ALLIS-CHALMERS

INSTRUCTION BOOK

TYPE "F" MOVABLE PORTION
FB-500A–FC-750A

RUPTAIR MAGNETIC POWER CIRCUIT BREAKER

AND AUXILIARY EQUIPMENT (SOLENOID OPERATOR)

September 1967

BWX 6732 OR

Book No. BWX-6700-2

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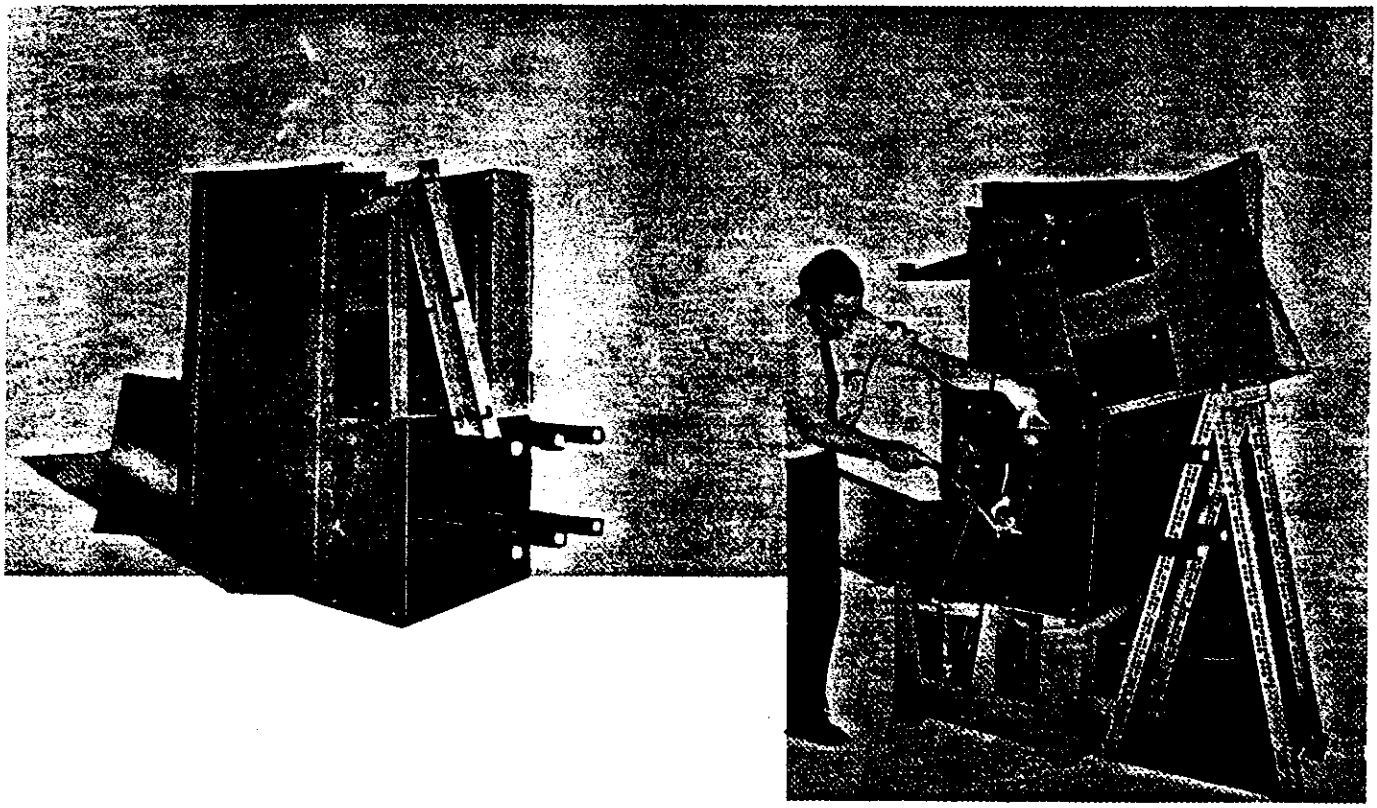

205129 Removing Phase Barriers.
Remove Channels (1), Panel (2), and slide Phase Barrier Assemblies (3) off front of breaker.

205130 Tilting Arc Chutes.
Position arc chute support; unfasten blowout coil connections and lower end of arc chute; tilt arc chutes back on supports.

With the breaker closed and armature (4-4) held with maintenance closing device against pole head (4-72), the armature must push the toggle roll (4-15) to a point which will provide a clearance of 1/64 to 3/64 with the prop latch (4-97), and 1/32 to 3/32 clearance to stop (4-59). These settings have been made at the factory and should not require readjustment. Adjustment is made by changing the effective plunger length with washers (small) (4-11) between the plunger (4-6) and the armature (4-4).

PART 4. DISCONNECT SECTION

4.1 BREAKER MECHANISM

The breaker mechanism consists essentially of movable contact arms and insulating links which connect the contact arms to the operator mechanism.

4.2 CONTACTS (Fig. 3)

The stationary contact structure of each phase is made up of two sets of contacts; main current carrying, and arcing, which are mounted on the upper bushing stud. The movable contacts are attached to contact arms that pivot from the end of the lower bushing stud. Transfer areas of current carrying contacts are silver-plated and contact surfaces are of silver-tungsten alloy. The main current carrying contacts are finger type and engage with a wiping action. The arcing contacts are butt type. All contacts are backed by steel springs giving positive contact pressure when engaged.

4.2A SERVICING CONTACTS

The frequency of contact inspection depends on the severity of service to which the breaker is subjected. There are two areas which normally require service inspection:

A. Stationary and moving main and arcing contacts. Badly pitted or burned contacts should be replaced.

B. Hinge joints. Remove the disconnect arms as a unit by removing screw (3-24), nut (3-14) and spring washers (3-23). Carefully inspect all contact surfaces. Silver washers (3-25) and adjacent surfaces should be clean and free of roughness or galling. Lubricate washers (3-25) and mating surfaces by rubbing in microfine dry graphite, used sparingly. Remove excess graphite. Reassemble, adjusting hinge joint pressure as described in Section 4.5.

4.3 BREAKER TIMING

Check the contact adjustment and breaker timing; also check adjustments of auxiliary equipment and see that it functions properly. A comparison of breaker timing at any period of maintenance with that taken when the breaker was new will immediately indicate a condition of maladjustment or friction should the timing vary more than 1/2 cycle on opening or 2 cycles on closing with the same coils. A hole is provided in the movable contact arm for the purpose of attaching a speed analyzer connection.

4.4 ARCING CONTACT HINGE JOINT (Fig. 3)

The arcing contact hinge joint is in proper adjustment when each spring washer (3-15) is deflected approximately 0.015 inches.

This adjustment is obtained by tightening nut (3-4) until all parts just touch, then tighten the nut 3/4 to 1 turn more.

4.5 CONTACT PRESSURE OF HINGE JOINT (Fig. 3)

The hinge joint contact pressure is in proper adjustment when a pull of from 5 to 7 pounds is required to move the disconnect toward the open position. This measurement is obtained as follows:

Remove pin (1-46) and detach link (1-47) from the disconnect arms (3-18) and (3-19). Move the disconnect to a position just short of "contact make." Attach a spring scale to the disconnect 10½ inches above screw (3-24), and in a direction perpendicular to the longest edge of the disconnect arm. Measure the pull to move the disconnect toward the open position.

Adjustment is made by tightening (or loosening) nut (3-14).

Before attaching link (1-47) to disconnect arms (3-18) and (3-19), check contact alignment (Section 4.6) and contact lead (Section 4.7).

4.6 CONTACT ALIGNMENT (Fig. 3)

The contacts are an integral part of the bushing assemblies and are carefully aligned with the upper and lower bushings before shipment and no further adjustment should normally be necessary.

The horizontal pairs of main contact fingers in each phase should "make" with the moving contact simultaneously. (Note: Contacts on different phases should not necessarily "make" simultaneously; they can vary as much as 1/32 inches.)

If not already detached, remove pin (1-46) and detach link (1-47) from disconnect arms (3-18) and (3-19).

Remove pin (1-46) and detach link (1-47) from disconnect arms (3-18) and (3-19) of two phases only. With the maintenance closing device, move the disconnects of the remaining phase toward the closed position until a main contact finger (3-11) is touched. Dimension c should then be no greater than .020 inches, with one contact touching.

Adjustment is made by loosening two nuts (3-22) and rotating the contact assembly. Alignment (Dimension c) should be checked after tightening nuts (3-22).

5.3 TILTING ARC CHUTES

Remove phase barriers (see Section 5.2).

Remove screws (1-1 and 1-37) on each phase. Loosen screws (1-23) and remove screws (1-24) and (1-39) to remove panel (1-22).

With arc chute support in place, at the rear of the breaker, tilt back the arc chutes.

After tilting arc chutes upright, and replacing barriers, be sure all screws are tightened securely on all three phases.

5.4 BARRIER STACKS (Fig. 2)

The barrier stacks are fragile and should be handled carefully. The barrier stacks should be inspected for erosion of the plates in the areas of the slots. The stacks should be replaced when a milky glaze is observed on the full length of the edges of most of the slots. They should likewise be replaced if plates are broken or cracked. When cleaning the breaker and cubicle, inspect for pieces of barrier stack refractory material which would obviously indicate breakage.

To remove the barrier stacks, tilt back the arc chutes (see Section 5.3).

Remove four screws (1-26), two barriers (2-1) and, if applicable, two screws (2-6) and two tubes (2-5) from each arc chute. Slide barrier stack (2-23) through top of arc chute.

When sliding a barrier stack into the arc chute, care should be taken to see that the end containing the Vee-shaped slots goes in first.

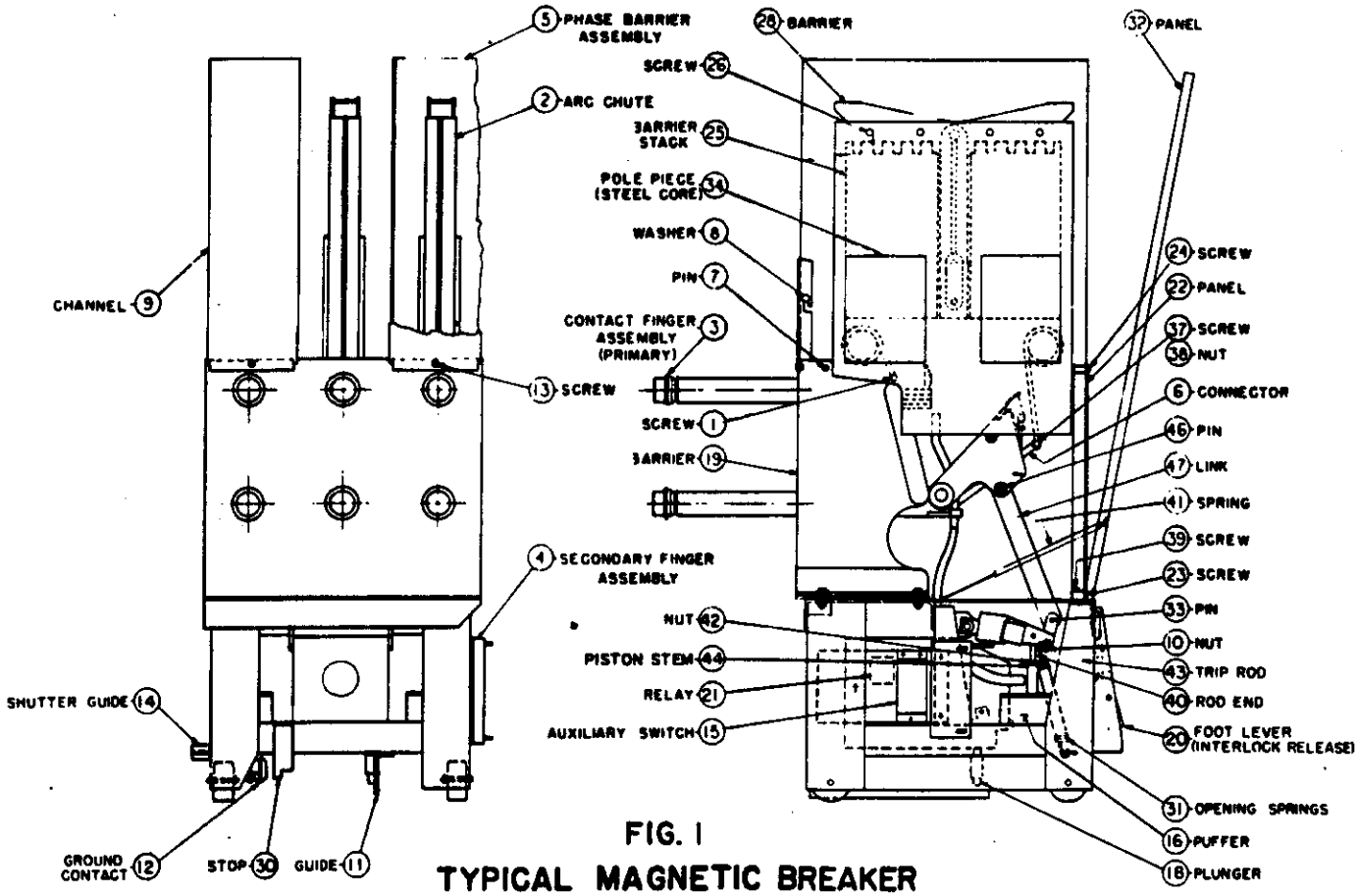

FIG. 1

TYPICAL MAGNETIC BREAKER

APRIL 20, 1967 72-420-057-401

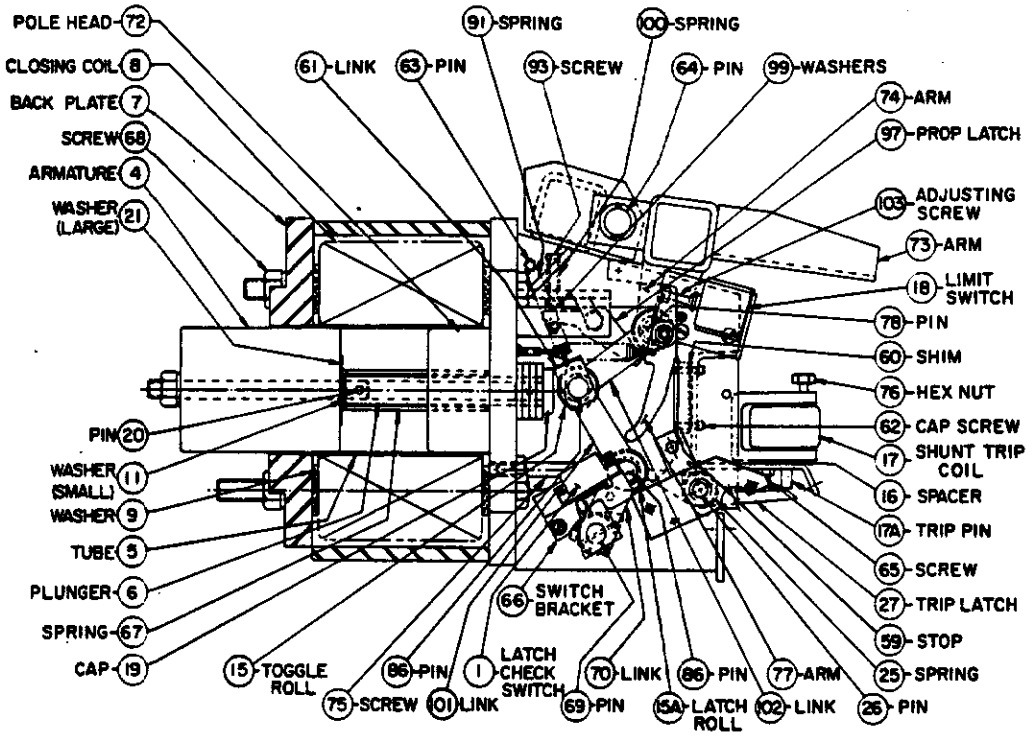

FIG. 4

TYPICAL OPERATOR ASSEMBLY

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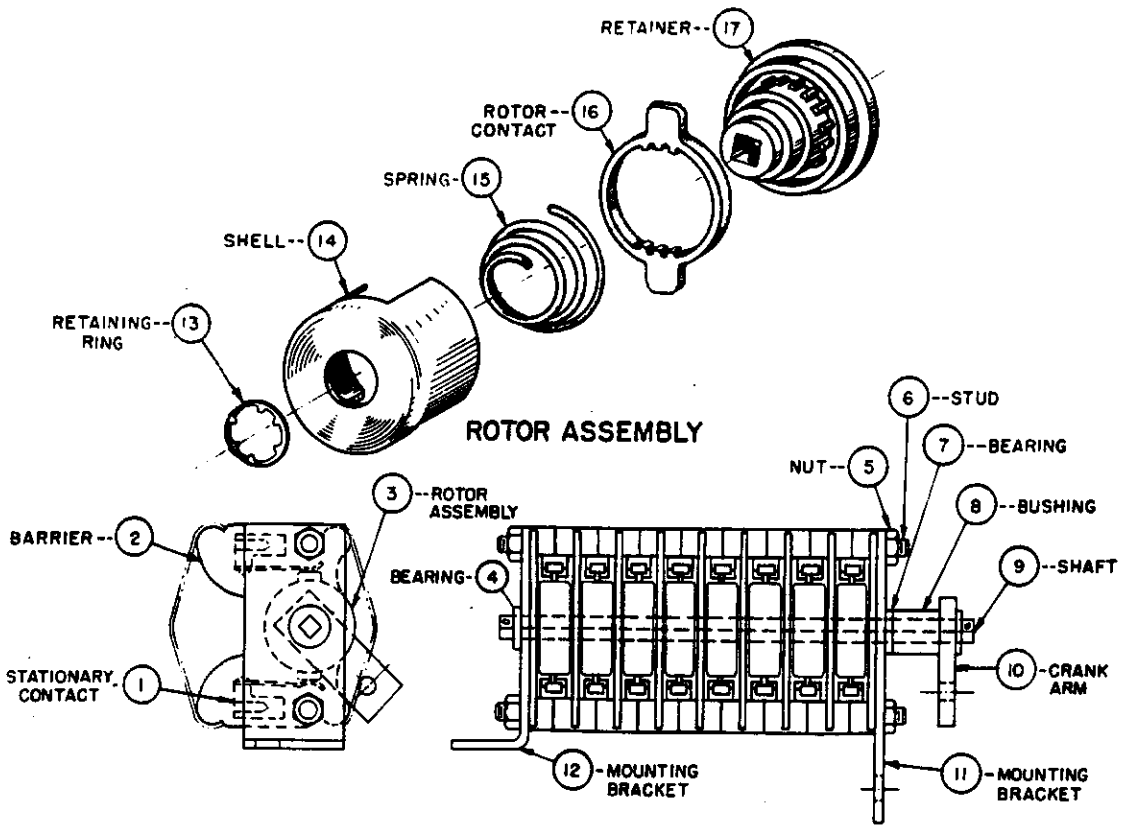

FIG. 11

TYPICAL AUXILIARY SWITCH

JULY 16, 1958 71-301-758

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INSTRUCTION BOOK

SUPPLEMENTAL TO BWX-6732 or BWX-6700-2

"FAIL SAFE" Time Delay Electro Magnetic

Latch Supplement for Air Magnetic

Breakers

UNION CARBIDE CORPORATION - Linde Division

Project 2554 Deer Park, Texas

A-C Shipping Order Nos. 01-1800-62862
01-1800-63221

ALLIS - CHALMERS CONTROLS DIVISON June, 1970

This book is a supplement to the standard breaker instruction book for the application of the magnetic fail-safe latch. Refer to Figure 4 of the instruction book and note that the shunt trip unit(17) and the latch(27) have been replaced by the mechanism shown on Figure 7 of this book.

FAILSAFE MAGNETIC LATCH

Breakers equipped with this special latch are mechanically trip free and requre energizing of the control circuit to close. The trip latch face is ground off center so that the pressure of the latch roll will throw the latch off if not held. The latch is held in stable position by an electro-magnetic circuit.

TO CLOSE BREAKER

It is necessary to supply A.C. voltage (208 to 240V) to the undervoltage device before the breaker can be closed manually. Do not attempt to mechanically block the latch to check contact alignment as excessive force may distort the latch and true hold position is not likely to be maintained.

Check wiring diagram for connection to energize U.V. coil from secondary fingers with necessary jumpers to complete circuit. Normally power is applied to points 5 & 6(the two lower fingers)with a jumper between 57 and 58(the 5th and 6th fingers down from the top).

With the U.V. coil energized, manual closing is performed in the normal manner.

OPENING OF THE BREAKER(Fig. 15) (See BWX-6732/BWX-6700-2)

Opening of the breaker is accomplished by removing the power from the electro magnet.

The biased latch has a clockwise movement around the latch pin due to the restraining of the breaker opening spring force. The armature on the tail of the latch prevents rotation of the latch when held in position by the holding magnet. When the magnet coil is de-energized the flux decays releasing the armature and the latch is forced clockwise releasing the latch roll and allowing the breaker to open. The reset spring then reacts to return the mechanism to its normal position.

The power for the electro magnet is furnished by the capacitor in the time delay device. Removal of capacitor charging supply power results in a delayed release of the latch. The time is controlled by the decay rate of the capacitor voltage. The bias resistor is adjusted to control this decay rate.

The tripping action described above can take place at any time during a closing operation, either manual or electrical, and regardless of whether or not the armature is energized. Thus the mechanism is electrically and mechanically trip free in any position.

ALIGNMENT

To align the magnet and latch add or subtract shims under the mounting hardware of the magnet so that the armature and magnet face are the same height. Move the magnet in or out to give about 3/16" bite on the latch when latch roll is against the latch face. Tighten bolts and energize the magnet, loosen bolts to allow the magnetic flux to give unstrained match of armature and magnet. Tighten set screw on back of the latch tail until it touches the armature then back it off about 1/2 turn.

CAPACITOR UNDERVOLTAGE DEVICE

This device forms the power source and time delay control for the hold in coil of the magnetic latch.

The capacitor is the power source for the coil of the electro-magnet. Resistors across the capacitor speed the bleed down rate and are set to give approximately 2 to 3 seconds time delay of the breaker opening after the capacitor power supply is interrupted. The adjustable resistor allows a finer adjust-ment of the time delay.

. . . FC-750A (2000 Amperes) 13,800volts Special/with Failsafe Device

Union Carbide Corporation Linde Division)S.O.# 01-1800-62862
)S.O.# 01-1800-63221

Reference Instruction Book Number BWX-6700-2 or BWX-6732			QUANTITY		NET PRICE
Fig. / Item No.	Description	Drawing Number	1-5 Bkrs.	5 or more	
3-9	Arcing Contact (Stationary)	71-112-966-502	1	3	
3-28	Arcing Contact (RH Moving)	71-112-913-502	1	3	
3-27	Arcing Contact (LH Moving)	71-112-913-503	1	3	
3-11	Main Contact (One Finger)	71-112-903-501	6	18	
3-19	Main Contact (RH Moving) Disconnect Arm	71-208-255-503	1	3	
3-18	Main Contact (LH Moving) Disconnect Arm	71-208-255-504	1	3	
2-23	Barrier Stack	71-303-149-501	1	3	
3-25	Washer Hinge Contact (Main)	71-177-196-003	2	6	
3-17	Washer Hinge Contact (Arcing)	71-114-701-001	3	12	
1-13	Primary Contact Finger Assembly	71-201-458-502	1	6	
1-21	"Y" Relay (Give Voltage)	00-871-763-400	1	2	
4-8	Closing Solenoid Coil (Give Voltage)	71-208-440-510	1	2	
4-17	MAGNET COIL	71-200-745-515	1	2	
4-1	Latch Check Switch	15-871-383-001	1	2	
4-18	Limit Switch	00-871-351-107	1	2	
1-21	"X" Relay	15-171-122-002	1	2	
	Rectifier POWER	71-118-060-501	1	2	
	TRIP RELAY (52TR)	00-871-797-109	1	2	
	RECTIFIER (TIME DELAY)	00-875-121-073	1	2	
	CAPACITOR (TIME DELAY)	00-875-347-005	1	2	

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Terms: NET CASH – 30 days
Minimum Order: 15 dollars
Estimated Delivery: 8 to 10 weeks
Export Pricing: Refer to Factory
It is recommended that if there are 5 or more identical breakers, a spare removable breaker element

ALLIS-CHALMERS CONTROLS

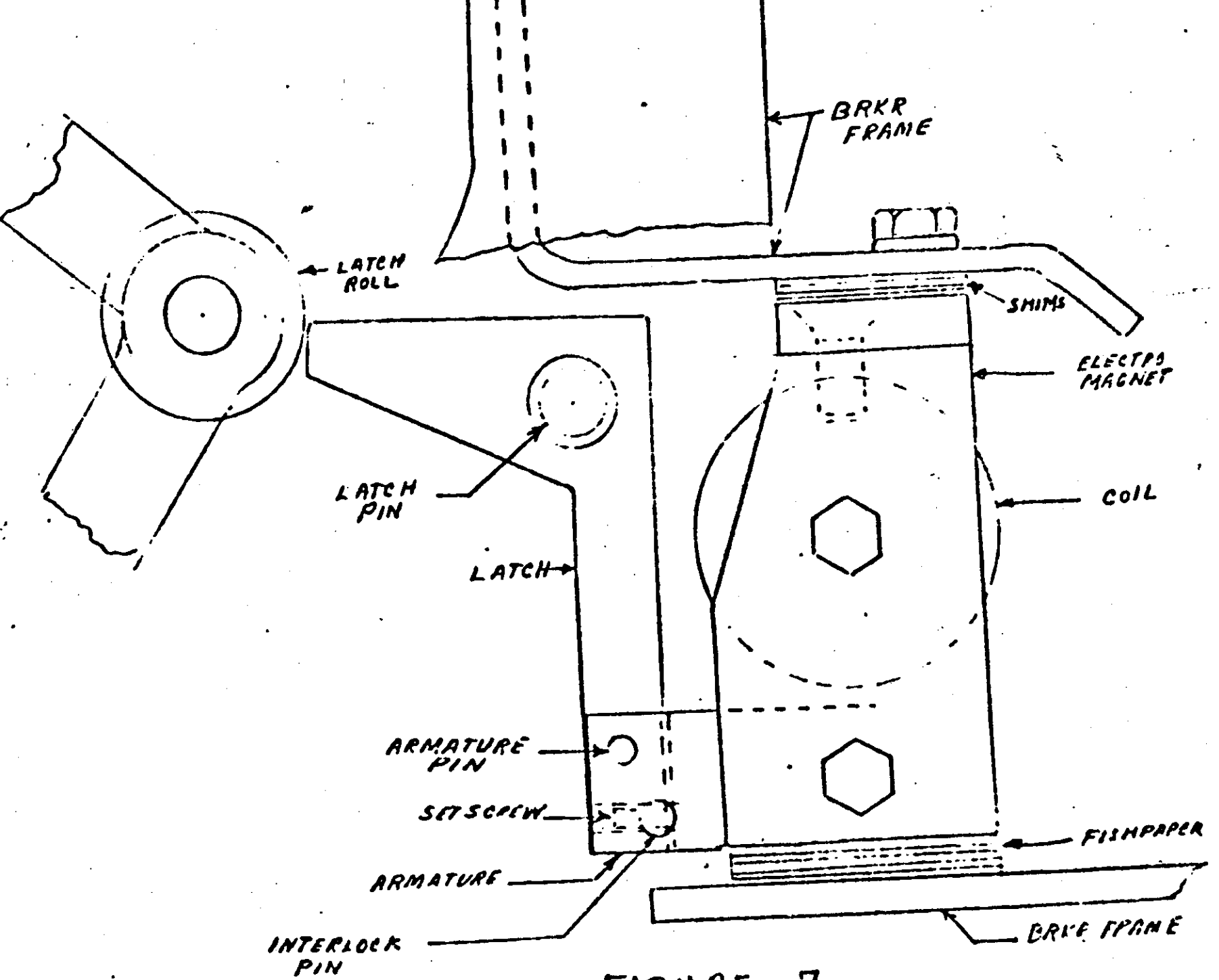

FIGURE 7

ALLEN-CHALMERS CONTROLS

At present a tube of "Aero Lubriplate" is supplied with the cubicle accessories for use as a cubicle disconnect contact lubricant to increase silver plating life. This lubricant must not be used on any part of the circuit breaker. The following procedures should be used:

GENERAL CIRCUIT BREAKER

Thorough inspection at periodic intervals is important to satisfactory operation. Conditions affecting maintenance are weather and atmosphere, experience of operating personnel, and special operation requirements. The frequency of inspection and maintenance will, therefore, depend on installation conditions and can be determined only by experience and practice.

When lubrication is necessary, all purely mechanical joints should be given a light film of BEACON P-290 grease (a product of Beacon Oil Company, a subsidiary of Humble Oil Corporation). All current-carrying joints should be inspected to be sure all contact surfaces are free of protrusions or sharp changes of plane. Rub microfine graphite well into all contact surfaces and remove any excess.

CAUTION: Do not get graphite on insulation as it cannot be removed and insulation must be replaced if contaminated with graphite.

NEEDLE BEARINGS

Needle bearings are packed with a special lubricant and should require no further attention. Bearing pins and other sliding or rotating areas should be wiped with a thin film of BEACON P-290 grease (a product of Beacon Oil Company, a subsidiary of Humble Oil Corporation). Greasing should be done with care because excess grease tends to collect foreign matter which in time may make operation sluggish and affect the dielectric strength of insulating members.

Beacon P-290 grease may be purchased through Humble Sales Offices in Los Angeles, California; Oak Brook, Illinois; Baltimore, Maryland; Pelham, New York; Charlotte, North Carolina; Memphis, Tennessee; Dallas and Houston, Texas.

This grease is available in five (5) pound cans from Allis-Chalmers, P.O. Box 2505, West Allis, Wisc., 53214. Ask for part number 00-337-131-001.