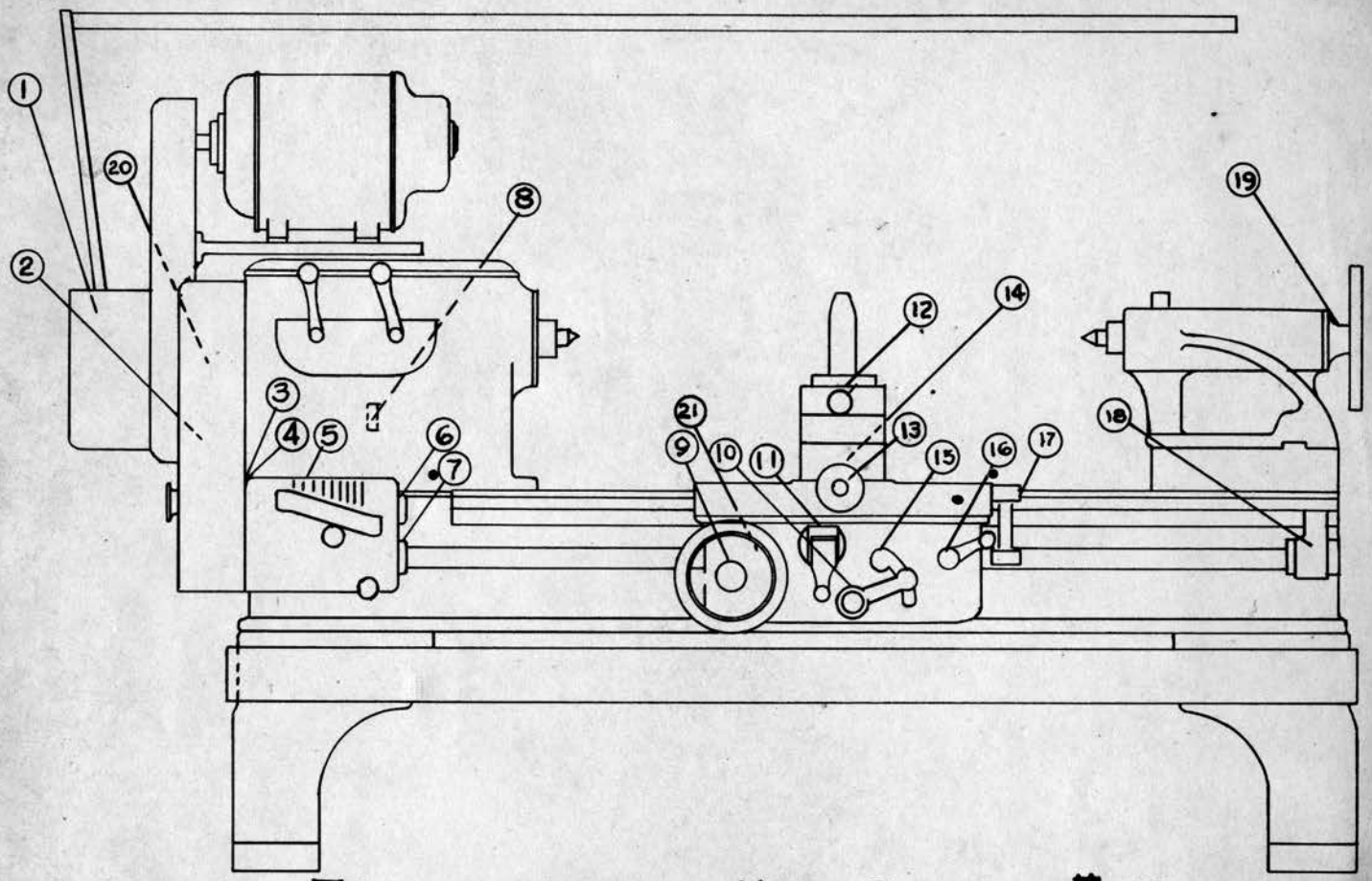
OIL CHART 14" SEBASTIAN LATHE



TO BE OILED WITH NAVY SYMBOL # 3050

① FRICTION
② REVERSE PLATE BUSHINGS
③ Q.C. BEARING
④ Q.C. BEARING
⑤ Q.C. BEARING
⑥ Q.C. BEARING
⑦ Q.C. BEARING
⑧ HEADSTOCK DRAIN & FILLER
⑨ FIRST PINION
⑩ REVERSE LEVER
⑪ FRICTION
⑫ TOP SLIDE
⑬ CROSS FEED BUSHING
⑭ CROSSFEED NUT
⑮ BEVEL GEAR PINION
⑯ HALF NUTS
⑰ INDICATOR
⑱ LEAD SCREW BEARING
⑲ TAILSTOCK BELL
⑳ VEE PULLEY
㉑ RACK GEAR

MECHANICAL FEATURES OF SEBASTIAN LATHES

The instructions listed herein are to be used in conjunction with our circular entitled "Important Features Used in Sebastian Lathes" which is attached herewith. This circular illustrates all of the component parts of this lathe.

HEADSTOCK

The mechanics of this head consist of three shafts, a drive shaft or power shaft, an intermediate shaft, and a spindle which is made of high carbon steel, heat treated to rigid specifications. These three shafts carry the head gears which are heat treated and shaved.

Keyed to and sliding on the drive shaft is a gear cluster composed of four gears which ratioally transmit power from the drive shaft to the intermediate shaft. The gear assembly of the intermediate shaft consists of four fixed gears and one sliding pinion. Mounted on the spindle are two gears; the face gear which is driven by the sliding pinion of the intermediate shaft; and the bull gear which slides on the spindle and is driven by one of the fixed gears of the intermediate shaft.

Facilities for selecting any one of the eight speeds, arranged in geometric progression, of this headstock have been conveniently arranged through two shifter levers on the face of the headstock. The lever to the left shifting the cluster gears and the lever to the right shifting the intermediate shaft pinion and the spindle bull gear.

All shafts in this headstock are mounted on anti-friction bearings and run in a bath of oil. The adjustment of these bearings has been provided for by means of adjustment nuts on the spindle and drive shaft and shims on the intermediate shaft.

QUICK CHANGE BOX

This box consists of a tumbler shaft which extends out of the box and transmits the motion from the quadrant to a tumbler which slides on the shaft and transmits the motion to the train gears. Train gears consist of nine gears which are fixed on the train gear shaft and which ratioally transmit the motion to the compound gears. The compound gears, mounted on and sliding on one end of the lead screw, thereby transmit the motion from the train gears to the lead screw. This compound is controlled by the A and B lever which is mounted on the bottom of the box. Convenient facilities for oiling the bearings of this unit have been provided by brass tubes.

QUADRANT

The quadrant consists of a cast iron bracket located by and having its bearing on the quick change box. Its function is to support the quadrant gears which ratioally transmit the motion from the spindle to the tumbler shaft. These gears are arranged in a fashion

so that by simply sliding the sliding gear, which is on the tumbler shaft, ratios of 1 to 1, 2 to 1 and 4 to 1 can be obtained. This quadrant, sometimes referred to as the reverse plate, can be used to reverse the motion of the lead screw with relationship to the spindle by loosening the clamp bolt and rocking the complete unit forward until the alternate gear is in mesh with the spindle gear.

CARRIAGE

The carriage or saddle is rigidly constructed and has its bearings on the two outside ways of the bed. It is completely equipped with tapered gibs, clamps, locks, wipers, chip cover, both power and hand crossfeed, and a hand compound feed. It is equipped with a graduated swivel slide having a full 360 degrees swing. The crossfeed nut is made of a special bronze alloy which reduces wear on the screw to a very minimum thereby enabling the unit to maintain its accuracy over a greater period of time.

APRON

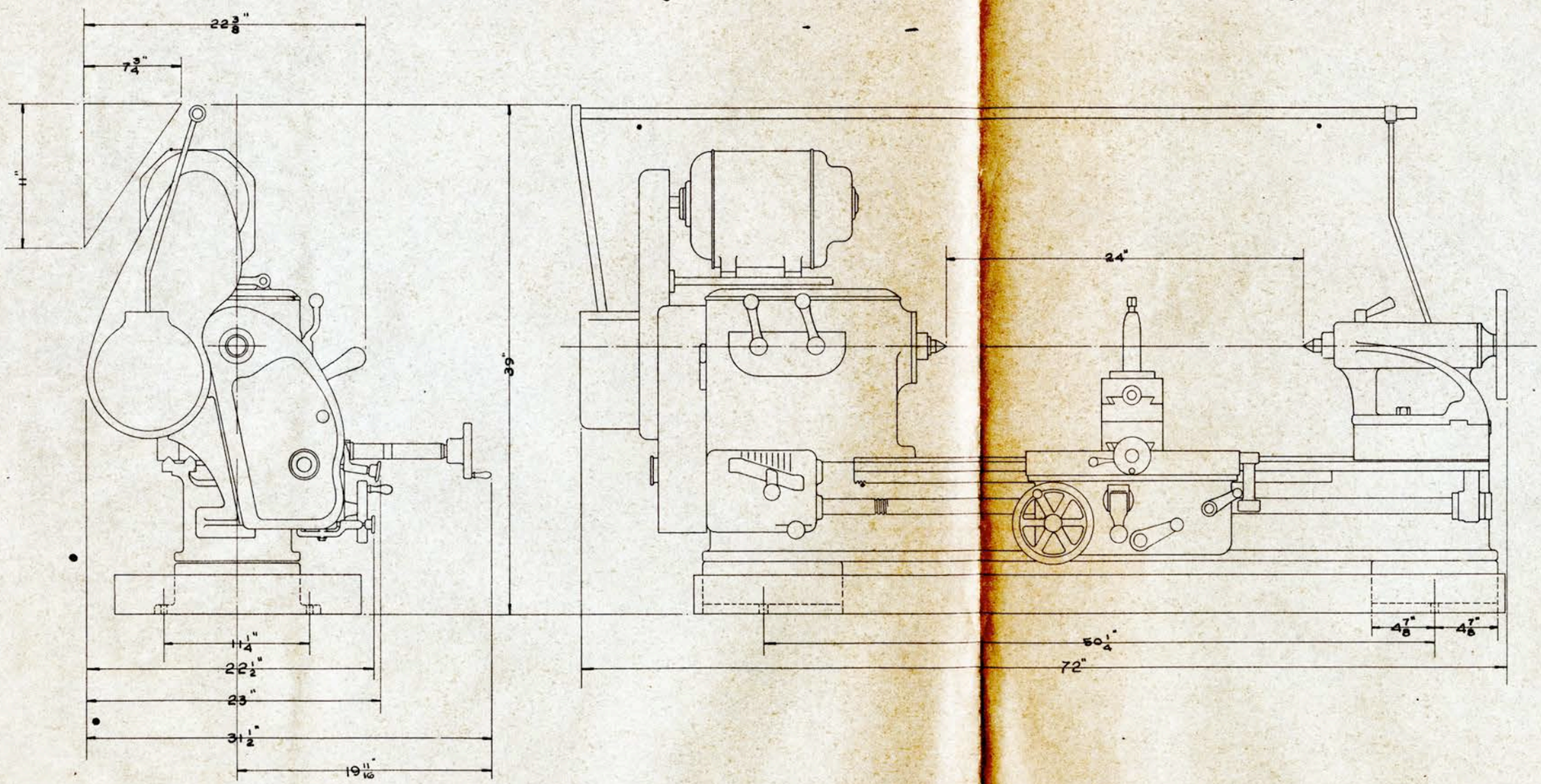
The construction of this unit is clearly shown. The power for the feeds is taken from the screw through the spline which drives two small bevel gears. The shifting of these bevel gears provides an instantaneous reverse for the feeds which are selected through the quick change box and controlled by a drop lever friction in the apron. All shafts and studs in this unit are heat treated and have their out board support by means of a rigid back plate. The split nuts are of a special grade of cast iron which reduces wear on the screw to a minimum. Arrangement has been provided so that the split nuts and the feed mechanism cannot be simultaneously engaged.

TAILSTOCK

The tailstock is of customary design in that adequate bed clamping facilities, the usual method of set over, and the movement of the spindle being controlled by hand wheel on the rear of the unit, have been provided. The feature of this unit is that the spindle is locked in position by a patented binder, thus eliminating the usual split in the tailstock barrel.

POWER FRICTION OR DRIVE CLUTCH

This clutch is located on the outer end of the drive shaft and is supplied so as to provide a means of instantaneous starting and stopping of the motion of the machine. To adjust, disengage clutch, press lock lever "A" and turn adjuster "B" approximately 3/8 of an inch to the right, release lever "A" and continue to turn the adjuster slowly until lock lever "A" snaps into place. If this is not enough, follow the same procedure, adjusting only one notch at a time.



WRENCHES
ARMSTRONG SPECIAL # 651
SEBASTIAN TAILSTOCK WRENCH 1 1/4" HEX.

WEIGHT	
TOTAL	2550
MOTOR	200
CONTROLS	100
EQUIP.	200

SUBMARINES	CONTRACT NO.	BUILDER
SS 275 - SS 280	91257	U.S. NAVY, PORTSMOUTH, N.H.
SS 281 - SS 284	91257	U.S. NAVY, MARE ISLAND, CALIF.
SS 285 - SS 291	91257	U.S. NAVY, PORTSMOUTH, N.H.
SS 292 - SS 303	NOBS 100	CRAMP SHIPBLDG. CO., PHILA., PA.
SS 304 - SS 307	91257	U.S. NAVY, MARE ISLAND, CALIF.
(SM1)	N2205-72135	U.S. NAVY, SAN FRANCISCO, CALIF.
SS 381 - SS 410	91257	U.S. NAVY, PORTSMOUTH, N.H.
SS 411 - SS 424	91257	U.S. NAVY, MARE ISLAND, CALIF.

LIST OF EQUIPMENT

QUANTITIES ARE FOR ONE LATHE

ANT.	DESCRIPTION
1	MILLING ATTACHMENT
1	3 JAW 6" CHUCK
1	4 JAW 12" CHUCK
1	DRILL CHUCK (3 JAW 0 TO 3/8")
1	LARGE FACE PLATE
1	SMALL FACE PLATE
1	ANGLE FACE PLATE WITH BOLTS
2	SETS OF LIVE CENTERS
2	SETS OF SQUARE CENTERS
1	SET OF BELL CENTERS
1	BORING TOOL HOLDER & SET OF BARS
3	CUTTING OFF TOOL HOLDERS
3	TURNING TOOL HOLDERS
1	SET OF LATHE DOGS (3/8", 1/2", 3/4", 1", 1 1/2", & 2")
1	FOLLOW REST
1	STEADY REST
1	SET OF SIDE MILLING CUTTERS (1/4", 5/16", 3/8", & 1/4" WIDE)
1	SET OF CONCAVE SIDE METAL SLITTING SAWS (1/32, 1/16, 3/32, 1/8, & 5/32)
1	SET OF LATHE WRENCHES (ARMSTRONG SPECIAL "651")
1	THREAD CHASING DIAL

NO.	PART	ALTERATIONS	APP.	DATE	AUTH.

14" SEBASTIAN ENGINE LATHE

THE SEBASTIAN LATHE CO.
CINCINNATI, OHIO

DATE 2/1/43 SCALE- APPROX. 1/6

DRAWN BY	APPROVED
TRACED BY	
INS. BY	
CH. DRAFT'S	APPROVAL LETTER
HEAD OF DEPT.	

CONTRACTORS FILE NO.	BUREAU OF ENGINEERING FILE		
	INDEX	GROUP	FILE NO.
91257			

SPECIFICATIONS FOR D-C CONTROLLERS

IDENTIFICATION
(A) MANUFACTURER - CUTLER-HAMMER, INC. ORDER NO. B800665A, B920366
(B) NAVY CONTRACT NO. 91257 , B920413
(C) FOR U.S.S. SS271-SS274 INCLUSIVE
SS285-SS291 INCLUSIVE
SS304-SS312 INCLUSIVE

(D) FOR USE WITH MOTOR DRIVEN ENGINE LATHE
(E) MANUFACTURER OF DRIVEN AUXILIARY - THE SEBASTIAN LATHE CO.
(F) MANUFACTURER OF DRIVING MOTOR -
(G) NUMBER OF CONTROLLERS INVOLVED - 26 1 PER SHIP

2. REFERENCE SPECIFICATIONS
THE CONTROL EQUIPMENT DESCRIBED HEREIN WILL CONFORM STRICTLY WITH NAVY DEPT. SPECIFICATIONS 40L4 DATED DEC. 1, 1938 AND 40L4A DATED JUNE 1, 1940. THE CONTROLLERS ALSO CONFORM TO AIEE STANDARDS, RECOMMENDED PRACTICE FOR ELECTRICAL INSTALLATIONS ON SHIPBOARD DATED DEC. 1938. FOR EXCEPTIONS SEE NOTE 8.

3. REFERENCE DRAWINGS
THE FOLLOWING DRAWINGS SHOWING VARIOUS CONSTRUCTION DETAILS AS REQUIRED BY THE SPECIFICATIONS UNDER "PLANS FOR APPROVAL" FORM A PART OF THIS PLAN.

TITLE OF DRAWING	MFR. PLAN NO.	BUREAU DWG.	ALT.
D-C MANUAL CONTROL EQUIPMENT FOR MOTOR DRIVEN ENGINE LATHE	4169		

4. CONTROLLER CLASSIFICATION AND RATING

(A)	VOLTS	250 (175-345)
(B)	HORSEPOWER	2
(C)	FULL LOAD CURRENT	7.5 AMPS
(D)	TYPE OF CONSTRUCTION	

SAFETY SWITCH - ENCLOSED, MANUALLY OPERATED, TWO POLE FUSED KNIFE SWITCH WITH QUICK MAKE AND BREAK CONTACTS AND INTERLOCKING COVER.
DRUM CONTROLLER - ENCLOSED, MANUALLY OPERATED REVERSING DRUM CONTROLLER WITH "START" & "RUN" POSITIONS ON EITHER SIDE OF "OFF" POSITION.
STARTING RESISTOR - SEPARATELY MOUNTED PORCELAIN BASE RESISTOR UNITS IN DRIPPROOF ENCLOSURE. RESISTOR UNITS ARE WOUND WITH #15 NICHROME WIRE (R1-R2) TOTAL 11.0 OHMS (SERIES)

(E)	DUTY RATING	MOTOR STARTING
(F)	RESISTOR CLASSIFICATION	LIGHT STARTING
(G)	LOW VOLTAGE	NONE
(H)	NO. RESISTOR STARTING STEPS	ONE
(I)	AMBIENT TEMPERATURE	40 DEGREES C

5. DESCRIPTION OF OPERATION-SEE CONNECTION DIAGRAM

6. PROTECTIVE FEATURES
THE CONTROL EQUIPMENT DESCRIBED HEREIN IS PROVIDED WITH SHORT CIRCUIT PROTECTION BY MEANS OF TWO (2) NON-RENEWABLE CARTRIDGE TYPE FUSES RATED 15 AMPERES 250 VOLTS.

7. LIST OF SPARES
(A) ONE SET PER VESSEL, AS FOLLOWS: PARTS WILL BE TAGGED WITH ITEM NUMBER. THESE PARTS WILL BE BOXED BY MOTOR MANUFACTURER.

LIST OF SPARE PARTS AND TOOLS
(REPRODUCED FROM MFRS. DWG. NO.) 4169 BUSHIPS NO.
NAMES AND NUMBERS OF VESSELS: USS SS275-SS304 INCL.

APPLICATION: ENGINE LATHE
NAVY CONTR. OR SHIPBLDRS. NO. 91257
APPLIANCE: CONTROLLER
MFR. CUTLER-HAMMER, INC.

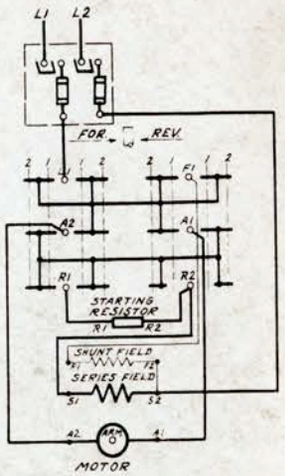
ITEM NO.	NO. SETS PER SET	NAME OF PART OR TOOL	MANUFACTURER'S DATA PART NO.	MFRS. DWG. PC.	MFRS. DWG. DWG.	BU. DWG. & PIECE NO. PC.	BU. DWG. & PIECE NO. DWG.
		FOR SAFETY SWITCH					
1	1 1	COVER LATCH SPRING	969-272	31	C95-154		
2	1 1	COVER INTERLOCK SPRING	969-543J	25	C95-154		
3	1 1	LATCH SPRING	69-208	7	C95-106		
4	1 1	HANDLE RETURN SPRING	69-192	17	C95-106		
5	1 2	HANDLE SPRING	969-577	14	C17-183		
		FOR DRUM CONTROLLER					
6	1 6	FINGER	40-2-3	7	R70-113		
7	1 6	FINGER SPRING	69-120	6	R70-113		
8	1 1	CYLINDER	74442X1-1	19	R70-113		
9	1 1	CYLINDER	74442X1-2				
10	1 1	CYLINDER	74442X1-3				
11	1 1	CYLINDER	74442X1-4				
12	1 1	STARWHEEL LEVER SPRING	69-17	13	R70-113		
		FOR RESISTOR					
13	1 1	R1-R2	57-49-17	17	C57-49		

IDENTIFICATION OF APPLIANCE FOR WHICH PARTS ARE INTENDED:
CUTLER-HAMMER, INC.
SERIAL NO. B800665A B920366 B920413

WHEN RE-ORDERING, ALWAYS REFER TO:-
1. "IDENTIFICATION OF APPLIANCE FOR WHICH SPARE PARTS ARE INTENDED"
2. PART NO. ORDERING DATA, AS ABOVE
3. C-H. INC. DRAWING NO. 767684W1
NO. OF SHEETS 1 SHEET NO. 1

SPARE LIST WHICH WILL ACCOMPANY SPARE PARTS WHEN THEY ARE SHIPPED WILL BE ON 8" X 10 1/2" SHEETS.

8. EXCEPTIONS TO NAVY SPECIFICATIONS
THE CONTROLLER HEREIN DESCRIBED DOES NOT CONFORM TO PARAGRAPH E3C OF SPECIFICATIONS 40-L-4 IN THAT IT IS MANUAL INSTEAD OF MAGNETIC AND HAS NO OVERLOAD OR LOW VOLTAGE PROTECTION.

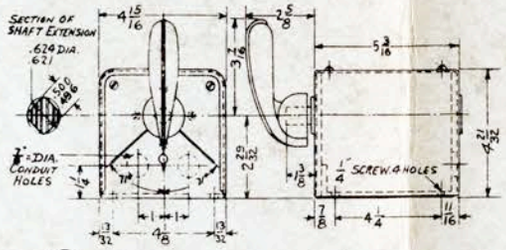


CONNECTION DIAGRAM

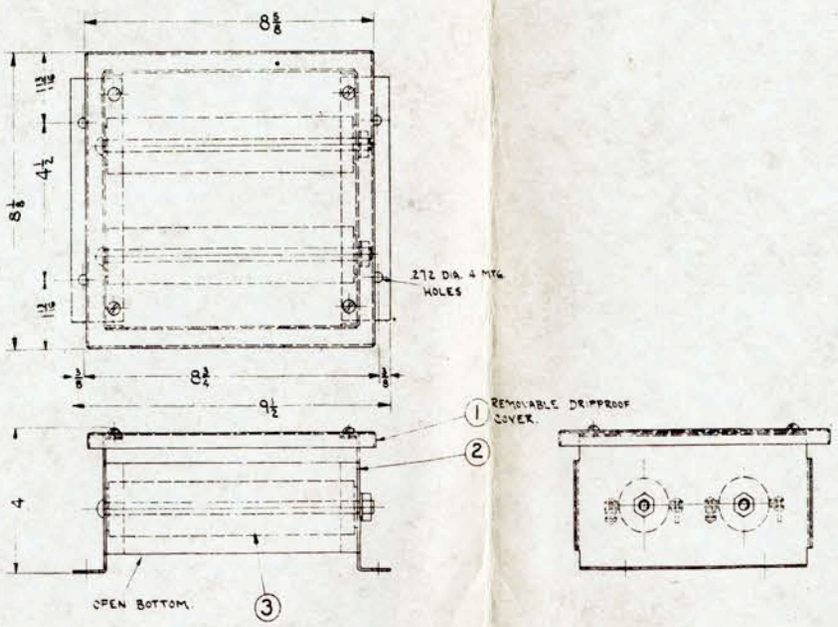
DESCRIPTION OF OPERATION
TO START THE LATHE MOTOR IN THE "FORWARD" DIRECTION THE DRUM CONTROLLER MUST BE TURNED IN THE MARKED DIRECTION, REMAINING ON THE FIRST POINT UNTIL THE MOTOR HAS REACHED ABOUT ONE HALF ITS NORMAL SPEED AND THEN PROCEEDING TO THE SECOND POINT. THE STARTING RESISTOR IS INSERTED IN THE MOTOR CIRCUIT WHILE THE HANDLE RESTS ON THE FIRST POINT.

TO STOP THE MOTOR THE DRUM CONTROLLER HANDLE MUST BE RETURNED TO THE "OFF" POSITION.

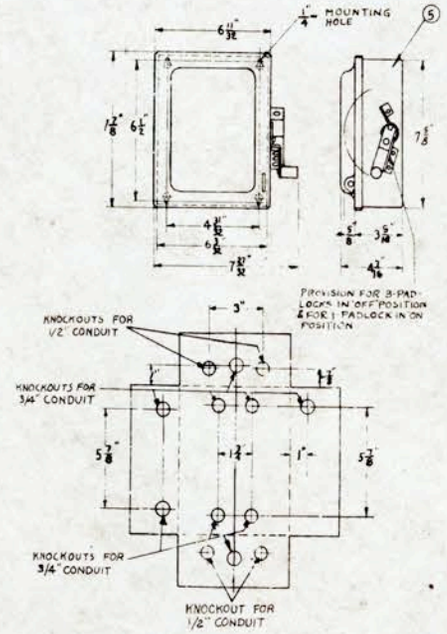
TO START THE MOTOR IN THE "REVERSE" DIRECTION THE HANDLE IS TURNED IN THE PROPERLY MARKED DIRECTION, RESTING ON THE FIRST POINT UNTIL THE MOTOR HAS REACHED ABOUT ONE HALF SPEED AND THEN PROCEEDING TO THE SECOND POINT. THE STARTING RESISTOR IS INSERTED IN THE MOTOR CIRCUIT WHILE THE HANDLE RESTS ON THE FIRST POINT.



⑥ OUTLINE DIMENSIONS OF DRUM CONTROLLER



OUTLINE DIMENSIONS OF RESISTOR



④ OUTLINE DIMENSIONS OF SAFETY SWITCH

LIST OF MATERIAL

QUANTITIES ARE FOR ONE ONE UNITS REQ'D PER SHIP

PIECE NO.	NAME OF PIECE	NO. WANTED	SPARE	MATERIAL	MATERIAL SPEC.	REMARKS	DRAWING NUMBER CONTR. NO.	DRAWING NUMBER BUR. NO.	DRAWING NUMBER OFF'L. NO.
	RESISTOR ASSEMBLY						729592X1		
1	COVER	1		STEEL					
2	FRAME	1		STEEL					
3	RESISTOR	2					C57-49		
4	SAFETY SWITCH 2 POLE 250V 30 AMP ENCLOSED						B95-157		
5	FUSE 15 AMP 250 VOLT	2							
6	DRUM CONTROLLER SIZE 1 REVERSING						A83-100		

NAVY DEPARTMENT MATERIAL SPECIFICATIONS OF LATEST ISSUE WILL APPLY.

COMPARISON OF WEIGHTS EST. WEIGHT	BUR. WEIGHT	DIFFERENCE
LBS.	LBS.	LBS.

WEIGHT			
COMPLETE UNIT	DRUM CONTROLLER	10	LBS.
SPEC. PARTS	SAFETY SWITCH (EST)	14	LBS.
	RESISTOR	6½	LBS.
	SPARES	4	LBS.
			LBS.
			LBS.

REFERENCE PLANS

TITLE	CONTRACTORS FILE NO.	BU. OF SHIPS FILE NO.

SS285 -SS312 INCLUSIVE
SS275—SS284 INCLUSIVE
VESSELS

CUTLER-HAMMER, INC.
MILWAUKEE, WIS.

C-H, INC. ORDER NO. B800665A, B920413, B920366
C-H, INC. PLAN NO. 4169 ALT. 1

SCALE:
DRAWN BY:
TRACED BY:
CHECKED BY:
DATE: 7-24-42
EXAMINED:
APPROVED:
APPROVED F. Wendnagel 7-24-42

FORWARDED TO BUREAU APPROVED DATE
LETTER NUMBER REFERENCE

SUPERVISOR OF SHIPBUILDING, U.S.N.

PLAN
EXAMINED AND FOUND CORRECT
DATE SUPERVISOR OF SHIPBUILDING, U.S.N.

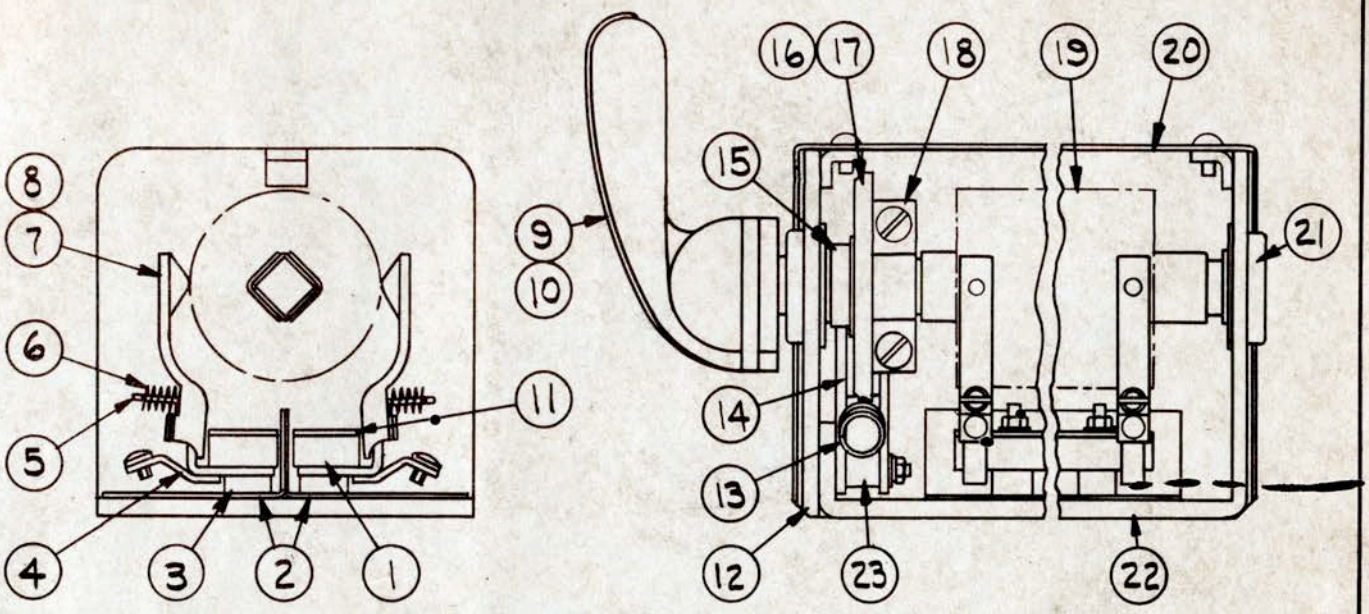
D.C. MANUAL CONTROL EQUIPMENT FOR MOTOR DRIVEN ENGINE LATHE

2 H.P. 250 (175-345) VOLTS
BUREAU OF SHIPS PLAN NUMBER

ALTERATIONS

NO.	DESCRIPTION	AUTHORITY	BY	DATE CONTR	APPD CONTR	DATE GOV'T	APPD GOV'T
	SS 308 ON ORDER B821469 A DELETED. ALSO PLAN EXTENDED FOR SS 286-312 INC. ON ORDERS B920413 & B920366 7-24-42						

RAW MAT. SPEC. WITH
PART NO. AND AMOUNT REQ'D.



ITEM NO.	DESCRIPTION OF PART	NO. REQ.	PART NO.
1	FINGER BOARD FOR 3 FINGERS FOR 5 FINGERS	2	 81-2249 81-2250
2	INSULATION FOR 3 FINGERS FOR 5 FINGERS	2	 56-992 56-993
3	SPACER	4	2222-473
4	BRACKET	AS REQ.	79-675
5	SPRING HOLDER	AS REQ.	55-292
6	SPRING	AS REQ.	69-120
7	FINGER WITH CONNECTOR	AS REQ.	40-2-3
8	FINGER COMPLETE	AS REQ.	40-205
9	HAND LEVER	1	24-1373
10	SET SCREW FOR ITEM 9	2	11-428
11	INSULATION FOR 3 FINGERS FOR 5 FINGERS	2	 56-994 56-995
12	BEARING PLATE	1	20-245-2
13	SPRING	1	69-17

ITEM NO.	DESCRIPTION OF PART	NO. REQ.	PART NO.
14	STARWHEEL LEVER	1	24-79
15	STOP LEVER - FOR SINGLE SPEED DRUM	AS REQ	24-76
16	STARWHEEL SINGLE SPEED TWO SPEED	1	 54-82 54-745
17	SET SCREW - FOR TWO SPEED STARWHEEL	AS REQ.	911-10006
18	CLAMP - FOR SINGLE SPEED STARWHEEL	AS REQ.	55-60
19	CYLINDER COMPLETE	1	GIVE NAME PLATE DATA
20	COVER 5 13/16" LONG 7 13/16" LONG	AS REQ.	 47-1473-2 47-1474-2
21	BALL BEARING	2	20-162
22	FRAME 5 7/16" LONG 7 7/16" LONG	1	 49-1099-2 49-1103-2
23	SPACER	1	29-1309

WHEN ORDERING RENEWAL PARTS, GIVE THIS DWG. NO. (A70-113), ITEM NO., PART NO., DESCRIPTION, AND COMPLETE NAME PLATE DATA.

BULLETIN

RENEWAL PART DWG. FOR BENCHBOARD MASTER

A				DR. R. WISCHER	4/3/39
B				CHK. H. Baecker	4/14/39
C				APP. R.O. Stephens	4/17/39
D					
E					
F					

FIRST ASSEM. WHERE LISTED: D83-99
SUP'S. NON-INTERCHANGEABLE
SUP'D BY NON-INTERCHANGEABLE
SURFACE COATING

DO NOT SCALE DRAWING. WORK ACCORDING TO DIMENSIONS.

STANDARD TOLERANCES 50-275 APPLY TO DIMENSIONS FOR WHICH TOLERANCES ARE NOT SPECIFIED.

SCALE NOT TO SCALE

ORDER NO. DEV. 4037-11

CUTLER-HAMMER, INC. MILWAUKEE CH NEW YORK

A 70-113

			N-220- S-72135	
SS-308 TO SS-312			NOs-91257	
SS-285 TO SS-291 SS-304 TO SS-307			NOs-91257	
SS-292 TO SS-303			NOBs-100	#547 TO #558
SHIP NO.	U.S.S. NAME	BUILT BY	U.S.N. CONTRACT NO. OR PO. NO. & DATE	HULL NO.

ALLIS-CHALMERS MFG. CO.

NORWOOD, OHIO, U.S.A.

ELECTRICAL DIVISION

DR-2403

DRAWN BY [illegible] TRACED BY [illegible]

CHECKED BY [illegible] CHIEF DRAFTSMAN [illegible] 8/27/42

APPROVED _____ DATE _____

SCALE _____

FORWARD TO BUREAU APPROVED _____ DATE _____

LETTER NUMBER _____

REFERENCE _____

SUPERVISOR OF S.B. U.S.N

_____ PLAN

EXAMINED AND FOUND CORRECT _____

SUPERVISOR OF SHIPBUILDING U.S.N.

DATE _____

LATHE DRIVE MOTOR

FRAME NO. 51 TYPE EB

2-HP. 250- VOLTS 1150-R.P.M. 7.5 AMPS.

OUTLINE-WINDING DATA & SPECIFICATIONS

BUREAU OF SHIPS PLAN NUMBER

DESCRIPTIVE DATA

IDENTIFICATION

MANUFACTURER- ALLIS CHALMERS MFG. CO
MANUFACTURER'S TYPE AND CLASS- EB 51 HORIZONTAL
NAVY CONTRACT OR SHIPBUILDERS ORDER- NOBS-00 NO-9257 NAVY $12,150
INSTALLED ON- SEE TITLE BLOCK FOR VESSELS INVOLVED
FOR DRIVING- LATHE
MANUFACTURER OF DRIVEN AUXILIARY SEBASTIAN LATHE CO.
REFERENCE SPECIFICATIONS-
THE MOTORS DESCRIBED HEREUNDER WILL CONFORM STRICTLY WITH BU. OF SHIPS SPECIFICATION 17M17 (MOTORS D.C. FOR SHIPBOARD USE) OF 3/1/42 AND GOVERNMENT SPECIFICATIONS 40L4 AND 40L4A
REFERENCE DRAWINGS:

TITLE OF DRAWING	MANUFACTURER'S NO.	BU. SHIPS NO.
DRIVEN AUXILIARY	9257	1-SC-01817
CONTROLLER	4169	1-SC-02519-L

MANUFACTURER'S DESCRIPTIVE DATA

CLASSIFICATION:
DEGREE OF ENCLOSURE- DRIPPROOF FULLY PROTECTED SERVICE- NAVY C
METHOD OF COOLING- SELF VENTILATED SPEED CLASS- ADJUSTABLE
DUTY CLASS- CONTINUOUS
VOLTAGE 250 R.P.M.- 1150 HP. 2
TYPE OF WINDING STABILIZED SHUNT AMPERES 7.5
AMBIENT TEMP. 40 °C - CLASS OF INSULATION- CLASS 'A'
TEMPERATURE RISE TABLE I METHOD 1 & 2 50°C. ARMS, 65°C. COMM.
MOUNTING HORIZONTAL OR VERTICAL - HORIZONTAL
MOTOR TO OPERATE ON 175 TO 345 VOLTS

PERFORMANCE

		EFFICIENCY	AMPERES
(A) GUARANTEED	4/4	79	7.5
(C) GUARANTEED	3/4	76.5	5.625
(B) GUARANTEED	1/2	73	3.75
(D)	1/4		

SPECIAL ATTACHMENTS

WEIGHTS
(COMPLETE)- 225 LBS. (B) ARM (COMPLETE)- 38 LBS.
(C) ALL SPARES BOXED (INCL. CONTROLER SPARES) 82 LBS
SHAFT, BEARINGS AND LUBRICATION
(A) SHAFT MATERIAL- C-1045 STL (B) TYPE OF BEARINGS- BALL
(C) BALL BEARING (P. END) MFG #6306 NAVY TYPE A CLASS b GRADE II
(C. END) MFG #6305 NAVY TYPE A CLASS b GRADE II
(D) TYPE OF LUBRICATION- GREASE NAVY SYMBOL - 14-L-3b GRADE "B"
(E) BEARINGS SHOWN ARE APPROVED BY BALL BEARING MAUFACTURER AS REQUIRED BY PAR 7 (C) APPENDIX I OF NAVY SPEC. 42B5
BRG. MFR. S.K.F. INDUSTRIES INC.
SIGNED W.E. Ball Pur. Agt. 8/15/42

POLES
(A) MAIN 2 LAMINATED STEEL (B) AIR GAP NOMINAL .040
(C) COMM. 1 SOLID STEEL (D) AIR GAP NOMINAL .0625
ARMATURE
(A) DIAM. 5 (B) CORE LENGTH 4 1/2
COMMUTATOR
(A) DIAM. 3 (B) LENGTH 1 5/8 (C) WEARING DEPTH 7/16 ON DIA.
(D) UNDERCUT (E) INSUL. BET. BARS .030 MICA TO GROUND 1/16 MICA
BRUSHES
(A) NO. OF STUDS 2 (B) NO. OF BRUSHES PER STUD 2
(C) DIMENSIONS: LENGTH 1 WIDTH 5/8 THICKNESS 3/16
(D) GRADE: NAVY A MANUFACTURER NATIONAL CARBON CO
EXCEPTIONS TO NAVY SPECIFICATIONS:
NONE.

PART B OF DR-2403

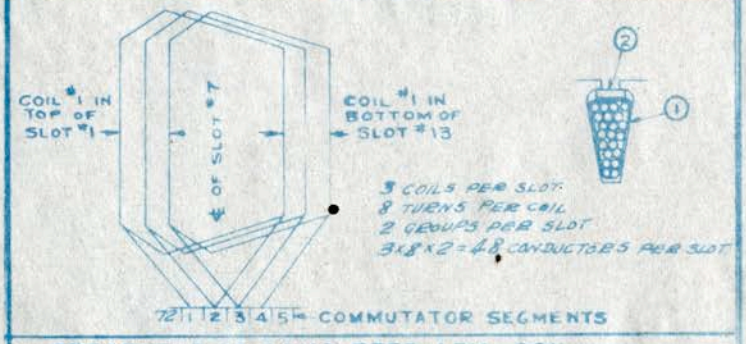
ARMATURE WDG. DATA	
NO. OF SLOTS	24
NO. OF COMM. SEGMENTS	72
NO. OF SINGLE COILS	72
CONDUCTOR COPPER	#18½
CONDUCTOR INSUL.	S.C.C.E
TURNS IN SERIES PER COIL	8
DEVELOPED LENGTH IN FT. PER COIL	14½
WEIGHT OF COPPER IN LBS.	4 13/16
RESISTANCE AT 25 °C	1.91Ω

INSUL. OF COILS

SEE VIEW BELOW

① PLACE IN EACH SLOT A CELL OF .012 FISH PAPER MICA

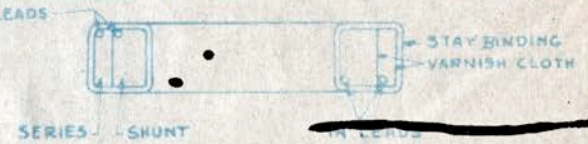
② AFTER ARMATURE IS WOUND PUT A ⅛ FISH PAPER STICK IN TOP OF SLOT.



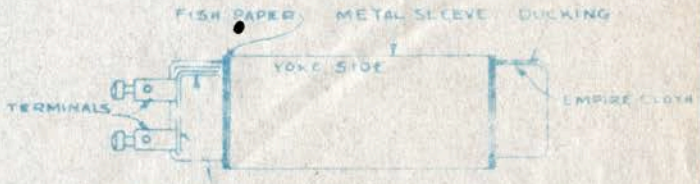
TREATMENT OF COMPLETED ARM. COIL

1. DIP COMPLETE 4 PH FOR ½ HOUR, DRAIN & BAKE 10 HOURS AT 100°C.
2. GIVE WINDINGS TWO COATS BLACK BAKING VARNISH DIP, DRAINE
3. BAKE 10 HOURS AT 100°C AFTER EACH DIP.
4. SPRAY COMPLETE WINDINGS WITH TWO COATS RED GLYPTAL INSULATOR &
5. ALLOW TO THOROUGHLY DRY BETWEEN EACH SPRAY

FIELD WINDINGS	MAIN SERIES	MAIN SHUNT	COMM
CONDUCTOR	# 13½	#26	2-4
CONDUCTOR INSUL.	S.C.C.	S.C.C.	S.C.C.
CONDUCTORS IN MULTI	1	1	1
TURNS PER COIL	25	TOTAL 1360 / 1680	193
DEV. LENGTH IN FT. PER COIL	43	TOTAL 1935 / 2604	210
WEIGHT OF COPPER IN LBS. PER COIL	5/8	3 3/16 / 3 29/32	2 1/16
RES. PER COIL AT 25°C	.037Ω	.210Ω	.536Ω



VIEW OF COMPOUND FIELD COIL



FLEX MICA UNDER TERMINAL

VIEW OF COMMUTATING FIELD COIL

TREATMENT OF COMPLETED COILS

MAIN FIELD	COMM FIELD
WIND COIL IN PETRITE INSULATING CEMENT. BEND COIL & CLAMP TO SHAPE BAKE 10 HOURS AT 100°C TO HARDEN PETRITE. REMOVE FORM. PAINT COIL WITH ONE COAT OF AIR-DRYING VARNISH. GIVE COIL TWO DIPS IN GLYPTAL INSULATOR AND ALLOW TO THOROUGHLY AIR-DRY BETWEEN EACH DIP.	WIND COIL IN PETRITE INSULATING CEMENT. BAKE 10 HRS AT 100°C TO HARDEN PETRITE. PAINT COIL WITH ONE COAT OF AIR DRY AIR VARNISH & GIVE COIL TWO DIPS IN GLYPTAL INSULATOR AND ALLOW TO THOROUGHLY AIR-DRY BETWEEN EACH DIP

INSULATION MATERIALS

MAIN FIELD	NAVY SPEC
BETWEEN SHUNT & SERIES	ALL CLASS "A"
2-.005 EMPIRE CLOTH COILS	
INSIDE CORNERS WHERE COIL	
RESTS ON POLE SHOE .013	
PAPER. OUTER PERIPHERY	
ONE LAYER VARNISH CLOTH	
TAPE ½ LAP	
COMM. FIELD	
SLEEVE INSULATION 3 TURNS	
.013 FISH PAPER LAYERED	
BY ONE TURN 3.32 DUCKING	
TERMINAL INSULATION .02	
FLEX MICA OUTER PERIPHERY	
ONE LAYER [illegible] TAPE	
½ LAP	

PART C OF DR-2403

LIST OF MATERIAL

QUANTIES ARE FOR ONE MACHINE

PIECE NO.	NAME OF PIECE	NO. REQ'D	MATERIAL	NAVY SPEC. LATEST ISSUE	CONTRACTOR'S DRAWING NO.
1	ARM. SHAFT	1	C-1045 ST.	49S-2 CLASS B SPECIAL	284027
2	ARM. CORE ASSEM.	1			DG-2342
3	ARM. COILS	24	COPPER		DG-2403
4	SLOT & BINDING MAT'L.	1 SET			
5	BALL BRG. (S.K.F. #6305Z)	1	STEEL	42B-5C #305	
6	BALL BRG. (S.K.F. #6306Z)	1	STEEL	42B-5C #306	
7	BRG. LOCKNUT (SKF N-05)	1	H.R. STEEL	49S-2 CLASS B SPECIAL	
8	BRG LOCKWASHER (S.K.F. W-05)	1	SH. STEEL	47-S-11	
9	BRG LOCKNUT (S.K.F. N-06)	1	H.R. STEEL	49S-2 CLASS B SPECIAL	
10	BRG. LOCKWASHER (S.K.F. W-06)	1	SH. STEEL	47-S-11	
11	COMM. ASSEM.	1			235760
12	COMM. SEGMENT	72	COPPER	47-C-2	235750
13	SEGT. INSUL. #1	72	MICA	17-M-5	263756
14	FIELD YOKE	1	CAST STEEL	49S-1 LOW CARBON	DK-45042
15	MAIN POLE ASSEM.	2	SH. STEEL	47S-11	DH-30011
16	HEX. HD. SCR. 3/8-16 x 1 3/4 LG.	4	STEEL	43B-11	
17	HEX. HD. SCR 5/16-18 x 1 1/2 LG.	2	STEEL	43-B-11	
18	COMM COIL & POLE ASSEM.	1			DG-728
19	COMP FIELD COIL	2			DG-2403
20	COMM HOUSING	1	CAST STEEL	49-S-1	299294
21	HOUSING	1	CAST STEEL	49-S-1	299187
22	HEX. HD. SCR 3/8-16 x 3 1/2 LG.	4	STEEL	43B-11	
23	HEX. HD. SCR 3/8-16 x 2 1/2 LG.	4	STEEL	43B-11	
24	END CAP	1	STEEL	49-S-1	290241
25	END CAP	1	STEEL	49 S-1	DH-30405
26	END CAP	1	STEEL	49 S-1	DH-30406
27	END CAP	1	STEEL	49 S-1	290302
28	HEX. HD. SCR 1/4-20 x 2 1/2 LG.	4	STEEL	43-B-11	
29	HEX. HD. SCR 3/8-16 x 2 1/4" LG.	4	STEEL	43-B-11	
30	GREASE SEAL #42	1	CORK		216208
31	GREASE CUP (EMPRESS 00	2	STEEL		
32	NAME PLATE	1	BRASS		288083
33	COVER PLATE #4	2	SHEET STEEL	47S-11	297941
34	COVER (SCREEN)	2	SHEET STEEL	47S-11	298244
35	FIL. HD MACH. SCR 10-24 x 1/2" LG.	16	STEEL	43B-11	
36	FAN ASSEM.	1	SHEET STEEL	47-S-11	297237
37	BRUSH ASSEM. #1	4	CARBON	17-B-8 GRADE-A	291563
38	BRUSH HOLDER ASSEM.	2	BRASS BODY	46B-11	296550
39	BRUSH HOLDER SPRING R.H.	2	PHOS. BRONZE	46B-14	235471
40	BRUSH HOLDER SPRING L.H.	2	PHOS. BRONZE	46B-14	235472
41	ROCKER ARM	1	STEEL	46S-1	262999
42	INSULATION SHIELD-FEMALE	2	BAKELITE		235461
43	INSULATION SHIELD-MALE	2	BAKELITE		235462
44	BRUSH STUD ASSEM.	2			263017
45	LEAD ASSEMBLY	1			237270
46	CONDUIT BOX ASSEM.	1	STEEL		N-17336
47	TERMINAL	9	COPPER	17-C-13	212016
48	COMM. POLE ASSEM.	1	H.R. STEEL		DG-678
49	DRAIN PLUG 1/8"	2	STEEL		
50	FAN SUPPORT		CAST STEEL	49-S-1	298259
51					
52					
53					
54					

PART D OF DR-2403

LIST OF SPARE PARTS AND TOOLS (PER VESSEL)

REPRODUCED FROM MFRS. DRAWING NO. DE-2403 BUREAU NO.
NAMES AND NUMBERS OF VESSELS: SEE TITLE BLOCK

APPLICATION - LATHE DRIVE MOTOR APPLIANCE - D.C. MOTOR
NAVY CONTRACT NO. NOBS-100, NS-9257, NZ20-3 72130 ALLIS-CHALMERS MFG. CO.
SHIP BUILDERS ORDER NO.

ITEM NO.	NO. OF SETS	NO. PER SET	NAME OF PART OR TOOL	MANUFACTURERS DATA: CATALOG OR SERIAL ORDERING DATA	MFRS. DRWG AND PIECE NO.: PC.	MFRS. DRWG AND PIECE NO.: DWG. NO.	BUREAU DWG AND PIECE NUMBER: DWG. NO.
1	1	1	ARMATURE ASSEMBLY			DG-2640	
2	1	1	SKF BALL BRG. #6325-Z		5		
3	1	1	SKF BALL BRG. #6306-Z		6		
4	1	2	FIELD COIL		19	DG-2409	
5	2	1	COMM. COIL		18	DG-728	
6	6	4	BRUSH #1		37	291563	

SPARE PARTS

SPARE PARTS FOR USE WITH—

TYPE EB FRAME 51

2 250 VOLTS

1150 R.P.M. 75 AMPS. D.C. MOTOR

SERIAL NO.

CASE NO.

GROSS WT. 92 LBS. NET WT. 57 LBS.

LEGEND—

WHEN REORDERING ALWAYS REFER TO MACHINE SERIAL NUMBER

NO. OF SHEETS 1 SHEET NO. 1

NO.	DESCRIPTION	AUTHORITY	BY	DATE	APP'D CONTRACTOR	DATE	APP'D GOV'T APP'L

ALTERATION

PART E OF DR-2403

ALLIS CHALMERS MFG. CO.
INSTRUCTION SHEET NO. 1 FOR
DIRECT CURRENT MOTORS AND GENERATORS

INSTALLATION

Unless suitably protected, the machine should be installed in a place that is clean, dry, well ventilated, and accessible for care and inspection. It should be rigidly supported, level, and after alignment with the drive or driven unit, securely bolted in place. Before starting the first time, check all electrical connections with wiring diagrams. In case of sleeve type, oil-lubricated bearings shipment is made without oil. Make sure that the bearings and oil wells are free from dust and dirt and that oil plugs are tight. Fill the oil wells to a point slightly below the overflow with a good grade of lubricating oil When starting, make sure that the oil rings in the bearings turn freely and carry up oil.

Anti-friction bearing machines are shipped from the factory with bearings properly packed with grease and ready to operate.

OPERATION

In case the brushes do not make good contact with the commutator, insert a piece of fine sandpaper between brush and commutator, drawing it back and forth over contour of commutator until the face of brushes is ground down to an even seat. High grade brushes are provided, having characteristics especially selected to provide satisfactory operation. Before substituting a different grade of brush, the factory should be consulted. Proper brush pressure is important and this pressure should be checked regularly to insure best operation. A pressure of approximately 2-1/2 pounds per square inch be maintained by adjusting the pressure spring lever to the proper notch in brush holder lever rack.

The proper brush position is determined at the factory. Each machine has one mark the brush rocker arm and one or two marks on the housing. If the operating position is the same as the neutral there is only one mark on the housing. If the operating position is other than neutral, and additional mark is made on the housing which will be directly opposite the one on the brush rocker arm. This is the correct operating position. The other marked position is the neutral. In case the direction of rotation is changed, and the brushes are other than neutral, then they should be rocked back to the neutral marking or to a position giving desired regulation for this changed rotation. This is as important as making the external changes to reverse rotation.

ALLIS CHALMERS MFG. CO.
INSTRUCTIONS SHEET NO.2 FOR
DIRECT CURRENT MOTORS AND GENERATORS

MAINTENANCE

To insure the most satisfactory operation, a systematic inspection should be made at least once a week.

Both the interior and exterior should be kept free from oil, water, dust and dirt. The exterior should be wiped and the interior blown out by compressed air or a small hand bellows. The bearings should be inspected to see that there is an ample supply of oil or grease. Check all electrical connections to be sure of good contact and tight joints. Examine the brushes, being sure they move freely in holders, have proper pressure on commutator and make good contact. The commutator must be kept clean and should maintain a polished surface. Ordinarily, the commutator will only require an occasional wiping with a dry non-linting cloth. Do not use oil or lubricating compounds of any kind on the commutator. The slots between bars should be kept free from dirt or oil and as commutator wears, a careful inspection should be made of these slots to be sure that the segment mica is below the commutator surface. High segment mica will cause rapid brush wear and usually poor commutation.

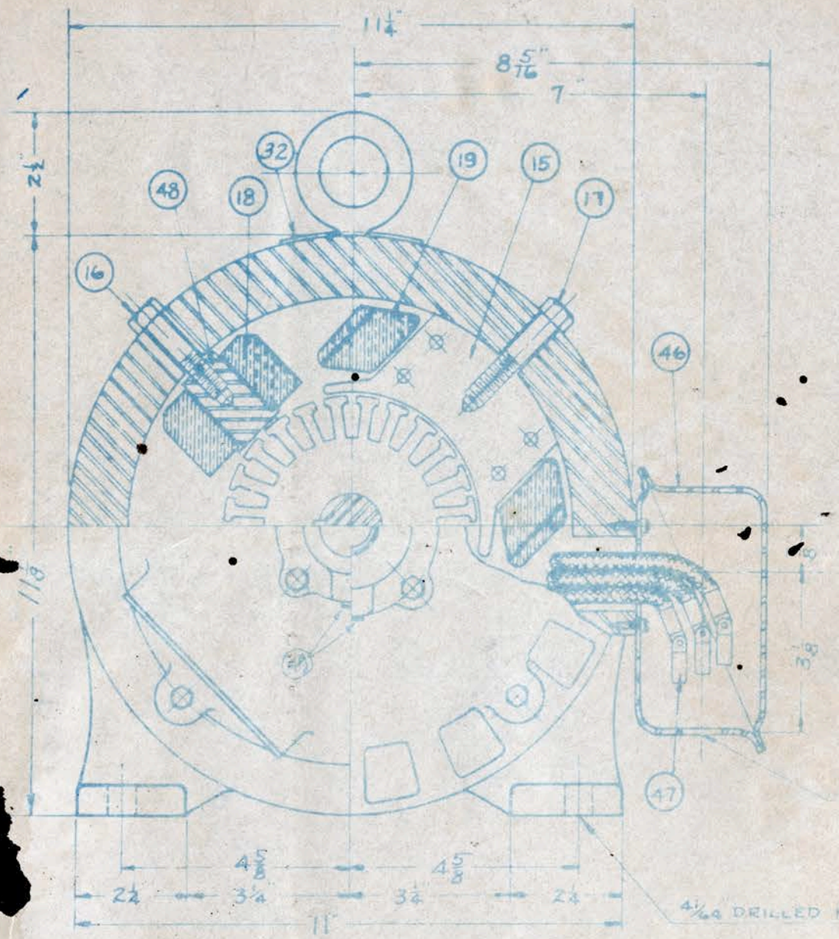
It is also advisable to make a check of insulation resistance at regular intervals, to determine the condition of insulation. A 500 volt megger is usually used. A systematic record of these readings will tend to indicate the condition of the insulation to ground over the period of service, and is a helpful guide to determine the dependability of the machine.

To assure long life of bearings, proper alignment must be maintained, and a high grade of oil or grease used, depending on the type of bearing. A worn bearing will unbalance the air gaps which in turn will unbalance the magnetic pull. This unbalanced magnetic pull increases bearing pressures and tends to distort the shaft and if not taken care of will lead to serious trouble.

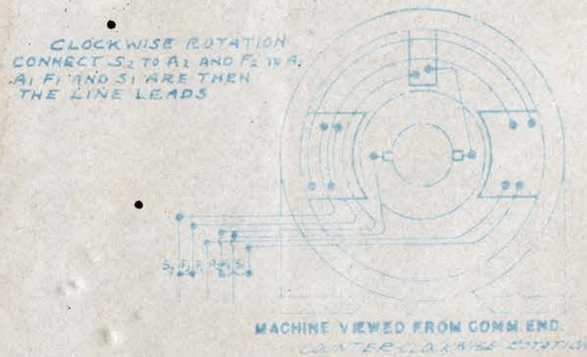
It is recommended that anti-friction type bearings be dismantled at least once a year and bearings and closure parts washed with kerosene, or, preferably, carbon tetrachloride, and the bearings repacked with new grease. The BEARING CAVITY SHOULD NEVER BE FILLED MORE THAN HALF FULL OF GREASE. Users of anti-friction bearings are cautioned against pounding or bumping on pulleys, couplings, etc. in a manner which will transmit the shock to the bearings, if satisfactory operation is expected.

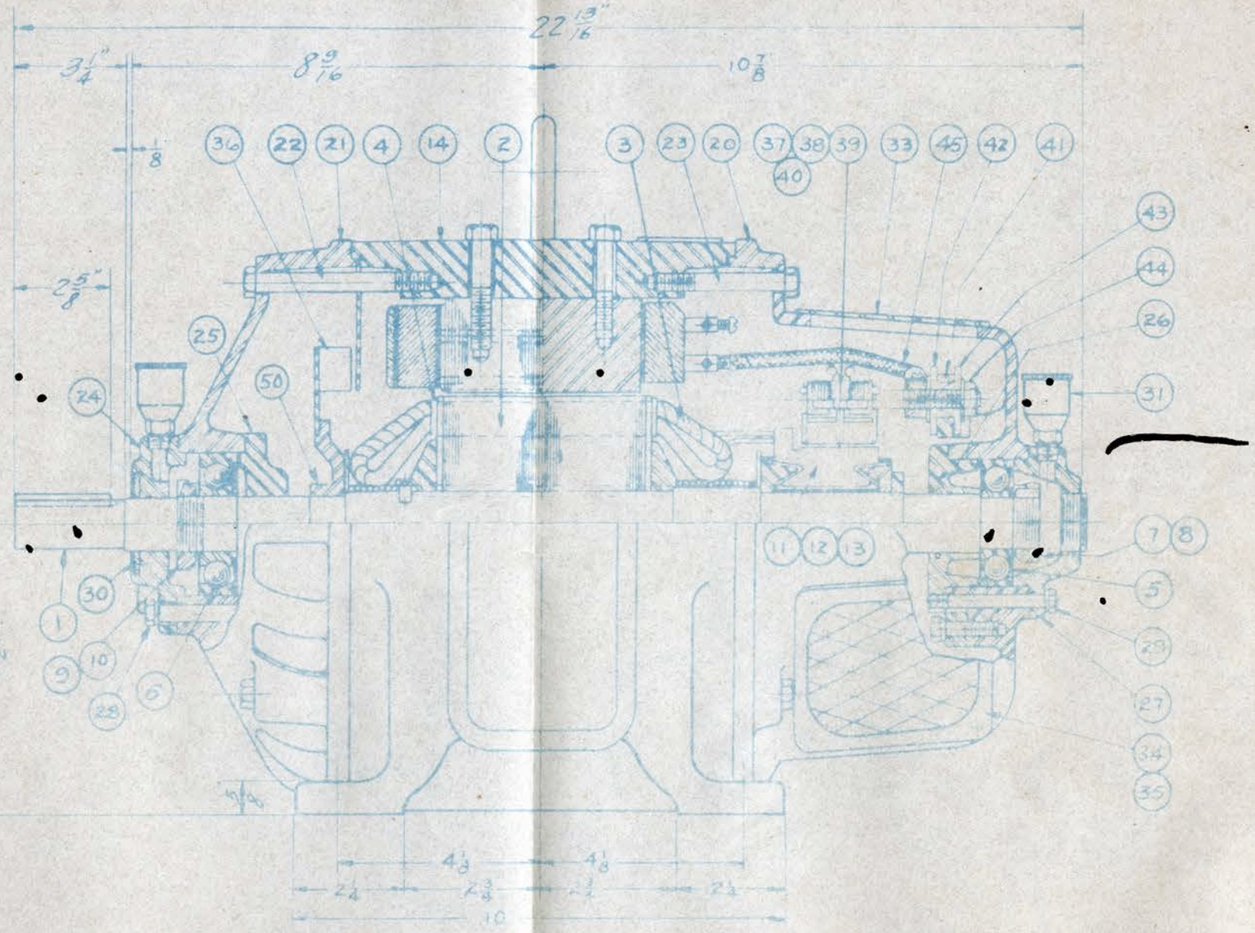
REPAIRS AND SUPPLIES

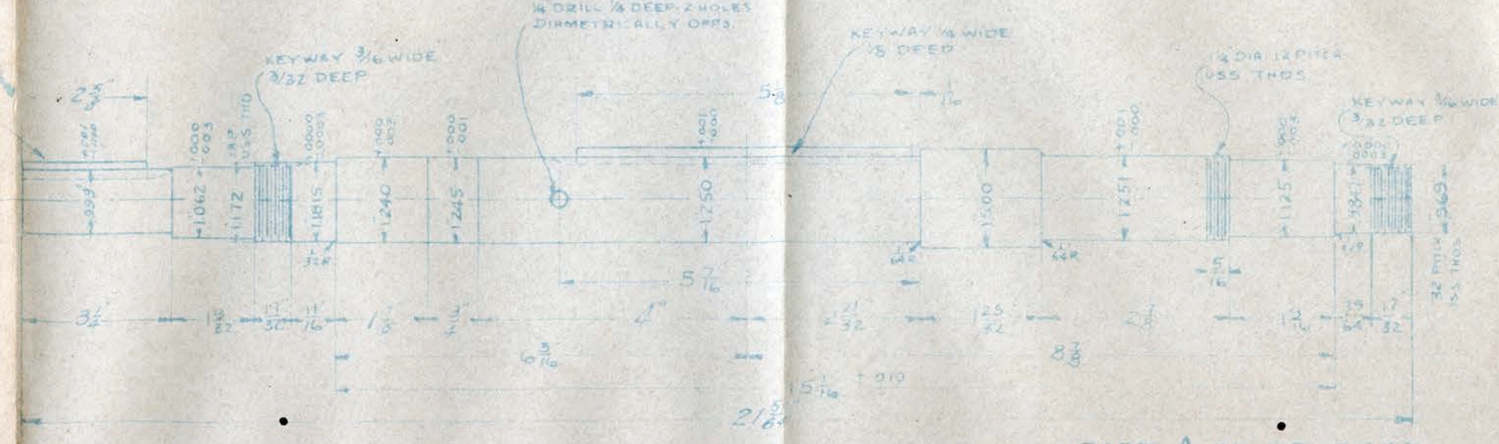
When writing for repair parts and supplies, always give the SERIAL NUMBER and other data found stamped on the nameplate.



NOTE
ARMATURE CORE AND COMMUTATOR CANNOT BE REMOVED FROM SHAFT WITHOUT DESTROYING WINDINGS







PART A OF DR-2403

THE SEBASTIAN LATHE CO.
CINCINNATI, OHIO. U.S.A.

METRIC INDEX PLATE

TO OPERATE A & B LEVER, DISENGAGE TUMBLER

SP. GR.	LEVER	THREADS IN M.M.								
48	A	2 1/2	2 14/23	2 8/11	3	3 1/3	3 3/4	4 2/7	4 8/13	5
48	B	5/8	30/64	15/22	3/4	5/6	15/16	1 1/14	1 2/13	1 1/4

10224B

INSTRUCTIONS

HAVE THIS COVENIENT TO THE LATHE

General—The Alignment tests of this lathe showed as follows:

Headstock alignment Top .002" Side .002"

Tailstock alignment .000"

Face Plate Hollow .0001"

We call this to your attention should there be any defect show up in the alignment after you have erected the lathe and put it into operation. Will you please check these items.

Is your lathe leveled properly?

(A machinist's level should be placed on the carriage with the carriage as near the head as possible and then run to the tail-stock end.)

If you have had the head cover off, be sure there is no felt or metal chips between the head cover and the head because if so and the screws were tightened down firmly you might possibly strain the head so as to throw it out of alignment.

Carefully remove the grease that covers the bright parts with a rag or waste saturated with kerosene, then wipe dry.

Is the center, center brush and spindle hole free of all dirt?

Clean the gears and rack carefully, removing all dirt that may have lodged there in transit.

Having selected the location for your lathe, which should be solid so as to avoid shaking or giving of any part of the foundation carefully level the lathe both cross-wise and length-wise, and at several points the entire length of the bed. When properly leveled, fasten the lathe NOT firmly to the floor with lag screws.

This lathe should be oiled daily at every point.

This lathe has been assembled with proper fits of the running parts and as a result may at first operate a trifle stiff but a short time of operation will free every part to operate easier. This wearing in, when lathe is properly oiled, will greatly lengthen the life of the lathe.

To connect the taper attachment (If one is furnished with the lathe) disconnect the cap screw which is at the rear of the bottom slide of compound rest. This screw connects with crossfeed nut. Use the same screw to connect the taper attachment bar, only put the screw in the other hole provided at the rear of the bottom slide. Reserve this when it is desired to connect the crossfeed nut by revolving the crossfeed screw until nut is in location to receive the screw.

THREAD CHASING, ON ALL SIZES OF LATHES

For any thread divisible by six engage half nut at any place. For even threads engage half nut at any line on thread indicator.

For uneven threads engage half nut at any numbered line.

For 11½ Threads on Sizes up to 16"

Engage half nut at No. 1 on indicator for first pass.
Engage half nut at No. 3 for second pass.
Engage half nut at No. 2 for third pass.

For 11½ Threads on 18" and 20"

Engage half nut at No. 1 for first pass.
Engage half nut at No. 3 for second pass.
Engage half nut at No. 5 for third pass.
Engage half nut at No. 1 for fourth pass.

On 11½ Thread Carriage must be brought back to the same point on the bed to pick up the Threading Dial.

NOTE:

TAPER ATTACHMENT

To connect taper attachment to bed bracket, move carriage close to bed bracket tighten ber bracket securely to bed, then tighten dog bar which runs parallel to the bed, to the bed bracket. Oil freely all slides, both top and bottom dove tails, and see that carriage moves freely from one end to other end of slide.

SPECIAL INSTRUCTIONS ON TYPE H LATHES

For oiling Type H Geared Head you will find a drain at rear. By removing the plug, oil will drain out. The gauge is marked to show proper level and it should be replaced twice a year.

Use a good grade of machine oil.

To oil reserve place gears and bushings, open door.

To adjust drive clutch, disengage clutch. Press on lock lever "A" and turn adjuster "B" one-quarter inch to right, release lock lever and continue to turn slowly to right until lock lever "A" snaps into next slot. If clutch does not pull properly after adjusting one slot, adjust to next slot. Don't adjust more than one slot at a time.

To oil drive clutch; oil sleve bearings are oiled by filling oiler "C" and filling sleeve with good quality machine oil, once every week. The gears in the headstock are all heat treated and hardened but it is so simple to stop the machine—always do so by disengaging the clutch before changing speeds. To change from in to out of back gear an easy way to find the clutch pins is to revolve the face plate, chuck or work by hand, to get the clutch pins to engage easily.

Safety shear pin is at the right hand end of Quick Change box and is a small brass pin and if it shears, simply drive it out a little further. An extra pin is sent with this lathe.

Drive Belt take up is easily accomplished by operating the two screws which can be reached through the doors at the front of motor leg. One elevates and lowers the plate and the other holds the position. (Be sure to oil motor through leg doors.)

THE SEBASTIAN LATHE COMPANY

CINCINNATI, OHIO, U. S. A.

FORM 1156

INSTRUCTIONS

FOR

LATHE

14 inch

U.S.S. PUFFER (SS268)

SUBMARINES	BUILDER
SS-212 - SS-227	ELECTRIC BOAT CO.
SS-240 - SS-264	ELECTRIC BOAT CO.
SS-265 - SS-274	MANITOWOC SHIPBUILDING CO.

THE SEBASTIAN LATHE COMPANY

CINCINNATI, OHIO

IMPORTANT FEATURES USED IN SEBASTIAN LATHES



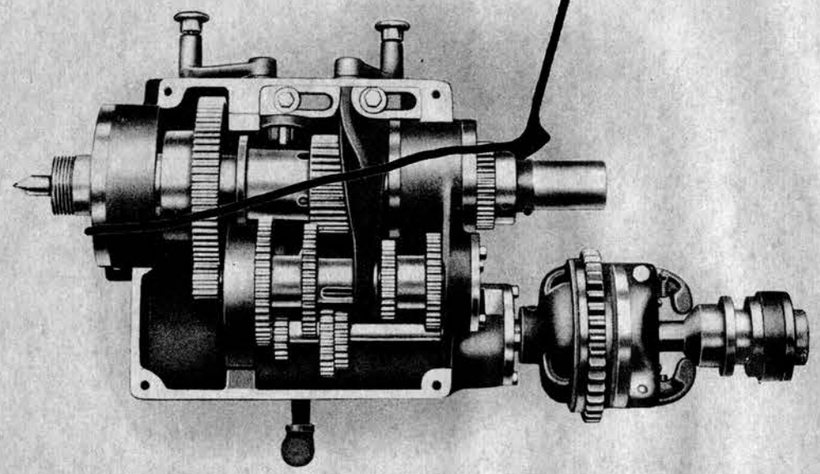
The Sebastian Lathe Company

CINCINNATI, OHIO, U. S. A.

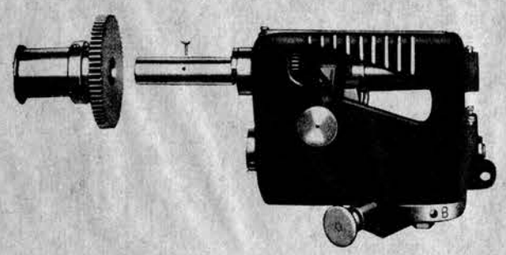
MAIL ADDRESS
P. O. Box 1017, Cincinnati, Ohio

Established 1882

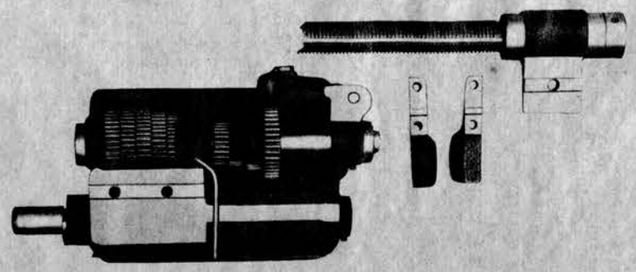
CABLE ADDRESS
Sebastian, Cincinnati



Timken Equipped Geared Headstock

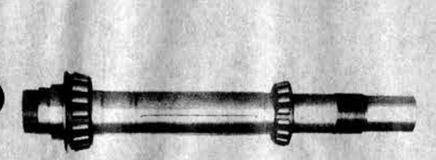


Quick Change Box

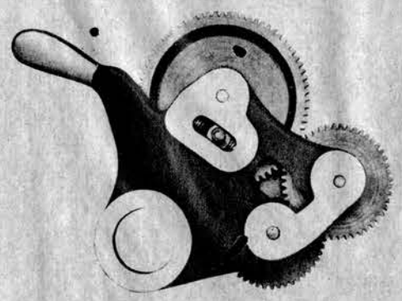


Alignment of Units

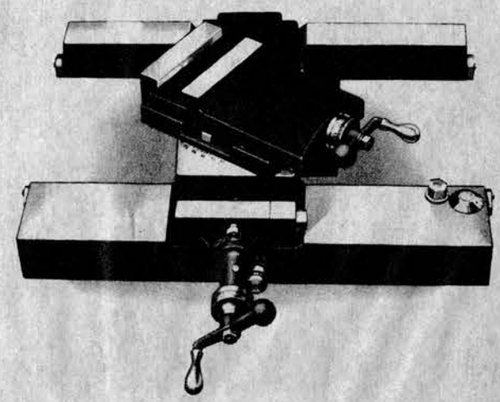
THE SEBASTIAN LATHE COMPANY - - CINCINNATI, OHIO, U. S. A.

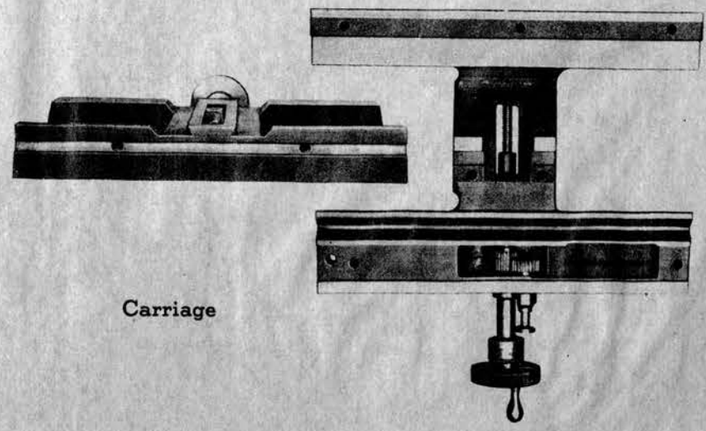


Spindle

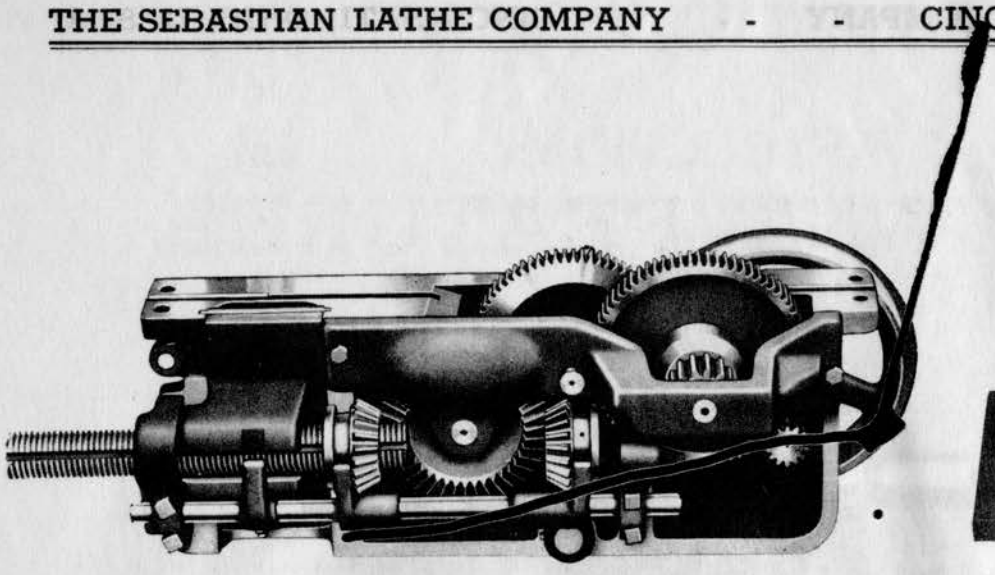


Quadrant

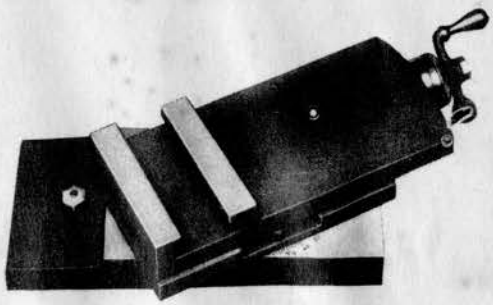




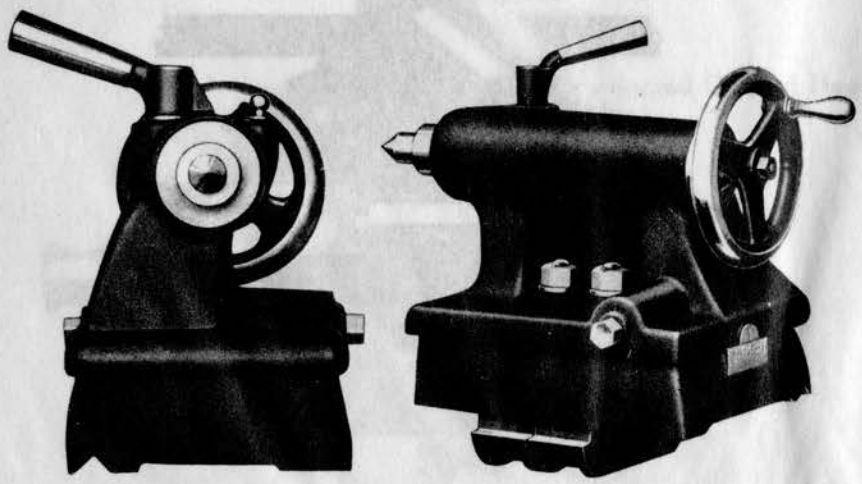
Carriage

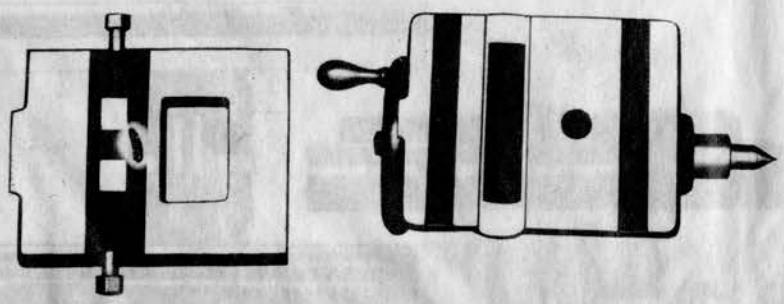


Apron

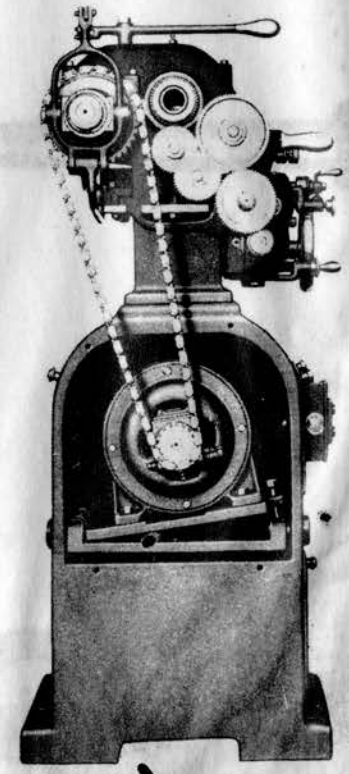


Compound Rest





Tailstock



End View Of 12-Inch Motor Driven Lathe
Guards Removed

INSTRUCTIONS

HAVE THIS COVENIENT TO THE LATHE

General—The Alignment tests of this lathe showed as follows:

Headstock alignment.....

Tailstock alignment.....

Face Plate Hollow.....

We call this to your attention should there be any defect show up in the alignment after you have erected the lathe and put it into operation. Will you please check these items.

Is your lathe leveled properly?

(A machinist's level should be placed on the carriage with the carriage as near the head as possible and then run to the tail-stock end.)

If you have had the head cover off, be sure there is no felt or metal chips between the head cover and the head because if so and the screws were tightened down firmly you might possibly strain the head so as to throw it out of alignment.

Carefully remove the grease that covers the bright parts with a rag or waste saturated with kerosene, then wipe dry.

Is the center, center brush and spindle hole free of all dirt?

Clean the gears and rack carefully, removing all dirt that may have lodged there in transit.

Having selected the location for your lathe, which should be solid so as to avoid shaking or giving of any part of the foundation carefully level the lathe both cross-wise and length-wise, and at several points the entire length of the bed. When properly leveled, fasten the lathe NOT firmly to the floor with lag screws.

This lathe should be oiled daily at every point.

This lathe has been assembled with proper fits of the running parts and as a result may at first operate a trifle stiff but a short time of operation will free every part to operate easier. This wearing in, when lathe is properly oiled, will greatly lengthen the life of the lathe.

To connect the taper attachment (If one is furnished with the lathe) disconnect the cap screw which is at the rear of the bottom slide of compound rest. This screw connects with crossfeed nut. Use the same screw to connect the taper attachment bar, only put the screw in the other hole provided at the rear of the bottom slide. Reserve this when it is desired to connect the crossfeed nut by revolving the crossfeed screw until nut is in location to receive the screw.

THREAD CHASING, ON ALL SIZES OF LATHES

For any thread divisible by six engage half nut at any place.
For even threads engage half nut at any line on thread indicator.

For uneven threads engage half nut at any numbered line.

For 11½ Threads on Sizes up to 16"

Engage half nut at No. 1 on indicator for first pass.
Engage half nut at No. 3 for second pass.
Engage half nut at No. 2 for third pass.

For 11½ Threads on 18" and 20"

Engage half nut at No. 1 for first pass.
Engage half nut at No. 3 for second pass.
Engage half nut at No. 5 for third pass.
Engage half nut at No. 1 for fourth pass.

On 11½ Thread Carriage must be brought back to the same point on the bed to pick up the Threading Dial.

NOTE:

TAPER ATTACHMENT

To connect taper attachment to bed bracket, move carriage close to bed bracket tighten ber bracket securely to bed, then tighten dog bar which runs parallel to the bed, to the bed bracket. Oil freely all slides, both top and bottom dove tails, and see that carriage moves freely from one end to other end of slide.

SPECIAL INSTRUCTIONS ON TYPE H LATHES

For oiling Type H Geared Head you will find a drain at rear. By removing the plug, oil will drain out. The gauge is marked to show proper level and it should be replaced twice a year.

Use a good grade of machine oil.

To oil reserve place gears and bushings, open door.

To adjust drive clutch, disengage clutch. Press on lock lever "A" and turn adjuster "B" one-quarter inch to right, release lock lever and continue to turn slowly to right until lock lever "A" snaps into next slot. If clutch does not pull properly after adjusting one slot, adjust to next slot. Don't adjust more than one slot at a time.

To oil drive clutch; oil sleve bearings are oiled by filling oiler "C" and filling sleeve with good quality machine oil, once every week. The gears in the headstock are all heat treated and hardened but it is so simple to stop the machine—always do so by disengaging the clutch before changing speeds. To change from in to out of back gear an easy way to find the clutch pins is to revolve the face plate, chuck or work by hand, to get the clutch pins to engage easily.

Safety shear pin is at the right hand end of Quick Change box and is a small brass pin and if it shears, simply drive it out a little further. An extra pin is sent with this lathe.

Drive Belt take up is easily accomplished by operating the two screws which can be reached through the doors at the front of motor leg. One elevates and lowers the plate and the other holds the position. (Be sure to oil motor through leg doors.)

THE SEBASTIAN LATHE COMPANY

CINCINNATI, OHIO, U. S. A.

MECHANICAL FEATURES OF SEBASTIAN LATHES

The instructions listed herein are to be used in conjunction with our circular entitled "Important Features Used in Sebastian Lathes" which is attached herewith. This circular illustrates all of the component parts of this lathe.

HEADSTOCK

The mechanics of this head consist of three shafts, a drive shaft or power shaft, an intermediate shaft, and a spindle which is made of high carbon steel, heat treated to rigid specifications. These three shafts carry the head gears which are heat treated and shaved.

Keyed to and sliding on the drive shaft is a gear cluster composed of four gears which ratioally transmit power from the drive shaft to the intermediate shaft. The gear assembly of the intermediate shaft consists of four fixed gears and one sliding pinion. Mounted on the spindle are two gears; the face gear which is driven by the sliding pinion of the intermediate shaft; and the bull gear which slides on the spindle and is driven by one of the fixed gears of the intermediate shaft.

Facilities for selecting any one of the eight speeds, arranged in geometric progression, of this headstock have been conveniently arranged through two shifter levers on the face of the headstock. The lever to the left shifting the cluster gears and the lever to the right shifting the intermediate shaft pinion and the spindle bull gear.

All shafts in this headstock are mounted on anti-friction bearings and run in a bath of oil. The adjustment of these bearings has been provided for by means of adjustment nuts on the spindle and drive shaft and shims on the intermediate shaft.

QUICK CHANGE BOX

This box consists of a tumbler shaft which extends out of the box and transmits the motion from the quadrant to a tumbler which slides on the shaft and transmits the motion to the train gears. Train gears consist of nine gears which are fixed on the train gear shaft and which ratioally transmit the motion to the compound gears. The compound gears, mounted on and sliding on one end of the lead screw, thereby transmit the motion from the train gears to the lead screw. This compound is controlled by the A and B lever which is mounted on the bottom of the box. Convenient facilities for oiling the bearings of this unit have been provided by brass ~~rubes~~ tubes.

QUADRANT

The quadrant consists of a cast iron bracket located by and having its bearing on the quick change box. Its function is to support the quadrant gears which ratioally transmit the motion from the spindle to the tumbler shaft. These gears are arranged in a fashion

so that by simply sliding the sliding gear, which is on the tumbler shaft, ratios of 1 to 1, 2 to 1 and 4 to 1 can be obtained. This quadrant, sometimes referred to as the reverse plate, can be used to reverse the motion of the lead screw with relationship to the spindle by loosening the clamp bolt and rocking the complete unit forward until the alternate gear is in mesh with the spindle gear.

CARRIAGE

The carriage or saddle is rigidly constructed and has its bearings on the two outside ways of the bed. It is completely equipped with tapered gibs, clamps, locks, wipers, chip cover, both power and hand crossfeed, and a hand compound feed. It is equipped with a graduated swivel slide having a full 360 degrees swing. The crossfeed nut is made of a special bronze alloy which reduces wear on the screw to a very minimum thereby enabling the unit to maintain its accuracy over a greater period of time.

APRON

The construction of this unit is clearly shown. The power for the feeds is taken from the screw through the spline which drives two small bevel gears. The shifting of these bevel gears provides an instantaneous reverse for the feeds which are selected through the quick change box and controlled by a drop lever friction in the apron. All shafts and studs in this unit are heat treated and have their out board support by means of a rigid back plate. The split nuts are of a special grade of cast iron which reduces wear on the screw to a minimum. Arrangement has been provided so that the split nuts and the feed mechanism cannot be simultaneously engaged.

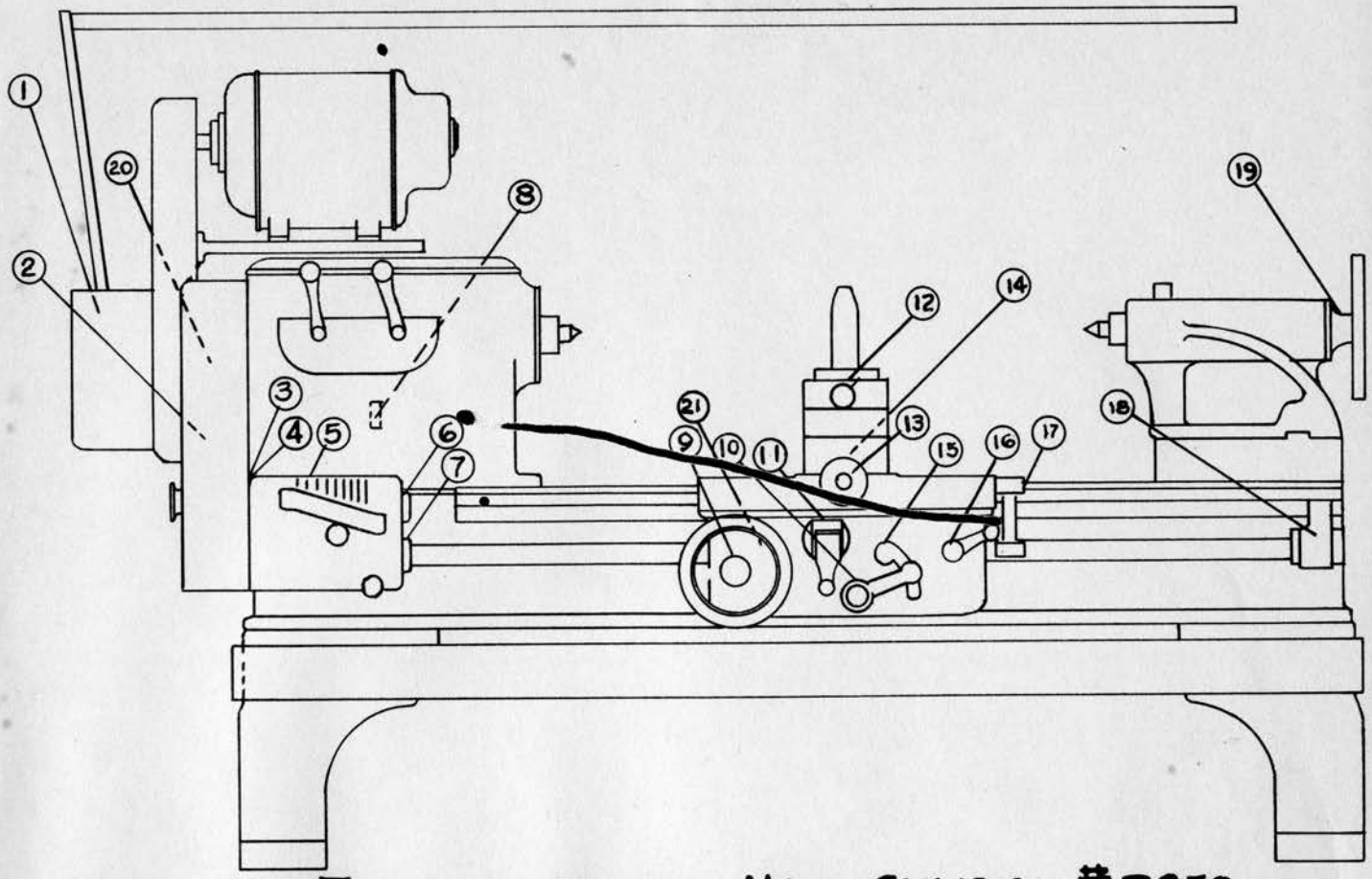
TAILSTOCK

The tailstock is of customary design in that adequate bed clamping facilities, the usual method of set over, and the movement of the spindle being controlled by hand wheel on the rear of the unit, have been provided. The feature of this unit is that the spindle is locked in position by a patented binder, thus eliminating the usual split in the tailstock barrel.

POWER FRICTION OR DRIVE CLUTCH

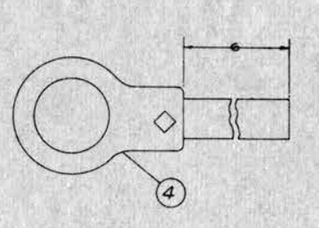
This clutch is located on the outer end of the drive shaft and is supplied so as to provide a means of instantaneous starting and stopping of the motion of the machine. To adjust, disengage clutch, press lock lever "A" and turn adjuster "B" approximately 3/8 of an inch to the right, release lever "A" and continue to turn the adjuster slowly until lock lever "A" snaps into place. If this is not enough, follow the same procedure, adjusting only one notch at a time.

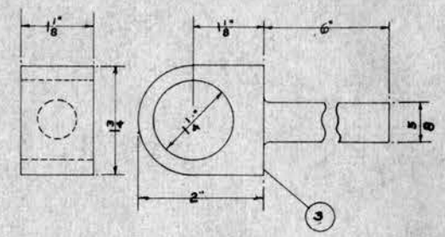
OIL CHART 14" SEBASTIAN LATHE



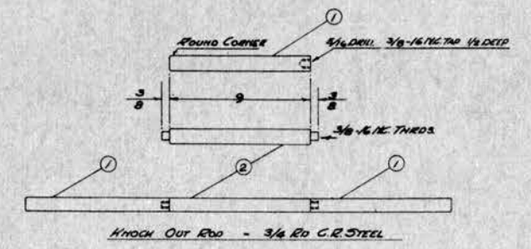
TO BE OILED WITH NAVY SYMBOL # 3050

① FRICTION
② REVERSE PLATE BUSHINGS
③ Q.C. BEARING
④ Q.C. BEARING
⑤ Q.C. BEARING
⑥ Q.C. BEARING
⑦ Q.C. BEARING
⑧ HEADSTOCK DRAIN & FILLER
⑨ FIRST PINION
⑩ REVERSE LEVER
⑪ FRICTION
⑫ TOP SLIDE
⑬ CROSS FEED BUSHING
⑭ CROSSFEED NUT
⑮ BEVEL GEAR PINION
⑯ HALFNUTS
⑰ INDICATOR
⑱ LEAD SCREW BEARING
⑲ TAILSTOCK BELL
⑳ VEE PULLEY
㉑ RACK GEAR





SHIFTER ROD SUPPORT - STEEL



KNOCK OUT ROD - 3/4 RD C.R. STEEL

THE SEBASTIAN LATHE CO. CINCINNATI, OHIO U.S.A.

SLIDING GEAR OUT, FINEST FEED .008

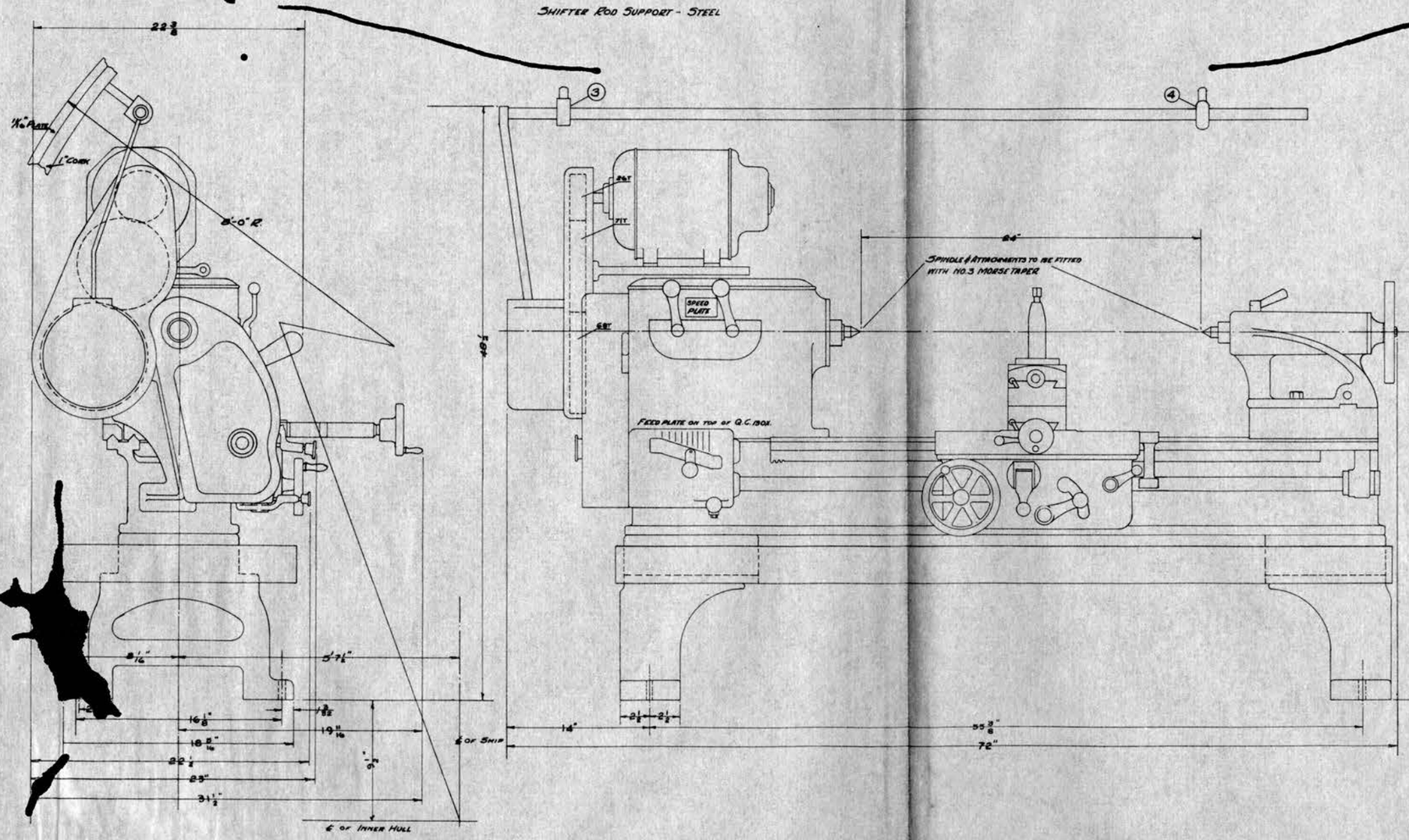
TO OPERATE AS A LEVER DISENGAGE WORM THUMBLE

THREADS PER INCH AND FEEDS IN THOUSANDTHS

BACK GEAR IN											
IN CENTER	A	15	11½	11	10	9	8	7	6½	6	THRDS.
		.065	.068	.072	.080	.088	.088	.112	.121	.131	FEEDS
	B	24	23	22	20	18	16	14	13	12	THRDS.
		.033	.034	.036	.040	.044	.049	.056	.061	.066	FEEDS
IN CENTER	C	48	46	44	40	36	32	28	26	24	THRDS.
		.017	.017	.018	.020	.022	.024	.028	.032	.033	FEEDS
	D	96	92	88	80	72	64	56	52	48	THRDS
		.008	.009	.009	.010	.011	.012	.014	.016	.017	FEEDS
TO CUT FOLLOWING COARSE THRDS. REVERSE "C" GEAR ON SPINDLE											
CENTER OUT	A	6	5¾	5½	5	4½	4	3½	3¼	3	THRDS
		.130	.137	.143	.159	.175	.196	.226	.281	.289	FEEDS
	B	TO CUT EXTRA FINE FEEDS, PULL SLIDING GEAR ALL THE WAY OUT, THEN THREADS & FEEDS WILL BE FOUR TIMES AS FINE AS ABOVE READINGS									

BACK GEAR

FEED PLATE
7¾" × 3⅞"



THE SEBASTIAN LATHE CO
CINCINNATI, O. U.S.A.

GEARED HEAD SPEED PLATE

BACK GEAR IN		BACK GEAR OUT	
REV. PER MIN.	LEVER	REV. PER MIN.	LEVER
19.5	A	122	A
31.5	B	197	B
50.5	D	315	D
78	C	487	C

STOP MACHINE TO CHANGE SPEEDS

SPEED PLATE
3 15/16" × 2 9/16"

REFERENCE PLANS

	Mfrs. No.	Rel. No.
LATHE MOTOR OUTLINE & ASS'Y.	E.D.O-36876	5521B-963-030
LATHE MOTOR CONTROL & SPEC'S.	E.D. 500-T	5521B-349-001

C-W Inc Plan No. 3841

WEIGHT	
TOTAL	2850
MOTOR	200
CONTROL	100
EQUIP.	200
LATHE	2050

NOTE: LATHE WILL CONFORM TO N.D. SPEC. 404 DATED DEC. 1938

55264	PARGO	ELECTRIC BOAT CO.
55263	PADDLE	
55262	MANALLUCK	
55261	MINGO	
55260	LAPON	
55259	JACK	
55258	HOE	
55257	HARDER	
55256	HAKE	
55255	HADDO	
55254	GURNARD	
55253	GUNNEL	
55274	ROCK	MANITOWOC SHIPBUILDING CO.
55273	ROBALO	
55272	REDFIN	
55271	RAY	
55270	RATON	
55269	RAINIER	
55268	PUFFER	
55267	POMPON	
55266	POGY	
55265	PETO	
55262	GARFISH	
55261	FLOUNDER	
55260	FLIER	
55259	FLASHER	
55248	DORADO	
55247	DACE	
55246	CROAKER	
55245	COBIA	
55244	CAVALLA	
55243	BREAM	
55242	BLUEGILL	
55241	BRENHAM	ELECTRIC BOAT CO.
55240	ANGLER	
55227	DARTER	
55226	CORVINA	
55225	CERO	
55224	COD	
55223	BONE FISH	
55222	BLUE FISH	
55221	BLACK FISH	
55220	BARB	
55219	AMBERJACK	
55218	ALBACORE	
55217	GUARDFISH	
55216	GRUNION	
55215	GROWLER	
55214	GROUPER	
55213	GREENLING	
55212	GATO	
NO.	NAME	

LIST OF EQUIPMENT

QUANTITIES ARE FOR ONE LATHE

AMT.	DESCRIPTION
1	MILLING ATTACHMENT
1	3 JAW 6" CHUCK
1	4 JAW 12" CHUCK
1	DRILL CHUCK 3 JAW 0 TO 3/8"
1	LARGE FACEPLATE
1	SMALL FACEPLATE
1	FACEPLATE ANGLE WITH BOLTS
2	SETS OF LIVE CENTERS
2	SETS OF DEAD CENTERS
1	SET OF BELL CENTERS ¼" TO 6"
1	BORING TOOL HOLDER & SET OF BARS
3	CUTTING OFF TOOL HOLDERS WITH CUTTERS
3	TURNING TOOL HOLDERS WITH CUTTERS
1	SET OF LATHE DOGS (⅜, ½, ¾, 1, 1¼ & 2)
1	FOLLOW REST
1	STEADY REST
1	SET OF SIDE MILLING CUTTERS (1/4 [illegible] 3/16 & 7/16" WIDE WITH ARBOR
1	SET OF CONCAVE SIDE METAL SLITTING [illegible] No. 3 Sec. 184 Page
1	ARMSTRONG SPECIAL WRENCH ("C [illegible]
1	SEBASTIAN LATHE TAILSTO [illegible] (1¼" HEX.)
1	THREAD CHASING DIAL
1	KNOCK OUT ROD (3 SECTIO [illegible]

NO.	PART	DESCRIPTION / ALTERNATE	APP.	DATE	AUTH

OUTLINE OF 14" LATHE

THE SEBASTIAN LATHE CO.
CINCINNATI, OHIO

SCALE - ½ SIZE — FEB. 14, 1942

DRAWN BY	J.R.S.
TRACED BY	J.R.S.
INVS. BY	D.E.T.
CHIEF DRAFTSMAN	J.R.S.
HEAD OF DEPT.	D.E.T.

WORKING PAN CONVERTED INTO FINISHED PLAN, CHECKED AND FOUND TO BE CORRECT

_____ U.S.N.
SUPERVISOR OF SHIPBUILDING

CONTRACTORS FILE NO.	BUREAU OF SHIPS FILE NO.		
		GROUP	FILE NO
E.B. #3	55212	591	01

CUTLER-HAMMER

MOTOR CONTROL

INSTRUCTION BOOK

FOR

2 H.P. 250 VOLTS
D-C MAGNETIC CONTROLLER FOR MOTOR DRIVEN LATHE
SEBASTIAN LATHE CO. ORDER 6927
CUTLER-HAMMER, INC. ORDER B564935
CUTLER-HAMMER, INC. PLAN NO. 3541

DATE 3-25-42

CUTLER-HAMMER
PIONEER MANUFACTURERS OF ELECTRIC CONTROL APPARATUS
MILWAUKEE, WIS., C-H PRINTED IN U.S.A.

INSTRUCTION SHEET

NO. 307 THERMAL OVERLOAD RELAY

Description

The essential operating parts of this relay are the heater coil, solder tube, control contacts, ratchet mechanism, and the compression spring. Under normal conditions the contacts of the relay are closed. The spring is then under compression and tends to open the contacts, but this is prevented by the outer part of the solder tube holding the ratchet mechanism. When the current to the heater coil becomes great enough to melt the solder film holding the outer part of the tube, this part of the tube rotates and releases the ratchet mechnism to open the control contacts. The opening of these contacts breaks the circuit to the coil of the contactor handling the power circuit and this circuit is opened. As soon as the power circuit is opened the solder film cools and hardens, after which the relay is ready to be reset with the reset button.

How to Install the Heater Coil

1—Remove the screws holding the instruction plate to the overload relay and take off this plate.

2—Remove the cover of the overload relay by sliding it to the extreme upper position and pulling outward.

3—Remove the terminal nuts at the side of the relay.

4—Insert the heater coil in the overload relay base, with the asbestos tube surrounding the coil. Be sure that the heater coil eyes fit over the terminal studs.

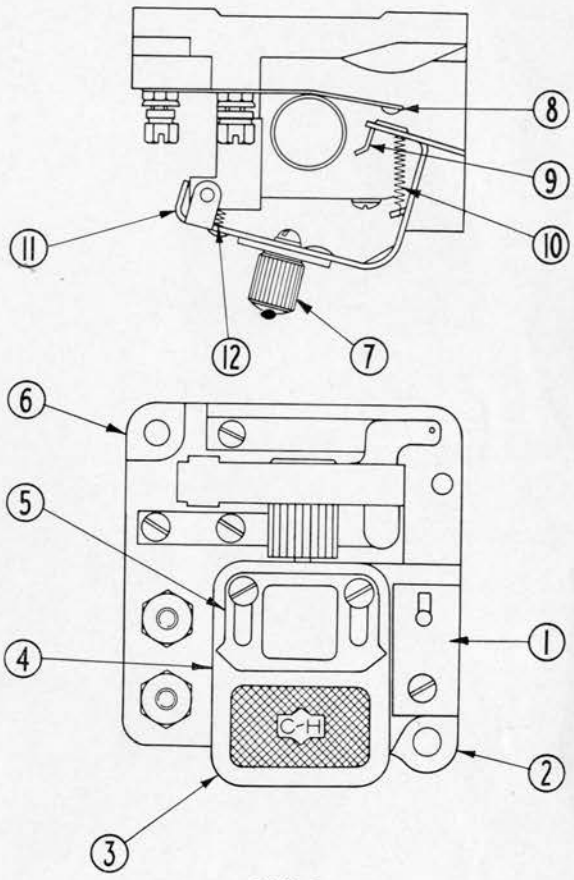
5—Fasten the celluloid calibration plate, which forms a part of the heater coil package, to the front of the overload relay base, using the screw provided for this purpose. Note that the celluloid plate bears a symbol marking which should agree with that on the heater coils.

6—Replace the [illegible] cover which should fit over the heater coil, [illegible] all of the coiled portion of the heater.

7—Replace the terminal nuts.

How to Set the Overload Relay

This relay, is adjustable. The pointer on the instruction plate should be set opposite the current marked on the calibration plate, at which it is desired to have the overload relay trip. This can be done by loosening the two screws which hold the instruction plate and the cover of the relay (item 3 on the cut above), and sliding the entire cover until the pointer on the plate is in the proper position.



34908-3

RENEWAL PARTS—Information Required

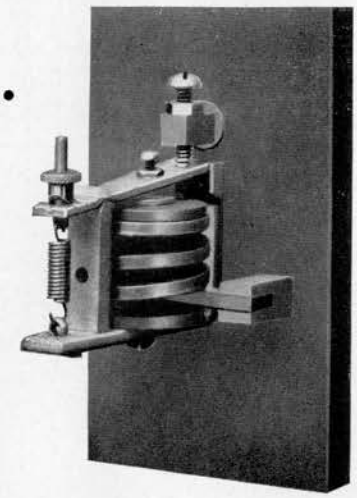
Parts **CANNOT** be sent promptly unless you include the **FOLLOWING** with your order: **PUBLICATION NO. 4527, PART NO., DESCRIPTION,** and the **Number Stamped on the Controller Nameplate.**

Due to the cost of handling, the minimum net billing charge is **$1.00**

Item No.	Description	No. Req.	Part No.
1	Calibration plate (supplied with heater coil)	1	Give No. on Bottom of Plate
2	Complete relay with reset button	...	34908-3 Fig.2
3	Cover and ratchet assembled	1	644–204
4	Heater coil	1	Give No. Stamped on Coil
5	Instruction plate	1	4230–151
6	Moulded base with post for item 11	1	17–1308
7	Reset button	1	2222–805
8	Stationary contact finger	2	640–217
9	Latch	1	845–44
10	Tension spring	1	69–262
11	Assembled contact lever includes items 9 and 10	1	34985–1 Fig. 3
12	Spring	1	69–264

INSTRUCTION SHEET
No. 175 DIRECT CURRENT SERIES RELAY
For Use With Magnetic Contactors

Additional copies of this Instruction Sheet can be obtained by requesting Publication No. 111.



ADJUSTMENT

These relays are for use with direct current contactors of various capacities, to govern the acceleration of the motor.

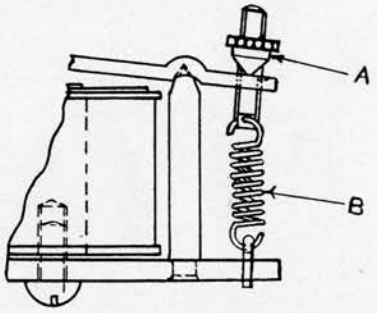
They are sent out properly adjusted for average [illegible] conditions of the motors with which they are to be used. If it is necessary to alter the rate of acceleration of the motor, this may readily be done by means of the adjusting screw shown in sketch opposite.

[illegible] the nut A to the right, increases the tension of the spring B on the armature lever and causes an increase in the rate of acceleration of the motor. Turning nut A to the left, decreases the tension on the armature lever, and causes a decrease in acceleration of the motor.

To speed up acceleration—turn nut A to the right.
To slow down acceleration—turn nut A to the left.

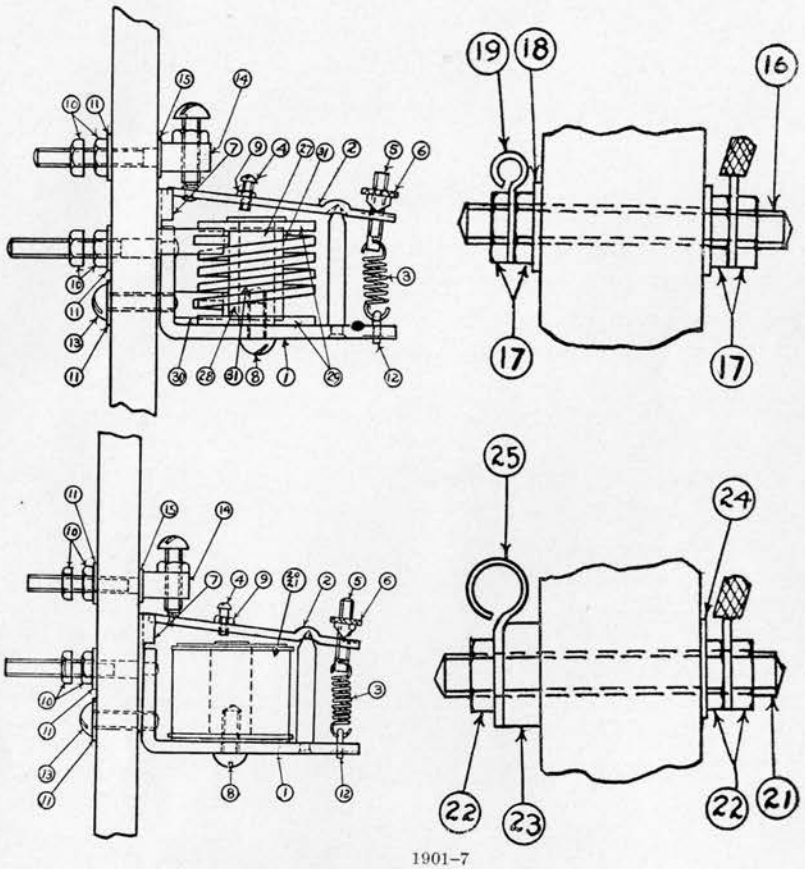
CARE

Keep contacts clean, and free from oil and grease. Lubrication of any part of the relay will serve only to retain dust and make the relay liable to stick.

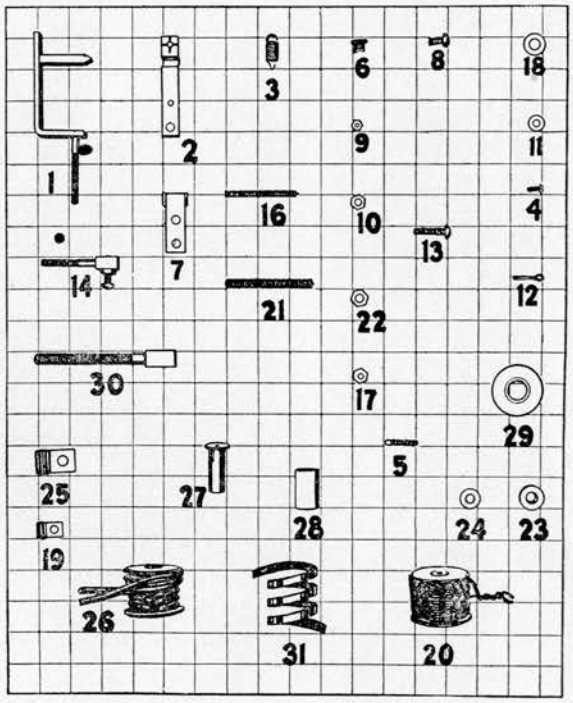


[illegible] CANNOT be sent promptly unless you supply the **INFORMATION REQUIRED.**

INSTRUCTION SHEET
No. 175 DIRECT CURRENT SERIES RELAY
For Use With Magnetic Contactors



1901-7



Scale: One Division=One Inch

INFORMATION REQUIRED

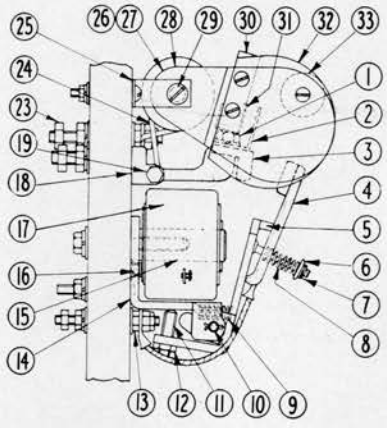
Your parts CANNOT be sent promptly unless you include the FOLLOWING with your order: PUBLICATION No. 111, ITEM NUMBER, STOCK NUMBER and DESCRIPTION.

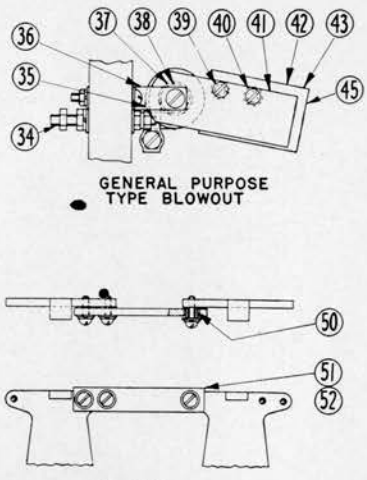
Item No.	No. Req'd	Stock No.	Description
			Parts Common to All Relays
1	1	979–806AZ	Bracket
2	1	624–263	Contact lever
3	1	69–512	Spring
4	1	811–412	8/32″x3/8″ brass screw
5	1	914–422	Adjusting stud
6	1	915–62	Adjusting nut
7	1	819–962	Brass quide
8	1	911–848Z	1/4″–20 screw
9	1	915–242Z	8/32″ hexagon nut
10	4	815–601	1/4″ brass nut
11	2	916–641Z	1/4″ washer
12	1	913–81Z	1/8″x5/8″ cotter pin
13	1	911–856Z	1/4″x1″ rd. head screw
14	1	918–492Z	Binding post
	1	811–854A	Contact screw
	2	815–601	1/4″ hexagon brass nut
	1	916–682Z	1/4″ lock washer
	1	915–24Z	1/4″ hexagon nut
15	1	916–601Z	1/4″ washer
16	1	814–489	1/4″x2-1/[illegible]″ brass stud
17	4	815–601	1/4″ hexa[illegible]on brass nut
18	2	916–641Z	1/4″ wash[illegible]r
19	1	1380–1041	Copper lu[illegible]
20	1	Series Coil	(Give nu[illegible]r stamped on
			75 Ampere Wire
21	1	814–566	5/16″x[illegible] brass stud.
22	2	815–721	5/16″[illegible]n brass nut
23	1	815–726	5/16[illegible] jam nut
24	2	916–762Z	5/[illegible] washer
25	1	1380–1201	Co[illegible]er lug
26		Series Coil	(Give number stampe[illegible]n c
			Bar Wound
27	1	985–1121Z	Core
28	1	1029–88	Insulating tube
29	2	1016–884F	Insula[illegible] washe
30	2	1318–1001	Copper l[illegible]g
	4	815–883	3/8″ hex. nut
	2	916–882Z	3/8″ washe
31	1	Bar Wound co[illegible]	([illegible] number [illegible]

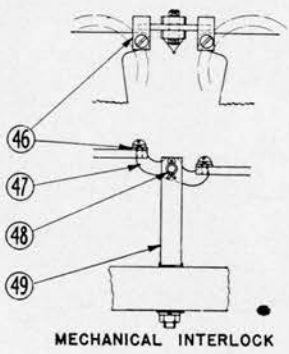
Your parts **CANNOT** be sent promptly unless you supply the **INFO[illegible]RMATIO[illegible]**

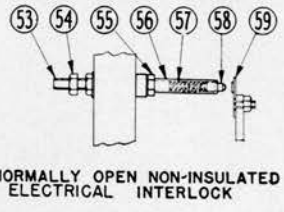
INSTRUCTION SHEET

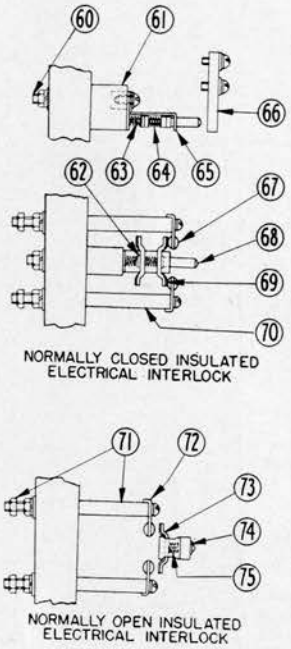
For No. 369—D-c Contactor











Rear Connected C10-45

CARE

Do not lubricate the main contacts, items 3 and 4. If these contacts become badly pitted or burned, smooth them with a fine file, taking care to remove as little copper as possible.

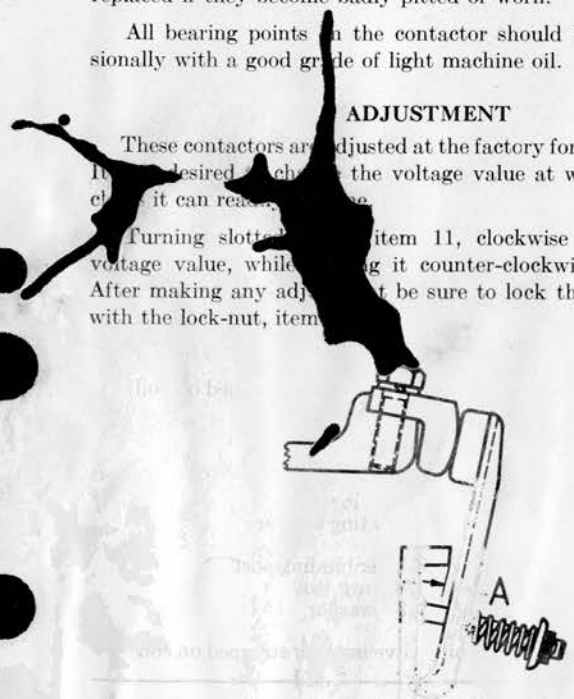
The contact surfaces of the electrical interlock contacts, items 67, 69, and 73, should be kept clean, and these contacts should be replaced if they become badly pitted or worn.

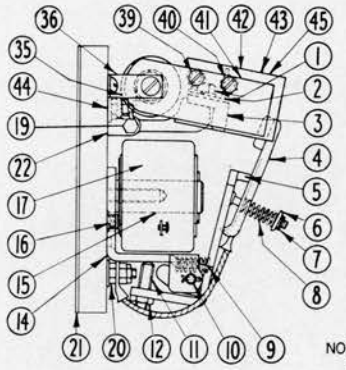
All bearing points in the contactor should be lubricated occasionally with a good grade of light machine oil.

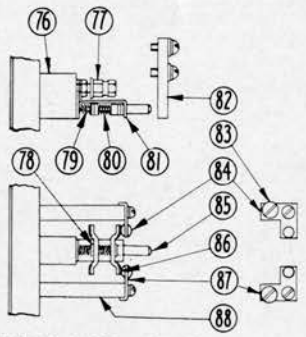
ADJUSTMENT

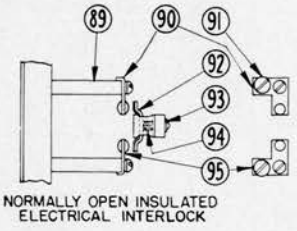
These contactors are adjusted at the factory for normal conditions. If desired, the voltage value at which the contactor closes it can readily be changed.

Turning slotted item 11, clockwise will decrease this voltage value, while turning it counter-clockwise will increase it. After making any adjustment be sure to lock the screw in position with the lock-nut, item 10.









Front Connected C10-543

These contacts should be renewed when the distance "A" indicated on figure 1 becomes not less than 1/32". This distance should be measured with the panel disconnected from the line and the armature lever moved by hand to close the contacts as indicated in Figure 1.

RENEWAL PARTS—Information Required

Parts **CANNOT** be sent promptly unless you include the **FOLLOWING** with your order: **PUBLICATION NO. 7210, Item No., PART No., DESCRIPTION, and the Number Stamped on the Controller Nameplate.**

Due to the cost of handling, the minimum net billing on any order is **$1.00.**

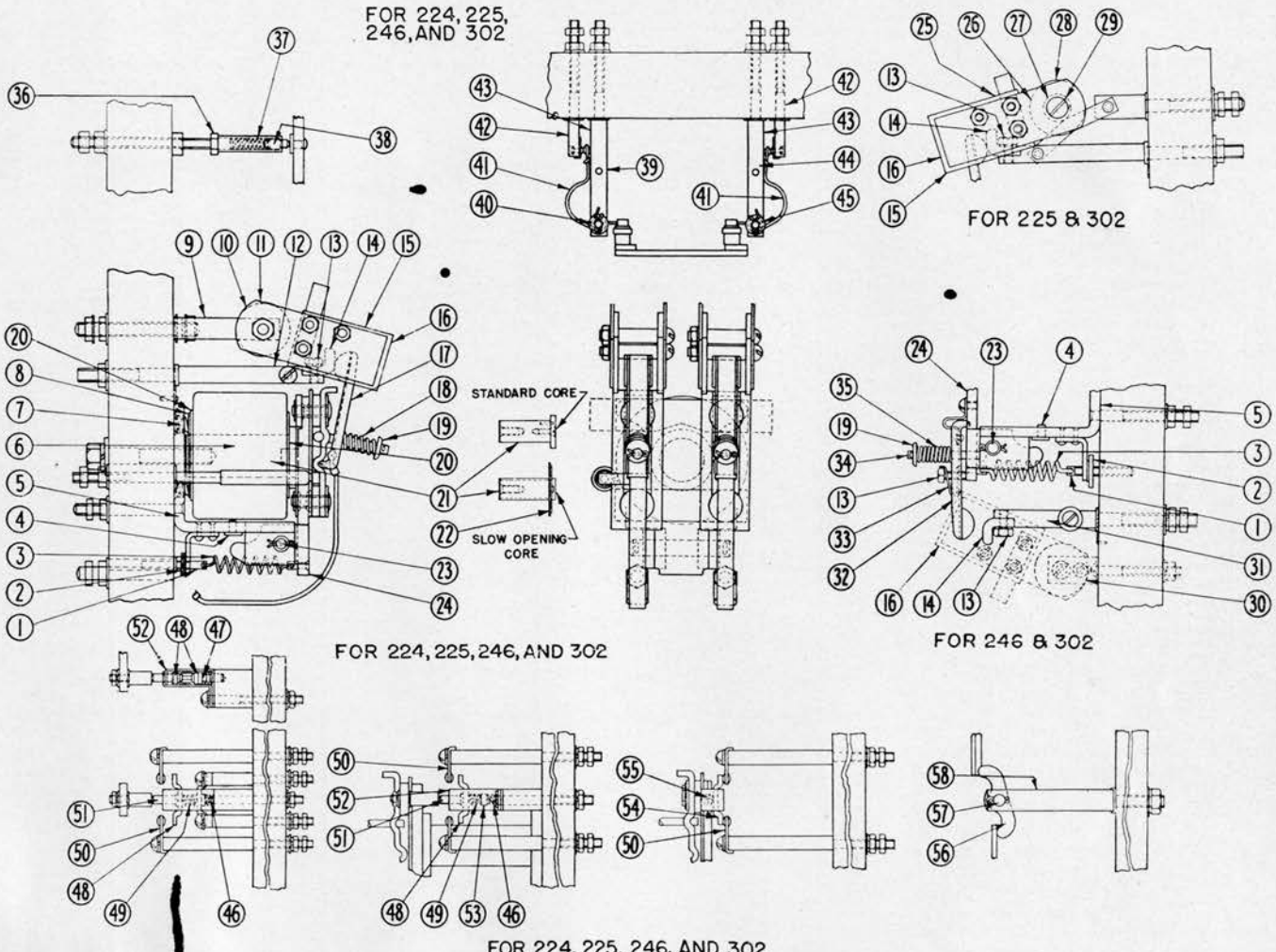
Item No	Description of Part	No. Req'd.	Part No.
	CONTACTOR PROPER		
1	Contact screw	1	911-5446FZ
	Lock washer	1	916-682Z
▲ 2	Arc guard	1	4221-7
▲ 3	Contact	1	1321-61
▲ 4	Finger with connector	1	640-246
5	Armature lever assembly	1	24-315-2
6	Cup washer	1	916-2641Z
7	Shim washer	3	816-563
▲ 8	Spring	1	69-95
▲ 9	Spring	1	69-179
10	Shaft	1	956-343
11	Adjusting screw	1	711-6
12	Hex. nut	1	815-73
	Shake proof washer	1	916-125
13	Stud	1	
	For ¾″ and 1″ panel	...	814-490
	For 1½″ and 2″ panel	...	814-14
	Lock nut	1	915-209
	Nut	4	815-601
	Lock washer	1	916-682Z
	Washer	3	916-641Z
14	Magnet frame	1	649-375
15	Core	1	51-64
16	Spring	1	969-566
▲17	Coil (Give No. stamped on coil)	1	.....
18	Contact post with stud	1	18-420-4
	Nut	2	815-721
	Lockwasher	1	916-763Z
	Washer	1	916-801Z
19	Blowout coil screw	1	911-5446FZ
	Washer	1	916-641Z
	Lockwasher	1	916-682Z
20	Screw	1	811-864
	Slotted nut	1	815-79
	Nut	1	815-601
	Washer	2	916-601Z
	Lock washer	1	916-682Z
	Cup washer	1	816-2721
21	Insulator	1	56-1227
22	Contact post	1	18-420-5
	MILL TYPE BLOWOUT		
23	Stud	1	
	For ¾ and 1″ panel	...	814-94
	For ½″ and 2″ panel	...	814-14
	Nut	4	815-601
	Lock nut	1	915-209
	Washer	3	816-642
	Lock washer	1	916-682Z
24	Coil (Give No. stamped on coil)	1	.....
25	Bracket	2	79-418
26	Arc chute assembly (includes items 28 to 33 incl.)	1	662-159
27	Mill type blowout complete (includes items 23 to 33 incl.) (Give No. stamped on coil)	1	.....
	For ¾″ and 1″ panel	...	62-20-3
	For 1½″ and 2″ panel	...	62-20-4
28	Pole piece	2	962-54
29	Spacer	2	929-992
30	Spacer	1	2222-402
31	Protecting clip	1	933-203Z
32	Arc shield	2	4973-5
33	Spacer	1	2222-483
	GENERAL PURPOSE TYPE BLOWOUT		
34	Stud	1	.....
	For ¾ and 1″ panel	...	814-490
	For 1½″ and 2″ panel	...	814-14
	Nut	4	815-601
	Lock nut	1	915-209
	Washer	3	816-642
	Lock washer	1	916-682Z
35	Coil	1	.....
	Bar wound	...	9-460-51
	Wire wound (Give No. stamped on coil)	...	.....
36	Bracket	1	.....
	For wire wound blowout	...	79-797
	For bar wound blowout	...	79-217
37	Fibre tube	1	1029-274
38	Steel core	1	985-526Z
39	Copper tube	2	1329-681
40	Fibre tube	2	1029-50
41	Pole piece	2	962-923Z
42	Arc shield	2	73-108
43	Blowout assembly (includes items 34 to 45 incl.)	1	.....
	Bar wound coil		
	For ¾″ and 1″ panel	...	62-21-2
	For ½″ and 2″ panel	...	62-21-3
	Wire wound coil	...	62-21-12
44	Screw	1	811-864
	Slotted nut	1	815-79
	Nut	1	815-601
	Washer	2	916-601Z
	Lock washer	1	916-682Z
	Cup washer	1	816-2721
45	Arc shield assembly (includes items 39 to 42 incl.)	1	62-21

Item No.	Description of Part	No. Req'd.	Part No.
	MECHANICAL INTERLOCK		
46	Stop	2	18-59
47	Lever	1	
	Steel	...	924-172
	Bakelite	...	24-1223
48	Hinge pin	1	356-325
49	Interlock complete (includes items 46 to 48 incl.)	1	.....
	With steel lever	...	10-80-3
	With bakelite lever	...	10-80-4
	TIE BAR		
50	Spacer	1	29-273
51	Normally open interlock bar (for use with tie bar)	As Req.	10-87-2
52	Tie bar (used with normally closed interlock and plain tie bar)	As Req.	61-75
	NORMALLY OPEN NON-INSULATED ELECTRICAL INTERLOCK		
53	Contact post complete (includes items 54 to 59 incl.)	1	.....
	For ¾″ and 1″ panel	...	10-43
	For 1½″ and 2″ panel	...	10-43-2
54	Stud	1	.....
	For ¾ and 1″ panel	...	618-165
	For 1½″ and 2″ panel	...	618-335
	Nut	2	915-605Z
	Washer	1	916-601Z
	Lock washer	1	916-682Z
55	Nut	1	815-115
56	Tube	1	829-332
57	Spring	1	869-22
▲58	Contact	1	1321-516
▲59	Contact plate	1	21-80
	NORMALLY CLOSED INSULATED ELECTRICAL INTERLOCK		
60	Post	1	18-372
61	Block	1	17-1066
62	Spacer	1	29-363
63	Spring	1	69-525
64	Spring	1	69-524
65	Guide	1	54-295
66	Contact bar (when used)	1	61-76
▲67	Stationary Contact	2	21-174-6
68	Post	1	18-284
▲69	Movable contact	2	23-887
70	Post	2	18-373
	Nut	4	915-283Z
	Washer	2	916-523Z
	Lock washer	2	916-484Z
	NORMALLY OPEN INSULATED ELECTRICAL INTERLOCK		
71	Post	2	18-116
	Nut	4	915-283Z
	Washer	2	916-523Z
	Lock washer	2	916-195
▲72	Stationary contact	2	21-144
▲73	Movable contact	1	4221-4
74	Interlock bar with riveted contact support	1	10-87
75	Spring	1	969-633
	NORMALLY CLOSED INSULATED ELECTRICAL INTERLOCK		
76	Block	1	17-1782
77	Screw	1	911-536Z
	Washer	1	916-166
	Lock washer	1	916-484Z
	Nut	1	815-323
	Cup washer	1	816-1921
	Slotted nut	1	815-197
78	Spacer	1	24-1362
79	Spring	1	69-525
80	Spring	1	69-524
81	Contact guide	1	54-780
82	Interlock bar	1	10-545-
83	Screw	2	811-729
	Washer	2	916-6
▲84	Stationary contact	1	2
85	Post	1	18
▲86	Movable contacts	2	
▲87	Stationary contact	1	
88	Post	2	
	Screw	2	
	Lockwasher	2	
	NORMALLY OPEN INSULA ELECTRICAL INTERL		
89	Post		
▲90	Stationary contact		
91	Screw		
	Washer		
▲92	Movable contact		
93	Interlock bar		
94	Spring		
▲95	Stationary contact		

▲We recommend that these items be stocked. The quantity to be stocked will depend on the total number in use.

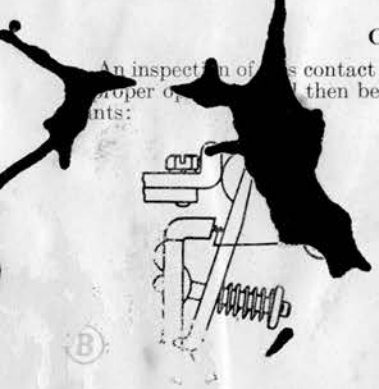
INSTRUCTION SHEET

NO. 224 AND NO. 246 DIRECT CURRENT RELAYS
NO. 225 AND NO. 302 DIRECT CURRENT CONTACTORS



CARE

An inspection of the contact at regular intervals is recommended, when proper operation can then be assured. Kindly note the following points:



Lubricate the armature lever shaft occasionally, with a light engine or machine oil.

Apply a drop or two of oil at the point B where the contact finger hinges on the armature lever.

Dress the contact tips. In case they become badly burned or pitted, they may be smoothed off with a fine file, taking care to remove only enough metal as is necessary.

Contacts should be renewed when the distance between the contact tips is such that any further wear of this might damage the contactor, or when the pressure exerted on the contact tip by the contact finger has been reduced beyond this point.

Keep the surface of the magnet core (item 21) and the armature lever (item 24) that come together when the contactor closes, clean and free from dust or oil. If any foreign matter gets between these parts, it will prevent them from sealing properly and will cause the contacts to heat.

The arc shields (item 16) **should be renewed** before the material is burned away enough to allow the arc to touch the blowout pole pieces. The arc shields can be easily raised for inspection or renewal of contact parts. However, they should be lowered to their normal position, as shown in the illustration above, before the contactor is again operated. If this is not done the contacts will wear rapidly.

ADJUSTMENT OF DOWN CONTACT FINGER FOR THE NO. 246 AND NO. 302

This contact is adjusted at the factory to have the proper contact pressure. When necessary to readjust this finger because of wear, proceed as follows: Have the contactor in its normally open position. The down contact finger will then be making contact with the lower contact tip. Turn the adjusting screw (item 13) to the right until the contact tip of the finger just begins to leave the contact (item 14). Now turn the adjusting screw one full revolution to the left. The clamping spring (item 33) will retain the screw in this position.

RENEWAL PARTS

INFORMATION REQUIRED

Parts **CANNOT** be sent promptly unless you include the **FOLLOWING** with your order; **PUBLICATION NO. 5221, PART No., DESCRIPTION, ITEM No. and COMPLETE NAMEPLATE DATA.**

Item No.	Description of Part	NO. 224 RELAY 18774-2		NO. 225 CONTACTOR 18774-1		NO. 246 RELAY 18773-1		NO. 302 CONTACTOR C10-311, C10-312	
		No. Reqd	Part No.	No. Reqd	Part No.	No. Reqd	Part No.	No. Reqd	Part No.
1	Adjusting Stud	1	914-423	1	914-423	1	914-423	1	914-423
2	Adjusting Nut	1	915-63	1	915-63	1	915-63	1	915-63
3	Spring	1	969-279	1	969-279	1	969-279	1	969-279
4	Stop	1	768-801	1	768-801	1	768-801	1	768-801
5	Magnet Frame	1	949-1482AZ	1	949-1482AZ	1	949-1482AZ	1	949-1482AZ
6	Magnet coil. Give No. stamped on coil	1	.....	1	.....	1	.....	1	.....
7	Spring	2	69-195	2	69-195	2	69-195	2	69-195
8	Washer for back of coil	1	916-2881Z	1	916-2881Z	1	916-2881Z	1	916-2881Z
9	Support for wire wound blowout	2	879-32	2	879-32	2	879-32	2	879-32
10	Wire wound blowout coil. Give No. stamped on coil	2	.....	2	.....	As Reqd.	.....	As Reqd.	.....
11	Complete wire wound blowout assembly. Give No. on coil	2	57530-3 Fig. 3	2	57530-3 Fig. 3	2	57530-3 Fig. 3	2	57530-3 Fig. 3
12	Upper contact post complete. For wire wound blowout	2	618-198	2	618-198	2	618-198	2	618-198
13	Cap screw	2	911-5248FZ	2	911-5248FZ	3	911-5248FZ	3	911-5248FZ
14	Contact Tip	2	1323-1484	2	1323-1484	3	1323-1484	3	1323-1484
15	Upper blowout chute. Without blowout coil	2	62-13	2	62-13	2	62-13	2	62-13
16	Arc shield	4	2673-100F	4	2673-100F	As Reqd.	2673-100F	As Reqd.	2673-100F
17	Upper contact finger with connector	2	940-963AZ7	2	940-963AZ7	2	940-963AZ7	2	940-963AZ7
18	Spring	2	69-467	2	969-548	2	69-467	2	969-548
19	Cup washer	2	916-2641Z	2	916-2641Z	3	916-2641Z	3	916-2641Z
20	2¼" diam. washer for front of coil using standard core	2	4416-1321	2	4416-1321	2	4416-1321	2	4416-1321
21	Core for magnet— Standard core	1	51-51	1	51-51	1	51-51	1	51-51
	Core for slow opening contactor	1	685-56	1	685-56	1	685-56	..	.....
22	2" diam. washer for front of coil using slow opening core	1	816-1441	1	816-1441	1	816-1441	..	.....
23	Shaft	1	956-500	1	956-500	1	956-500	1	956-500
24	Armature lever assembly. Give complete nameplate data and position of contactor on panel if more than one is used	1	.....	1	.....	1	.....	1	.....
25	Complete bar wound blowout assembly. For 2" slate mounting	..	.....	2	57603-2 Fig. 3	..	.....	2	57603-2 Fig. 3
	For 1½" mounting and under	..	.....	2	662-79	..	.....	2	662-79
26	Bar wound blowout coil sweated to posts For 2" slate mounting	..	.....	2	57603-2 Fig. 5	..	.....	2	57603-2 Fig. 5
	For 1½" mounting and under	..	.....	2	57603-2 Fig. 4	..	.....	2	57603-2 Fig. 4
27	Fibre spacer for core	..	.....	2	1029-274	..	.....	2	1029-274
28	Washers on coil ends	..	.....	4	4416-6044	..	.....	4	4416-6044
29	Core for bar wound coil	..	.....	2	985-526Z	..	.....	2	985
30	Lower blowout chute complete	..	.....	..	.....	1	48920-1 Fig		48920-1 Fig
31	Lower contact post complete	..	.....	..	.....	1	618-163		618-163
32	Lower contact finger with connector	..	.....	..	.....	1	940-963A		940-963AZ
33	Spring	..	.....	..	.....	1	970-645		970-645Z
34	Lower contact finger pin	..	.....	..	.....	1	913-563	1	913-563
35	Spring	..	.....	..	.....	1	69-4	1	969-4

REPAIR PARTS LIST FOR ELECTRICAL AND MECHANICAL INTERLOCK PARTS. QUANTITIES ARE AS REQUIRED.

Item No.	Description of Part	Part No.
36	Plug switch complete	618-118
37	Spring	869-22
38	Contact	1321-516
39	Right hand normally open or normally closed lamp switch complete	618-214
40	Spring	769-363
41	Contact lever	969-764AZ1
42	Contact Post	918-294AZ
43	Post	918-445AZ
44	Left hand normally open or normally closed lamp switch complete	618-213
45	Spring	769-363F
46	Spring	69-525
47	Spacer	29-363
48	Contact	23-887
49	Spring	69-524
50	Contact plate	21-174-2
51	Post	18-284
52	Contact guide	54-295
53	Spacer (Interlocks using this spacer have been redesigned to use spacer, item 47 and an additional contact, item 48, in place of this spacer, item 53. These parts should be ordered instead of item 53 and assembled as shown in the picture calling for item 47, 48 and 52.)	
54	Contact	4221-4
55	Spring	969-633
56	Lever	924-172
57	Pin	956-325
58	Post	918-723Z

SPECIFICATIONS FOR D. C. CONTROLLERS

1. IDENTIFICATION
(A) MANUFACTURER ..... CUTLER-HAMMER, INC. ORDER NO. B564935
(B) NAVY CONTRACT NO. .....
(C) FOR U.S.S. ..... SS212-SS227 INCL.
SS240-SS264 INCL.
SS265-SS274 INCL.

(D) FOR USE WITH ..... MOTOR DRIVEN ENGINE LATHE
(E) MANUFACTURER OF DRIVEN AUXILIARY - THE SEBASTIAN LATHE CO.
(F) MANUFACTURER OF DRIVING MOTOR
(G) NUMBER OF CONTROLLERS INVOLVED - 54 ...1 PER SHIP.

2. REFERENCE DRAWINGS
THE FOLLOWING DRAWINGS SHOWING VARIOUS CONSTRUCTION DETAILS AS REQUIRED BY THE SPECIFICATIONS UNDER "PLANS FOR APPROVAL" FORM A PART OF THIS PLAN.

TITLE OF DRAWING	MFR. PLAN NO.	BUREAU DRAWING	ALT.
D-C MAGNETIC CONTROLLER			
[illegible] DRIVEN ENGINE	3541	BASIC SS212-S63-7	1
LATHE		SS212-363-2246	1
CONSOLIDATED SPARE PARTS	SS[illegible]591-1		1
LATHE E.B.W.S.			

NOTE 1. THE CONTROLLERS DESCRIBED HEREIN CONFORM TO NAVY DEPT. SPECIFICATIONS 404A DATED DEC. 1, 1938 AND 404AA DATED JUNE 1, 1940. THE CONTROLLERS ALSO CONFORM TO AIEE STANDARDS, RECOMMENDED PRACTICES FOR ELECTRICAL INSTALLATIONS ON SHIPBOARD DATED DECEMBER, 1938. FOR EXCEPTIONS TO SPECIFICATIONS SEE NOTE 2.

NOTE 2. A HASP SUITABLE FOR PADLOCK IS FURNISHED ON CONTROLLER CABINET INSTEAD OF A SPRING TYPE DOOR LOCK AS REQUIRED IN PAR. E-3C(1)B(1) OF 404AA BECAUSE OTHER CONTROLLERS ON THESE SUBMARINES DO NOT HAVE THE SPRING TYPE DOOR LOCK. PUSH BUTTON MASTER IS OF NON-DRIPPROOF, NON-WATERPROOF CONSTRUCTION.

NOTE 3. WEIGHTS - PANEL 90 LBS
PUSH BUTTON MASTER 3 "

NOTE 4.
SPARE PARTS FOR THESE CONTROLLERS ARE TO BE COMBINED WITH SPARES FOR OTHER CONTROLLERS AND QUANTITIES ARE TO BE BASED ON THE TOTAL NUMBER OF SIMILAR PARTS INSTALLED ON EACH VESSEL. CONSOLIDATED LIST OF SPARE PARTS IS GIVEN ON SPARE PARTS PLAN LISTED UNDER PARAGRAPH 3 HEREON. ITEMS ON THESE CONTROLLERS FOR WHICH SPARE PARTS ARE REQUIRED ARE AS FOLLOWS:

NAME OF PART	MANUFACTURER'S DATA: PART NO. ORDERING DATA	MFR'S DWG. & PC. NO. PC.	MFR'S DWG. & PC. NO. DWG.	NO. INSTALLED: PER PANEL	NO. INSTALLED: PER SHIP	ITEM NO. ON SPARE PARTS PLAN NO. 3370
PUSHBUTTON MASTER						
P.B. ELEMENT (N.O.)	631-117	F1	45100-3	2	2	127
P.B. ELEMENT (N.C.)	631-123	F3	45100-3	1	1	128
175 RELAY (SR)						
CONTACT SCREW	811-654A	14	PUB.111	1	1	102
CONTACT LEVER	624-263	2	PUB.111	1	1	100
ADJUSTING SPRING	09-512	3	PUB.111	1	1	101
225 CONTACTORS (F-R)						
CONTACT TIP	1323-1484	16	PUB.5221	4	4	4
MAIN CONTACT FINGER	940-963AZ7	17	PUB.5221	4	4	11
MAIN FINGER SPRING	969-548	18	PUB.5221	4	4	17
HOLDOUT SPRING	969-279	1	PUB.5221	2	2	26
PLUG SWITCH CONTACT	1321-515	36	PUB.5221	2	2	52
PLUG SWITCH SPRING	659-22	37	PUB.5221	2	2	51
MOV. INT. CONTACT	23-687	48	PUB.5221	4	4	55
STAT. INT. CONT. (N.O-M-C)	21-174-2	50 (MOD)	PUB. 5221	8	8	61
INT. SPRING (FRONT)	69-524	44	PUB.5221	2	2	67
INT. SPRING (BACK)	69-525	46	PUB.5221	2	2	68
SHUNT COIL	9-91-58	6	PUB.5221	2	2	30
45 OVERLOAD RELAY (OL)						
STAT. CONT. FINGER	940-217	8	PUB.4527	2	2	119
MOVABLE CONTACT	624-27	9	PUB.4527	1	1	120
LATCH SPRING	69-262	10	PUB.4527	1	1	121
MAIN LEVER SPRING	69-264	12	PUB.4527	1	1	122
HEATER COIL PACKAGE	9104H0184	M	PUB.4527	1	1	123
RESET SPRING	969-452	-	THIS PLAN	1	1	124
369 CONTACTOR (M-1A)						
ARCING CONTACT	1321-61	14	PUB.4519	2	2	3
MAIN CONTACT FINGER	940-240	15	PUB.4519	2	2	9
MAIN FINGER SPRING	69-95	16	PUB.4519	2	2	15
HOLDOUT SPRING	69-179	19	PUB.4519	2	2	22
STAT. CONT. PLATE (N.O.)(M)	21-174	24	PUB.4519	2	2	60
MOV. INT. CONTACT(M)	4221-4	25	PUB.4519	1	1	57
INT. SPRING (FOR N.O. CONT.(M)	69-933	27	PUB.4519	1	1	69
STAT. INT. CONT. (N.C.)	21-174-6	51 (MOD)	PUB.4519	4	4	63
MOV. INT. CONTACT	23-687	48 (MOD)	PUB.4519	4	4	55
INT. STAT. SPRING (BACK)	69-525	52 (MOD)	PUB.4519	2	2	68
INT. STAT. SPRING (FRONT)	69-524	52 (MOD)	PUB.4519	2	2	67
	9-403-7	47	PUB.4519	2	2	31
RESISTORS						
1500 OHM	11003H44B23	23	11003L46	1	1	158
2000 OHM	11003H44B24	24	11003L46	1	1	159
1500 OHM R	11003H44B23	23	11003L46	1	1	158
2000 OHM R	11003H44B24	24	11003L46	1	1	159
550 OHM R	11003H44B20	20	11003L46	2	2	155
1500 OHM R UNIT	11003H44B23	23	11003L46	1	1	158
2000 OHM R UNIT	11003H44B24	24	11003L46	1	1	159
16.0 OHM R UNIT	11003H44B12	12	11003L46	2	2	150

COPIES OF PUBLICATIONS REFERENCED ABOVE ARE BOUND IN THE "INSTRUCTION BOOK FOR ELECTRICAL AUXILIARIES".

NOTE 5. THESE CONTROLLERS ARE ENCLOSED IN DRIPPROOF PROTECTED CABINETS WITH A DURABLE BLACK FINISH INSIDE AND OUTSIDE.

NOTE 6. THE PUSHBUTTON MASTER IS OF THE 3 BUTTON MOMENTARY CONTACT TYPE AND IS OF NON-DRIPPROOF CONSTRUCTION AND HAS A CAST ALUMINUM CASE WITH A DURABLE BLACK FINISH.

NOTE 7. LIST OF DEVICES MOUNTED ON PANEL.

2 - #225 MAGNETIC CONTACTORS "F" AND "R"
1 - #307 THERMAL OVERLOAD RELAY "OL"
1 - #369 MAGNETIC CONTACTOR "1A" "M"
1 - #175 SERIES RELAY "SR"
10 - TYPE R RESISTOR UNITS (SEE TABULATION IN NOTE #8)
1 - 10 AMPERE 250 VOLT N.E.C.S. CONTROL FUSE

1 - MECHANICAL INTERLOCK
10 - TERMINALS #10/24 STUDS

NOTE 8. RESISTOR TABULATION

G-H	2 TYPE R UNITS 11003H44B23 & 24	3500 OHMS
A-B	2 TYPE R UNITS 11003H44B23 & 24	3500 OHMS
C-D	2 TYPE R UNITS 11003H44B23 & 24	3500 OHMS
R1-R2	2 TYPE R UNITS 11003H44B12 //2 TOTAL	8.0 OHMS
F-E	2 TYPE R UNITS 11003H44B20	1100 OHMS

NOTE 9. MOTOR RATING AND CLASSIFICATION

2 H.P. 250 (175-345) VOLTS D-C
FULL LOAD CURRENT - 7.65 AMPS.
STARTING RESISTOR DUTY IS LIGHT STARTING
PROTECTING RESISTOR DUTY IS CONTINUOUS

NOTE 10. THE AMBIENT TEMPERATURE IS 40 DEGREES C.

NOTE 11. THE SHUNT COILS AS PROTECTED WILL NOT EXCEED ALLOWABLE TEMPERATURE RISE ON 175-345 VOLTS.

NOTE 12. THE HEATER ELEMENTS ON THE #307 ADJUSTABLE THERMAL OVERLOAD RELAY ARE RATED AT 7.75 AMPERES AND ARE SET AT 8.4 AMPERES BASED ON 110% OF FULL LOAD MOTOR CURRENT. THE RANGE OF ADJUSTMENT PROVIDED IS FROM 7.75 AMPERES TO 9.5 AMPERES.

NOTE 13. THE CONTROL CIRCUIT IS FUSED WITH TWO 10 AMP. 250 VOLT NEOS NON-RENEWABLE TYPE FUSES.

DESCRIPTION OF OPERATION

TO START THE MOTOR IN EITHER THE FORWARD OR REVERSE DIRECTION PRESS THE FORWARD OR REVERSE PUSHBUTTON WHICH COMPLETES A CIRCUIT TO THE CORRESPONDING DIRECTION CONTACTOR "F" OR "R" WHICH IN TURN CLOSES CONTACTOR "M" AND THEREBY CONNECTS THE MOTOR TO THE LINE THRU ONE STEP OF STARTING RESISTANCE. WHEN THE CURRENT DECREASES TO 6.2 AMPERES THE SERIES RELAY "SR" CLOSES A CIRCUIT TO THE ACCELERATING CONTACTOR "1A" WHICH CONNECTS THE MOTOR DIRECTLY ACROSS THE LINE.

IF VOLTAGE FAILS THE MOTOR WILL STOP AND CAN BE RESTARTED UPON RESTORATION OF VOLTAGE, BY PRESSING EITHER THE FORWARD OR REVERSE PUSHBUTTON. TO STOP THE MOTOR PRESS THE "STOP" PUSHBUTTON.

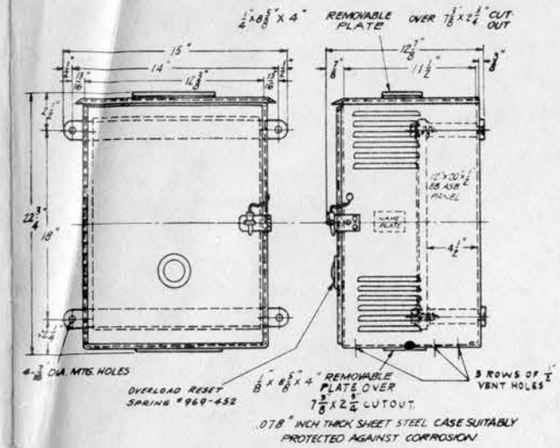
IF AN EXCESSIVE OVERLOAD CONDITION EXISTS THE OVERLOAD RELAY WILL TRIP AND STOP THE MOTOR. TO RESET THE OVERLOAD RELAY PRESS THE RESET BUTTON IN DOOR OF CABINET.

TO RESTART THE MOTOR PRESS THE DESIRED DIRECTION PUSHBUTTON.

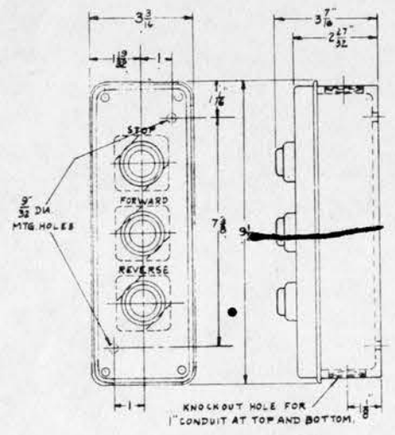
MECHANICAL AND ELECTRICAL INTERLOCKS PREVENT SIMULTANEOUS OPERATION OF THE DIRECTION CONTACTORS.

ELECTRICAL INTERLOCKS ON CONTACTORS M, 1A, F, AND R INSERT PROTECTING RESISTANCE IN THEIR RESPECTIVE COIL CIRCUITS.



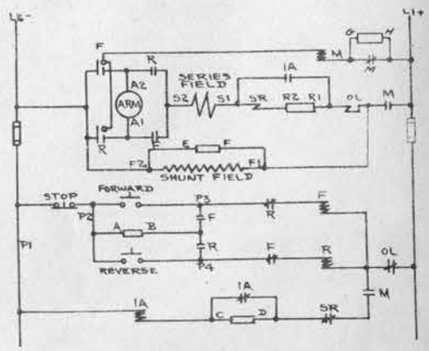


OUTLINE DIMENSIONS OF CONTROLLER

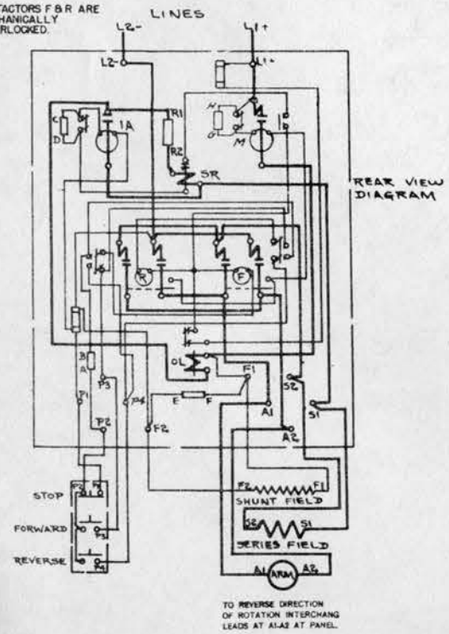


CAST ALUMINUM CASE & COVER

OUTLINE DIMENSIONS OF PUSH BUTTON MASTER



SCHEMATIC DIAGRAM



CONNECTION DIAGRAM

PHOTOGRAPHIC REPRODUCTION NAVY

NO.	PART	DESCRIPTION	APPROVED	DATE	AUTHORITY
1		REVISED 1-9-42 CHANGED SPARES TO AGREE WITH SPARE PARTS PLAN PLAN REVISED TO PLACE SPARES PARTS ON CONSOLIDATED SPARE PARTS PLAN 3370.			
		ALTERATIONS			

SS212-SS227
SS240-SS264
SS265-SS274

D.C. MAGNETIC CONTROLLER FOR MOTOR DRIVEN ENGINE LATHE

2H.P. 250(175-345)VOLTS D.C.

CUTLER-HAMMER, INC.
MILWAUKEE, WIS. U.S.A. NEW YORK, N.Y.

C-H INC. ORDER NO.	APPROVED
B564935A	

CONTRACTORS FILE NO.	BUREAU OF SHIPS FILE NUMBER		
C-H INC. PLAN NO.	INDEX	GROUP	FILE NO. -
3541 ALT. 1	BASIC SS212	S63	7 ALT. 1

ELECTRO DYNAMIC WORKS
of the
ELECTRIC BOAT COMPANY

BAYONNE, N. J.

INSTRUCTIONS

ENGINE LATHE MOTORS

For

U.S. Submarines - (SS-212 - 227 Incl.)
U.S. Submarines - (SS-240 - 274 Incl.)

THE SEBASTIAN LATHE COMPANY

CINCINNATI, OHIO

Order Numbers
6934 and 6951

ENGINE LATHE MOTORS

U.S. Submarines - (SS-212 - 227 Inclusive)
U.S. Submarines - (SS-240 - 274 Inclusive)

The equipment furnished for these vessels includes one motor for each vessel manufactured by the Electro Dynamic Works of the Electric Boat Company, Bayonne, New Jersey. The lathes are manufactured by the Sebastian Lathe Company, Cincinnati, Ohio.

The data for each of the motors are as follows:

(a)	Volts	250 Normal*
(b)	Amperes	7.7
(c)	Horsepower	2
(d)	R.P.M.	1150
(e)	Duty	Intermittent 1 Hour
(f)	Temperature Rise	Table 1, Method 2
(g)	Degree of Enclosure	Drip-proof, Semi-Enclosed
(h)	Cooling	Self-ventilating
(i)	Speed	Constant
(j)	Field Windings	Shunt Stabilized
(k)	Ambient Temperature of Reference	40°C.
(l)	Manufacturer's Type	D-225
(m)	Mounting	Horizontal
(n)	Rotation	Reversing

*Motors will operate within limiting temperature rises over a voltage range of 175 to 345 volts.

Efficiency

The motor efficiencies are as follows:

(a)	At rated load	77.5%
(b)	At 3/4 load	78.0%
(c)	At 1/2 load	75.3%

Armature and Field Windings

For winding data, including treatments, refer to drawing D-36276 Alt. 1.

Ball Bearings and Lubrication

Each motor has two bearings, both being Marlin Rockwell No. 306-S, Navy Department Specifications 42-B-5, Type A, Grade II, Class b. Bearings are lubricated by grease.

Care and Operation

The interior and exterior of the machine should be kept clean. Dirt and oil must not be allowed to accumulate either inside or outside of the machine.

It is necessary that surface inspection of the machine be made daily. Insulation resistance should also be checked daily. Whenever insulation resistance drops to one-half megohms, it is recommended that a complete check be made of the machine. All parts should be wiped down with clean rags, cheesecloth being preferred, for the windings. A material that might deposit lint should never be used.

If insulation resistance is still low, the windings should be cleaned with carbon tetrachloride. The commutator heads and cross connectors should also be thoroughly cleaned. Dry for several hours, or even longer, until insulation resistance becomes constant; then coat windings and adjacent parts with high grade, air drying varnish. Never apply varnish over damp or dirty parts. Also, do not depend on insulating varnish alone to increase the insulation resistance. Clean all parts and repair any defects first, than apply the varnish.

For drying windings, it is recommended that complete machine be covered with canvas and that lamps or heating units be used. These should be distributed so that the temperature of all parts will be uniform. If insulation resistance is not too low, reduced current may be passed through the shunt field coils to accomplish the same purpose. However, this should never be done when field coils are wet or actually grounded, for short circuits may develop in the coils. In using this method, care should be taken so that there will be no high voltage to ground. It should be remembered that reduced voltage across the terminals of field coils is no assurance of low voltage to ground. When drying coils with power applied, have several thermometers on coils. Take readings every fifteen minutes for a few hours and watch closely for short circuited coils. It is desirable to record the voltage drop of individual coils at one-half hour intervals.

Do not continue drying after insulation resistance becomes constant. If insulation resistance is still low, determine which parts of the machine is defective and make necessary repairs.

Do not use lead or zinc paints inside machine. Use air drying insulating varnish. All studs, nuts and bolts should be inspected regularly and should be kept tight.

IN CASE OF FIRE SHUT DOWN MACHINE IMMEDIATELY. Use carbon tetrachloride, but not soda and acid extinguishers.

Compressed air may be used for cleaning inaccessible parts but its use is not recommended, inasmuch as it has a tendency to drive the dirt between the coils rather than out of the machine.

Armature

It is important that air spaces between coils be open for free circulation of air. This is also true of the openings between the shaft and core plates. Do not allow dirt or other foreign material to accumulate on the armature, particularly in locations where it will restrict the free circulation of air. It is of major importance that no oil or dirt accumulate above the commutator. Large creepage distances have been provided between the commutator bars and the heads. Keep this portion dry and occasionally coat with special insulating compound manufactured for this purpose.

Armature coils should be cleaned regularly and should occasionally be thoroughly dried and varnished in accordance with general instructions. A vacuum cleaner with small inlet is effective in cleaning between the coils and is much more desirable than the compressed air.

Steel banding wire should be checked regularly and replaced if any bands show signs of defects.

Commutator

Successful operation and long life of machine depends largely on the fact that the commutator is kept clean and free from oil or dirt. Wipe the heads and end of "V" rings frequently to keep them in good condition. Use special insulating compounds for these parts.

Also keep undercut between copper segments clean. This will prevent burning between bars and possible short circuit of armature coils.

Do not continually sandpaper and stone commutator.

Never use emery cloth. If sanding or stoning should be necessary, make sure that the paper or stone fits the surface of the commutator.

After the machines have run for a short period, commutators will usually have a dull brown finish. This is the proper surface. Do not try to keep the commutator bright and shiny.

If mica between commutator segment becomes higher than the copper, the slots should be cleaned. This is easily done with a hacksaw blade which has the "set" ground off. Continual cleaning of the undercut with a sharp instrument will wear down the mica to such a point that an excess amount of carbon dust may collect in the undercut. After mica has been cut down with saw blade, file or other instrument, it is desirable to sand the commutator lightly to remove any burrs on the edges of the copper segments.

If commutator has high bars or is rough, it should be ground smooth, otherwise the condition may cause excessive sparking and heating of the commutator. Other results would be severe burning of the bars and possible loosening of the armature leads.

Grinding should be done at as high a speed as practical, and with extreme care. Make several light passes over the commutator. When finished, undercut mica and sand commutator lightly. Canvas should be fitted around the armature so that copper dust will not enter the spaces between the windings. If practical, a vacuum cleaner should be placed in such a position that the flying dust will be collected. When finished, the machine should be thoroughly cleaned, but do not use compressed air, for it will blow the copper dust through the entire machine.

Commutator holding nut should be kept tight, but do not tighten excessivly. Excessive tightening might tend to spring the commutator segments.

Since successful operation of the machine depends largely on the proper functioning of the commutator, electricians should be entirely familiar with their design and construction.

Main Poles and Coils

Main poles are held to the magnet frames by bolts which may be removed with standard wrenches.

The coils and adjacent parts should always be kept clean. Dirt must not be allowed to collect between the coils and the magnet frames. If dirt cannot be readily removed, release the holding bolts and wipe the coils and frames dry with a cloth. Dry the coils, coat with air drying insulating varnish and tighten bolts. Be sure that bolts are thoroughly tightened, and that there is no misalignment of the poles.

If a coil should become damaged, remove the coil and pole piece from the machine, which can be done without removing the armature. When removing the coil from the pole, or when reassembling, do not damage the sheets of insulation which are wrapped around the pole.

Should it be necessary to replace any of the taping, dry the coil thoroughly and coat with air drying insulating varnish before retaping. Never apply varnish to a damp coil, for it will tend to seal the moisture and may cause trouble.

When removing a coil, be sure to check the air gap before releasing the holding bolts, then disconnect the cross connectors and check the markings to make sure the connectors will be replaced in their proper positions. When bolts have been released, observe the number and thickness of the shims. Care should be taken in withdrawing or replacing a coil so that the pole will not damage

the armature. The use of a sheet of pressboard rubbed with parafine and inserted in the air gap will often make this operation easier.

Commutating Poles and Coils

Commutating poles are held in the same manner as the main poles, and the method of removing and replacing an interpole coil is similar to that for a main field coil.

Voltage drop across any one interpole coil will be very low, so there is little or no chance of short circuited turns. However, the voltage to ground may be practically as high as the line voltage. Also, the interpole coils are of bare copper and have no taping. Therefore, it is important that no dirt collect on the insulating plates or lodge between the plates and magnet frames. If it is impossible to readily remove the dirt between the plates and the frames, the poles may be released in the same manner as the main poles.

Coils are dipped in insulating compound and baked; therefore, they are a solid mass. Disassembly of a coil from a pole may be easier if the coil is heated after it has been removed from the frame. Coils are fitted on the poles from the frame side so that it is unnecessary to remove the pole shoes.

The method of removing an interpole coil is similar to that for a main field coil. When tightening cross connectors to terminals of interpole coils, use feeler gauge to insure full contact.

Brushes and Rigging

The brush rigging is of rigid construction in order to eliminate vibration. All studs must be kept tight. Clean insulator plates regularly. Never run machines unless the brush rings are locked in their proper positions. A complete disassembly should be made yearly, at which time the insulating plates and tubes should be thoroughly cleaned.

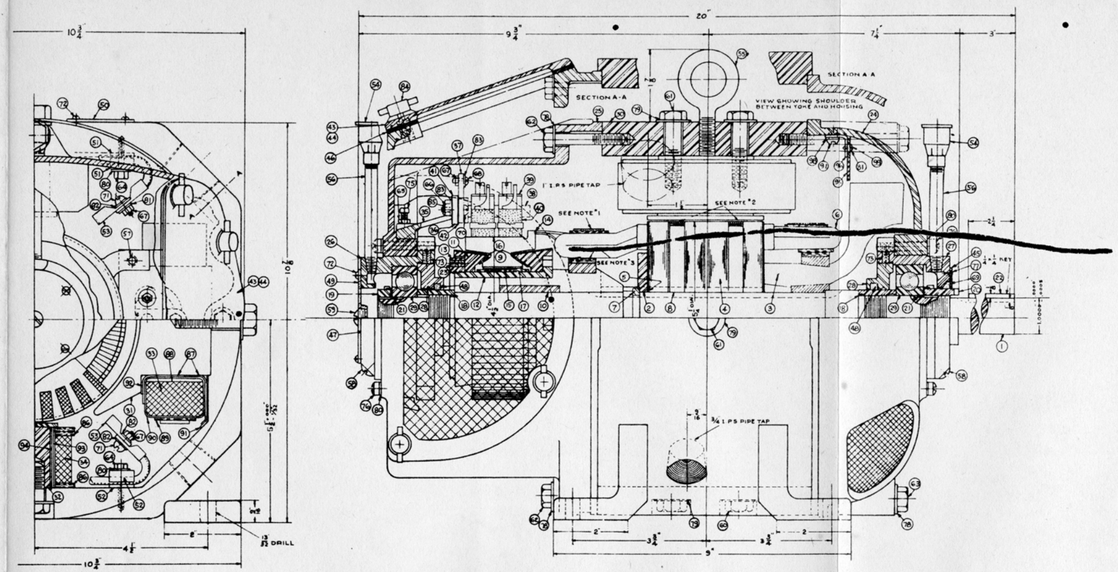
Brushholder carriers should be kept in their original position so that they are square with the commutator segments and that the distance between the brushes around the commutator are equal. Brushholders fit in grooves in order to assure proper alignment, and are removable.

The brushes which are furnished for this application are of a type and grade selected to give best operation characteristics. This type and grade should not be changed without consulting the manufacturer of the equipment. Brushes should not be loose in the holders, neither should they be so tight that they do not move freely. New brushes should be sanded to fit the surface of the commutator. (Do not allow the carbon dust to be blown through the machine). Spring tension on the brushes should be approximately two pounds per square inch of brush surface. If brushes spark, due to a rough commutator, little or nothing will be accomplished by

setting the springs for higher tension. Continuous operation under these conditions will cause excessive heating of the commutator which may cause loosening of the armature leads. Correct the trouble at its source.

Weights

(a)	Motor complete	165 lbs.
(b)	Spare armature complete	42 lbs.
(c)	Field coils each (approximate)	
	Interpole	3 lbs.
	Compound	6 lbs.



LIST OF MATERIAL

QUANTITIES ARE FOR ONE MOTOR

PC. NO.	NAME OF PIECE	NO. REQ'D.	MATERIAL	MAT'L SPEC.	REMARKS	DRAWING NUMBERS CONTRACTOR	BUREAU
69	FELT LUB. SEAL FOR PC. 27	1	FELT	27-F-7		3/16"X1/4"X 6-1/4"	
70	RD.HD. MACH. SCR. FOR PCS. 56-57	4	BRASS	62-S-5	TYPE II	#10-24 X 3/4"	
71	RD.HD. MACH. SCR. FOR PC.53	6	BRASS	62-S-5	TYPE II	#8-32 X 3/8"	
72	RD.HD. MACH.SCR.FOR PC.30-26-49-50	8	BRASS	62-S-5	TYPE II	#8-32 X 5/8"	
73	CUP PT. SET FOR PCS. 26-27	2	STEEL	62-S-5	TYPE G	1/4"-20 X 3/8"	
74							
75	SQ. HD. SET SCR. FOR PC. 35	1	STEEL	62-S-5	TYPE C	#10-24 X 1/2"	
76	FIL.HD.MACH. SCR.FOR PC.24-25-26	6	S.CAD.PL.	62-S-5	TYPE IV	1/4"-20 X 1-1/4"	
77	FL. HD.MACH.SCR.FOR PC.27-45	4	BRASS	62-S-5	TYPE I	#8-32 X 3/8"	
78	SHAKEPROOF LOCKWASHER FOR PC.62-63	8	S.CAD.PL	COMM.		3/8" STD.	
79	SHAKEPROOF LOCKWASHER FOR PC.60-61	6	S.CAD.PL	COMM.		1/2" STD.	
80	SHAKEPROOF LOCKWASHER FOR PC.64-79	10	S.CAD.PL	COMM.		1/4" STD.	
81	WASHER FOR PC. 99	4	BRASS	45-W-2		#8 STD.	
82	WASHER FOR PC. 71	12	BRASS	45-W-2		#7 STD.	
83	BUSH FOR PC. 69-70	12	BRASS	43-B-2		#8 STD.	
84	THUMB SCR. FOR PC. 25-45-44	8	BRASS	47-B-2		S. P. 53180	
85	FIL.NUT FOR PC. 70	4	S.CAD.PL	COMM.		#10-24	
86	WASHER FOR PC. 32	4	FIBER	17-F-5	GRADE BH	B-23605-B	
87	PRESSBOARD INSULATION	X	PRSB.	17-I-10		.030" THICK	
88	PRESSBOARD INSULATION	X	PRSB.	17-I-10		.010" THICK	
89	PRESSBOARD INSULATION	X	PRSB.	17-I-10		.030" THICK	
90	COTTON TAPE	X	COTTON	17-T-15		.007" THICK	
91	FIBER STRIPS	X	FIBER	17-F-5	GRADE BH	1/16" THICK	
92	FIBER STRIPS	X	FIBER	17-F-5	GRADE BH	1/16" THICK	
93	PAPER INSULATION	X	PAPER	17-I-11		.005" THICK	
94	MICA INSULATION	X	MICA	17-M-5	FORM III	GRADE C .015" THICK	
95	BAFFLE PLATE	1	PHENOLIC	17-P-5	TYPE FBE	B-23170-C5	
96	CLIP FOR PC. 93	4	SH. STL.	47-S-11	GRADE-C	B-25170-B	
97	RD.HD. MACH. SCR.FOR PC.24-96	4	BRASS	62-S-5	TYPE II	#10-24 X 1/4"	
98	SHAKEPROOF LOCKWASHER FOR PC. 97	4	S.CAD.PL	COMM.		#10 STD. "	
99	RIVET FOR PCS. 95-96	4	COPPER	43-R-6		#9 X 1/4"	

LIST OF MATERIAL

QUANTITIES ARE FOR ONE MOTOR

PC. NO.	NAME OF PIECE	NO. REQ'D.	MATERIAL	MAT'L SPEC.	REMARKS	DRAWING NUMBERS CONTRACTOR	BUREAU
1	ARMATURE SHAFT	1	FGD.STL.	49-S-2	CLASS B	B-36730-G1	
2	ARMATURE END PLATE C. E.	1	STEEL	46-S-13		A-23581-A	
3	ARMATURE END PLATE P. E.	1	MAL.IRON	46 I-5		A-35327-A	
4	ARMATURE CORE	1	S-I/N SH.STL.	ELEC.SH.		B-23384-A-B	
5	ARMATURE CORE SUPPORTING PLATE	4	SH.STL.	ELEC.SH.		B-23384-C	
6	ARMATURE COIL	24	COP.WIRE	15-W-2		A-23208-G1	
7	ARMATURE RING KEY	2	SEMI STL.	46-I-5		S. P. 52915	
8	ARMATURE KEY	1	STEEL	46-S-13		1/4 x 1/4 x 3 1/16	
9	COMM. ASSEMBLY	1				B-22760-G1	
10	COMM. BARREL	1	SEMI STL.	46-I-5		A-23303-G1	
11	COMM. FRONT HEAD	1	STEEL	46-S-13		B-22760-A	
12	COMM. BACK HEAD	1	STEEL	46-S-13		A-22773-G1	
13	COMM. NUT	1	STEEL	46-S-13		B-22760-B	
14	COPPER SEGMENT	72	COPPER	43-C-2	CLASS b	A-22778-A	
15	MICA SEGMENT	72	MICA	17-M-5	FORM III	GRADE A A-22773-A	
16	MICA RING	2	MICA	17-M-5	FORM III	GRADE B B-22780-A	
17	MICA INSULATING RING	1	MICA	17-M-5	FORM III	GRADE C B-22780-C	
18	BEARING REMOVAL NUT	2	STEEL	46-S-17		B-22658-C	
19	SHAFT NUT C. E.	1	STEEL	46-S-17		N-OR	
20	SHAFT NUT P. E.	1	STEEL	46-S-17		A-30696-B	
21	SHAFT NUT LOCKWASHER	2	SH.STL.	62-S-11	GRADE C	N-OR	
22	PULLEY KEY	1	STEEL	46-S-13		B-12930-H	
23	CUP PT. SET SCR. FOR PC. 13	1	STEEL	62-S-5	TYPE G	#10-24 X 3/8"	
24	P. E. HOUSING	1	SEMI STL.	46-I-5		B-25169-G3	
25	C. E. HOUSING	1	SEMI STL.	46-I-5		C-28320-G4	
26	C. E. CARTRIDGE	1	SEMI STL.	46-I-5		B-30246-D	
27	P. E. CARTRIDGE	1	SEMI STL.	46-I-5		B-30246-C	
28	C. E. & P. E. INSIDE COVER	2	SEMI STL.	46-I-5		B-28001-C	
29	#306 BALL BEARING	2	STEEL	42-B-5	TYPE A	GRADE 11 CLASS b	
30	YOKE	1	M.R.STL.	46-S-4	GRADE N	A-35075-A	
31	MAIN POLE PIECE	2	SH.STL.	ELEC.SH.		B-22763-G1	
32	INTERPOLE PIECE	2	STEEL	46-S-13		A-22764-G1	
33	MAIN FIELD COIL E.S.21-14, E.S. 21-49	2	COP.WIRE	15-W-2		B-34011-G1	
34	INTERPOLE COIL E.S. 21-34	2	COP.WIRE	15-W-2		B-23642-G1	
35	BRUSH RING	1	CAST STL.	49-S-1	CLASS C	B-33065-G1	
36	BRUSH HOLDER INSULATION 1/4 THICK	2	PHENOLIC	17-P-5	TYPE FBE	B-33096-PC2	
37	BRUSH STUD CARRIER	2	CAST IRON	46-I-11		B-26990-C	
38	BRUSH STUD	2	BRASS	47-B-2		S. P. 53303	
39	BRUSH HOLDER "I BAYLIS 3/8" X 5/8"	4	CAST STL.	46-B-11		B-35113 GR I	
40	CARBON BRUSH .3/8" X 5/8"	4	CARBON	17-B-8	GRADE A	S. P. 52872	
41	BRUSH HOLDER INSULATION 1/32 THICK	2	PRSB.	17-I-10		B-33096-PC17	
42	BRUSH HOLDER INSULATION 1/32 THICK	2	PHENOLIC	17-P-5	TYPE FBE	B-33096-PC16	
43	COVER C. E. R. H. FOR PC. 25	1	MAL. IRON	46-I-8		B-28850-A	
44	COVER C. E. L. H. FOR PC. 25	1	MAL.IRON	46-I-3		B-28850-A	
45	COVER PLATE FOR PC. 21	1	SH.STL.	62-S-11	GRADE C	A-28001-A	
46	GASKET FOR PCS. 25-43-44	2	RUBBER	33-B-1		S. P. 53468	
47	GASKET FOR PCS. 26-49	1	YELLOW CID	33-P-22		S. P. 53322	
48	FELT LUB SEAL FOR PC. 28	2	FELT	27-F-7		1/4"X1/4"X6-1/2"	
49	TRADE MARK NAME PLATE	1	BRASS	62-N-2	TYPE A	C-22363	
50	NAME PLATE	1	CAST BR.	62-N-2	TYPE D	B-33180-A	
51	LEAD CLAMP	1	PHENOLIC	17-P-5	TYPE FBE	A-30838-G1	
52	LEAD CLAMP	1	PHENOLIC	17-P-5	TYPE FBE	B-28563-G1	
53	TERMINAL	12	COPPER	COMM.		#2269	
54	GREASE CUP (FEMALE) 1/8" L.P.S.	2	S.CAD.PL.	COMM.		#000	
55	EYE BOLT	1	STEEL	43-B-11	CLASS B	S. P. 52961	
56	PIPE NIPPLE FOR PCS. 26-27	2	S.CAD.PL.	44-P-19		1/8"STD. X 3-1/2"	
57	FL. HD. MACH. SCR. FOR PC. 35-36	4	BRASS	47-B-5	TYPE I	#10-24 X 1/2"	
58	SLOTTED HD. VENT PLUG FOR PC.26-27	2	S.CAD.PL.	43-B-11	CLASS B	1/8" STD.	
59	SLOTTED HD. VENT PLUG FOR PC. 49	1	S.CAD.PL.	43-B-11	CLASS B	1/4" STD.	
60	HEX. HD. CAP SCR. FOR PC. 30-32	2	S.CAD.PL.	43-B-11	CLASS B	1/2"-13 X 1"	
61	HEX. HD. CAP SCR. FOR PC.30-31-32	4	S.CAD.PL.	43-B-11	CLASS B	1/2"-13 X 1-1/2"	
62	HEX. HD. CAP SCR. FOR PC. 10-25	4	S.CAD.PL.	43-B-11	CLASS B	3/8"-16 X 1 3/4"	
63	HEX. HD. CAP SCR. FOR PC. 30-24	4	S.CAD.PL.	43-B-11	CLASS B	3/8"-16 X 3"	
64	HEX. HD. CAP SCR. FOR PC.30-31-32	4	S.CAD.PL.	43-B-11	CLASS B	1/4"-20 X 1"	
65	HEX. CHECK NUT FOR PC. 75	1	S.CAD.PL.	43-B-11	CLASS B	#10-24	
66	HEX. NUT FOR PC. 70	4	BRASS	47-B-2		#10-24	
67	HEX. NUT FOR PCS. 68-71	8	BRASS	47-B-2		#8-32	
68	RD. HD. MACH. SCR. FOR PC. 37	2	BRASS	62-S-5	TYPE II	#8-32 X 1/2"	

MAIN FIELD COIL WINDING

SHUNT-5900 TURNS OF #28 ENAMELLED WIRE.
SERIES-20 TURNS OF #14 D. C. C. WIRE.
RESISTANCE-SHUNT FIELD (COLD) 1180 OHMS. PER SET.
RESISTANCE-SERIES FIELD (COLD) 0.19 OHMS. PER SET.

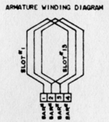
COIL IS WOUND ON A SHELL OF PRESSBOARD AND TAPED COMPLETE WITH 3/4" COTTON TAPE HALF LAPPED. SERIES TURNS ARE WOUND OVER PRESSBOARD ON OUTSIDE OF COIL. COMPLETE COIL IS HEATED DIPPED IN BAKING VARNISH THEN BAKED. THIS DIPPING AND BAKING IS REPEATED TWICE, THEN COIL IS DIPPED IN AN APPROVED COMPOUND, THEN BAKED. PRESSBOARD AND FIBER ARE PLACED AT TOP AND BOTTOM OF COIL WHEN ASSEMBLED ON POLE.

INTERPOLE COIL WINDING

210-TURNS OF #14 D. C. C. WIRE.
RESISTANCE (COLD) 1.08 OHMS. PER SET.

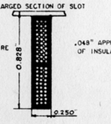
INTERPOLE CORE IS INSULATED WITH MICA AND INSULATING PAPER. COIL IS ASSEMBLED ON INSULATED CORE WITH FIBER WASHERS TOP AND BOTTOM, HEATED, DIPPED IN BAKING VARNISH, THEN BAKED. THIS DIPPING AND BAKING IS REPEATED TWICE, THEN COIL IS DIPPED IN AN APPROVED COMPOUND, THEN BAKED.

ARMATURE WINDING DIAGRAM



COILS ARE TAPED WITH 3/4" COTTON TAPE HALF LAPPED. WOUND ARMATURE IS DRIED OUT BEFORE BAKING AND WHILE HOT IT IS DIPPED IN BAKING VARNISH AND BAKED. THIS DIPPING AND BAKING IS REPEATED THREE TIMES.

ENLARGED SECTION OF SLOT



.048" APPROX. THICKNESS OF INSULATION.

SLOT CELLS CONSISTS OF:
ONE LAYER OF .010" INSUL. PAPER
ONE LAYER OF .005" VARNISHED CAMBRIC
ONE LAYER OF .005" INSUL. PAPER
SLOT CELL EXTENDS 3/8" BEYOND EDGE OF SLOT AT EACH END AND IS OF SUFFICIENT LENGTH TO OVERLAP THE COILS AFTER THEY ARE INSERTED IN THE SLOTS.

ARMATURE BALANCING

ASSEMBLED ARMATURE CORE IS DYNAMICALLY BALANCED AND WHERE NECESSARY WEIGHTS ARE WELDED TO ARMATURE END PLATE (PCS. 2 & 3) AFTER WHICH ARMATURE IS WOUND. FURTHER BALANCE IF NECESSARY BY ADDING SOLDER TO ARMATURE BANDS.

NAME PLATE DATA

MANUFACTURER ELECTRO DYNAMIC WORKS
FRAME-D-225 SERIAL-

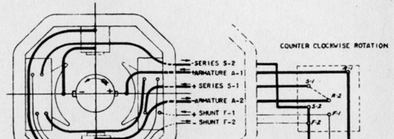
YEAR OF MFG. 1941
H. P.-2 VOLTS-230
R. P. M.-1150 AMPERES-7.7
DUTY INT., 1 HR. 50°C. RISE
WINDING-SHUNT STABILIZED

BALL BEARING APPLICATION APPROVED FOR LOAD, SPEED, MOUNTING AND LUBRICATION
MAIL IN-ROCKWELL CORP.,
JAMESTOWN, NEW YORK.

PER A. L. Johnson
DATE 1-14-1941

CONNECTION DIAGRAM

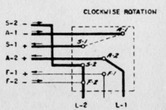
VIEWED FROM COMM. END



COUNTER CLOCKWISE ROTATION

ARMATURE & SERIES LEADS 11,368 C. M.
SHUNT LEADS 7,150 C. M.

CLOCKWISE ROTATION



GENERAL MOTOR DATA

1-MOTOR TO OPERATE SATISFACTORILY OVER VOLTAGE RANGE FROM 175 TO 345 VOLTS.
2-DEGREE OF ENCLOSURE-DRIPPROOF-SEMI-ENCLOSED-SELF VENT.
3-MOTOR EFFICIENCY (A) AT RATED LOAD 77% (B) AT 3/4 LOAD 77% (C) AT 1/2 LOAD 75%.
4-AIR GAP-MAIN POLE 3/64"-INTERPOLE-3/64".
5-INSULATING VARNISHES AND COMPOUND-(A) ARMATURE #7 CHINALAK APPROVED SERIAL NO. ENB/15-2/191 (B) MAIN FIELD AND INTERPOLE COILS BAKING #7 CHINALAK APPROVED. SERIAL NO. ENB/15-2/191 FINISHING #2 BROWN STERLING COMPOUND. NAVY SPEC. 52-V-13.
6-COMMUTATOR-(A) LENGTH 1-9/16" (B) WEARING DEPTH 1/4" ON A SIDE.
(C) MICA UNDER 3/64" (D) MICA INSULATING MATERIAL BETWEEN BARS .030" THICK.
(E) 1/16" MICA INSULATION TO GROUND.
7-BRUSHES (A) LENGTH 1 9/16" (B) WEARING DEPTH 1/4" ON A SIDE.
(C) MICA UNDER 3/64" (D) MICA INSULATING MATERIAL BETWEEN BARS .030" THICK.
(E) 1/16" MICA INSULATION TO GROUND.
7-BRUSHES (A) LENGTH 1 9/16" WIDTH 5/8" THICKNESS 3/8" (B) TRADE NAME OF BRUSH SA-35 (C) NAME OF BRUSH MANUFACTURER-NATIONAL CARBON CO.
8-SPEED-CONSTANT
9-MOTOR IN ACCORDANCE WITH NAVY DEPT. SPECIFICATION 40-L-4 DATED DEC. 1, 1938
10-LEAFLET SPECIFICATION REFERENCES ARE FOR REPLACEMENT PURPOSES ONLY.
11-WEIGHT COMPLETE MOTOR 185 LBS. WOUND ARMATURE 61 LBS.

NOTE #1-26- TURNS OF #20 B & S GA. STEEL BANDING WIRE 37 FT. LG. INSULATED FROM COIL WITH PRESSBOARD 1/32"X1"X17" LONG.

NOTE #2-6- TURNS OF #20 B & S GA. STEEL BANDING WIRE 9 FT. LG. INSULATED FROM CORE WITH PRESSBOARD 1/64"X3/8"X17" LONG.

NOTE #3-END RINGS INSULATED WITH 1/32" PRESSBOARD AND .007" THICK COTTON TAPE THEN PAINTED WITH BLACK AIR DRYING VARNISH.

NOTE #4-MATERIAL SPECIFICATION WILL BE THOSE IN EFFECT ON DATE OF INVITATION FOR BIDS, OR AT THE OPTION OF THE CONTRACTOR ANY LATER EDITION.

NOTE #5-ALL THREADS ARE IN ACCORDANCE WITH NATIONAL COARSE THREAD SERIES FIT #3 UNLESS OTHERWISE SPECIFIED.

NOTE #6-ALL BOLTS, SCREWS, NUTS, PINS AND PLUGS, ETC., TO BE PROTECTED AGAINST CORROSION IN ACCORDANCE WITH NAVY DEPT. SPEC, 17-M-9 # PAR. 3 CADMIUM PLATING IN ACCORDANCE WITH 48-P-1.

NOTE #7-ALL SHEET STEEL PARTS AND SCREWS VARNISHED TO PREVENT CORROSION.

NOTE #8- INTERNAL CONNECTIONS OF MOTOR-RUBBER COVERED STRANDED CABLE WITH OUTER BRAID GLAZED COTTON VARNISH FINISHED, IN ACCORDANCE WITH NATIONAL ELECTRIC CODE.

SPARE PART & TOOL DATA

NAME OF PART	EDDO. WKS. DWG. NO. D-36276 / BUREAU OF SHIPS DWG. NO. BASIC SS212/S63/6 PG. NO.	NO. INSTALLED PER MOTOR	NO. INSTALLED PER SHIP	CONSOLIDATED SPARE PART DWG. NO. D-35801 / BUREAU OF SHIPS DWG. NO. ITEM NO.
ARMATURE	1 TO 23	1	1	19
MAIN FIELD COILS	33	2	2	33
INTER POLE COILS	34	2	2	58
COMM END BEARING	29	1	1	80
PULLEY END BEARING	29	1	1	80
BRUSH HOLDER	39	4	4	119
BRUSH HOLDER SPRING	FOR PC. 39	4	4	131
BRUSH HOLDER INSULATION	36	2	2	142
BRUSH HOLDER INSULATION	41	2	2	154
BRUSH HOLDER INSULATION	42	2	2	148
CARBON BRUSH	40	4	4	106
GREASE CUP	54	2	2	103
FELT LUB. SEAL	48	2	2	165
FELT LUB SEAL	69	1	1	163
WRENCH FOR SOCKET HD. SCR. #10	FOR PC. 23		1	172
WRENCH FOR SOCKET HD. SCR. 1/4	FOR PC. 73		1	173
BEARING REMOVAL TOOL CONSISTING OF THE FOLLOWING PARTS			2	189
PULLER JAW 5" LG (COMM. END)			2	191
PULLER JAW 9" LG (PULLEY END)			1	197
CROSS BAR COMM & PULLEY END			1	199
SCREW COMM & PULLEY END				

FOR RE-ORDERING REPLACEMENT SPARES, REFER TO PROCEDURE OUTLINED ON E.D.WKS. DWG. D-35801. FOR ORDERING REPLACEMENT PARTS NOT FURNISHED AS SPARES, GIVE NAMEPLATE DATA, ITEM NUMBER, DRAWING NUMBER AND DESCRIPTION FROM DRAWING D-36276

NO.	PART	DESCRIPTION	APPR'D.	DATE	AUTH'Y
		ALTERATIONS			

NUMBER & NAME	B'LD'R
SS 274 ROCK	MANTOWOC SHIP B'LD'G CO.
SS 273 ROBALO	
SS 272 REDFIN	
SS 271 RAY	
SS 270 RATON	
SS 269 RASHER	
SS 268 PUFFER	
SS 267 POMPON	
SS 266 POGY	
SS 265 PETO	
SS 264 PARGO	ELECTRIC BOAT CO.
SS 263 PADDLE	
SS 262 MUSKALLUNGE	
SS 261 MINGO	
SS 260 LAPON	
SS 259 JACK	
SS 258 HOE	
SS 257 HARDER	
SS 256 HAKE	
SS 255 HADDO	
SS 254 GURNARD	
SS 253 GUNNEL	
SS 252 GABILAN	
SS 251 FLOUNDER	
SS 250 FLIER	
SS 249 FLASHER	
SS 248 DORADO	
SS 247 DACE	ELECTRIC BOAT CO.
SS 246 CROAKER	
SS 245 COBIA	
SS 244 CAVALLA	
SS 243 BREAM	
SS 242 BLUEGILL	
SS 241 BASHAW	
SS 240 ANGLER	

NUMBER & NAME	B'LD'R
SS 227 DARTER	ELECTRIC BOAT CO.
SS 226 CORVINA	
SS 225 CERO	
SS 224 COD	
SS 223 BONEFISH	
SS 222 BLUEFISH	
SS 221 BLACKFISH	
SS 220 BARB	
SS 219 AMBERJACK	
SS 218 ALBACORE	
SS 217 GUAPISH	
SS 216 GRUNION	
SS 215 GROWLER	
SS 214 GROUPER	
SS 213 GREENLING	
SS 212 GATO	

SECTIONAL ASSEMBLY OUTLINE & DIAGRAM
D-225 D.P. SEMI-ENCL. SELF. VENT. MOTOR FOR ENGINE LATHE

ELECTRO DYNAMIC WORKS BAYONNE, N.J.
OF THE ELECTRIC BOAT COMPANY

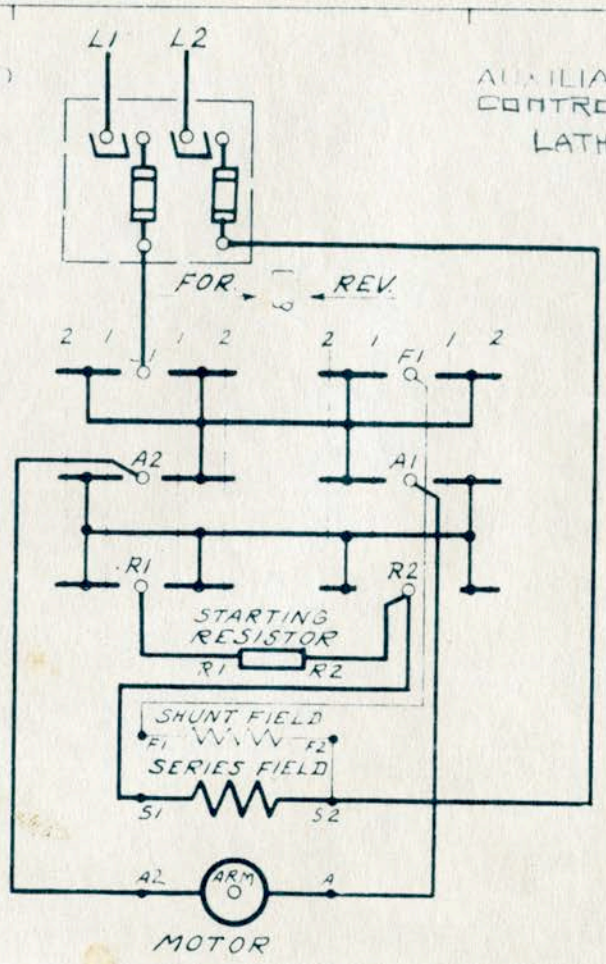
SCALE C.N.	MOTORS PER VESSEL 1
DRAWN BY G.W.P.	DATE 1-14-41
TRACED BY G.W.P.	E.D.WKS.S.O. 20-D-8018 / 20-D-8049
CHECKED BY G.M.K.	ELEC. ENG. OFF 5.49

CONTRACTOR'S PLAN NUMBER: D-36276 ALT. 0

BUREAU OF SHIPS PLAN NUMBER: BASIC SS212-S63-6

AUXILIARIES
CONTROLLER
LATHE.

B821469A
IDENTIFICATION
(A) MANUFACTURER - CUTLER-HAMMER, INC. ORDER NO. P2006654



CONNECTION DIAGRAM

DESCRIPTION OF OPERATION

TO START THE LATHE MOTOR IN THE "FORWARD" DIRECTION THE DRUM CONTROLLER MUST BE TURNED IN THE MARKED DIRECTION, REMAINING ON THE FIRST POINT UNTIL THE MOTOR HAS REACHED ABOUT ONE HALF ITS NORMAL SPEED AND THEN PROCEEDING TO THE SECOND POINT. THE STARTING RESISTOR IS INSERTED IN THE MOTOR CIRCUIT WHILE THE HANDLE RESTS ON THE FIRST POINT.

TO STOP THE MOTOR THE DRUM CONTROLLER HANDLE MUST BE RETURNED TO THE "OFF" POSITION.

TO START THE MOTOR IN THE "REVERSE" DIRECTION THE HANDLE IS TURNED IN THE PROPERLY MARKED DIRECTION, RESTING ON THE FIRST POINT UNTIL THE MOTOR HAS REACHED ABOUT ONE HALF SPEED AND THEN PROCEEDING TO THE SECOND POINT. THE STARTING RESISTOR IS INSERTED IN THE MOTOR CIRCUIT WHILE THE HANDLE RESTS ON THE FIRST POINT.

CONTROLLER CLASSIFICATION AND RATING

(A)	VOLTS	230 (175-345)
(B)	HORSEPOWER	2
(C)	FULL LOAD CURRENT	7.5 AMPS
(D)	TYPE OF CONSTRUCTION	

SAFETY SWITCH - ENCLOSED, MANUALLY OPERATED, TWO POLE FUSED KNIFE SWITCH WITH QUICK MAKE AND BREAK CONTACTS AND INTERLOCKING COVER.

DRUM CONTROLLER - ENCLOSED, MANUALLY OPERATED REVERSING DRUM CONTROLLER WITH "START" & "RUN" POSITIONS ON EITHER SIDE OF "OFF" POSITION.

12 APR 43

EA-S63-2-40, SOURCE { CUTLER-HAMMER 4169 / PORTS NO 6098-275 } SS 304-307, 308-312 / APPLY, SS 275-284, 285-291