator Station

b. Master Station

c. Console Station

8. SAMPLE CIRCUIT