



**PORTABLE SHAPE-CUTTING
MACHINES
NOS. 10 AND 16
RADIAGRAPHS®**

INSTALLATION,

OPERATION and

MAINTENANCE

NOVEMBER, 1959

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AIR REDUCTION

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NOS. 10 AND 16 RADIOGRAPHS®

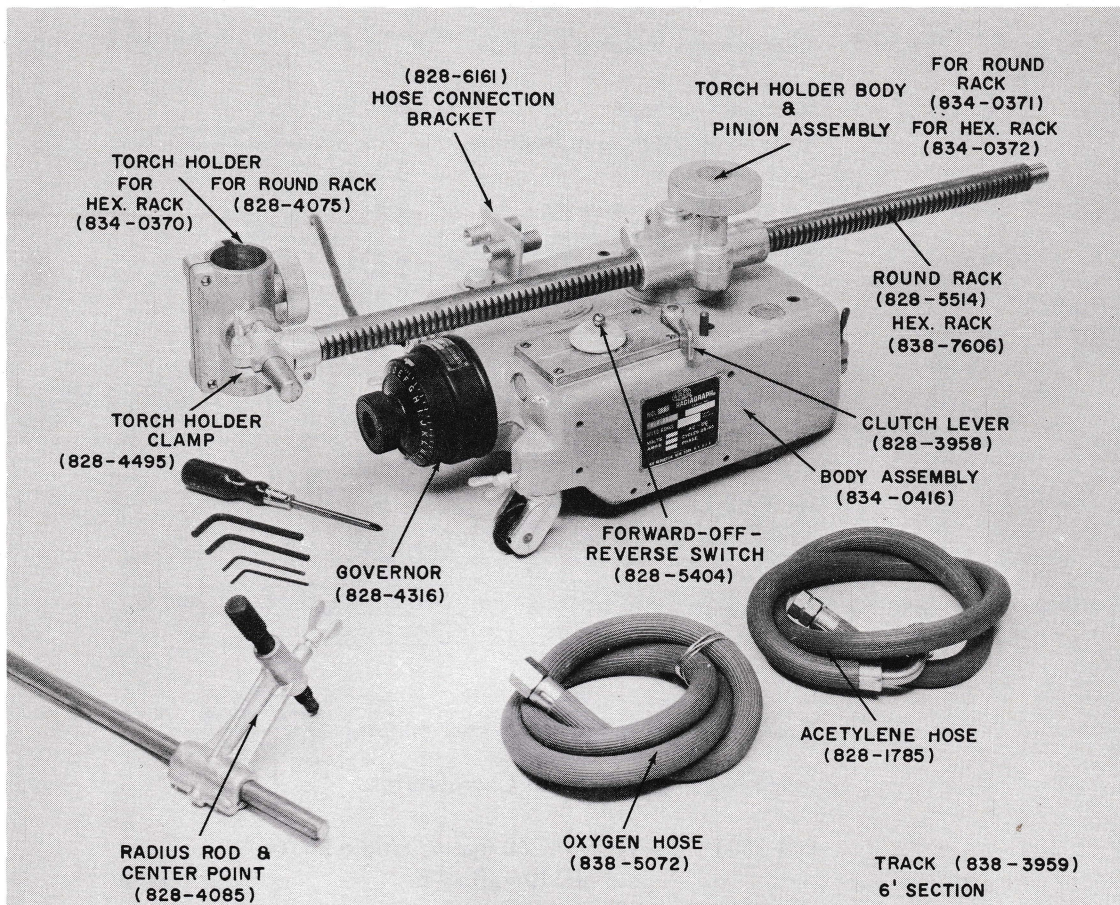


Fig. 1

I. INTRODUCTION

A. GENERAL

The AIRCO® 10 & 16 Radiographs (Fig. 1) are portable, motor-driven machines, which provide a controlled movement of equipment used in gas cutting, flame treating and inert-gas shielded arc welding.

Both the 10 & 16 Radiographs are identical except for obtainable speed ranges. The Radiographs are designed, primarily, for oxyacetylene cutting of steel sheets, plates, billets and forgings. Their ruggedness and dependability meet the varied requirements of most metal working shops and are ideal for supplementing heavy cutting equipment in shipyards, steel mills, etc.

Radiographs are available for operation on either 110 volt or 220 volt, a-c or d-c supply lines. A machine may be easily converted from 110 volt operation to 220 volt (or from 220 volt to 110 volt) operation.

Supplied with the Radiograph are the following.

- Torch Holder Assembly
- Radius Rod and Center Point Assembly
- Torch Holder Post
- Hose Connection Bracket Assembly
- Hose and Connection Assemblies (2)
- Allen Wrenches (4)
- Phillips Screw Driver

B. SPECIFICATIONS

Approximate Weights (pounds):

Machine Carriage	33 1/3
Style 4740 Two-Hose Machine	
Cutting Torch	3 3/4
Torch Holder Assembly	8 3/4
Radius Rod and Center Point	
Assembly	2 3/4
6-foot length of track	13 1/2

Approximate Dimensions (Inches):

	Length	Width	Height
Machine Carriage	14 1/2	7 1/2	9
Track	72	7	5/16

Operating dimensions for straight line and circle cutting - See Fig. 2, A, B, C, and D.

Power Requirements:

No. 10 Radiagraph (4" to 50" per minute)

<i>Stock No.</i>	<i>Electrical Characteristic</i>
804 2501	110 volt, 60 cycle, single phase a-c or 110 volt, d-c.
804 2520	220 volt, 60 cycle, single phase a-c or 220 volt, d-c.

No. 16 Radiagraph (2" to 28" per minute)

804 2516	110 volt, 60 cycle, single phase a-c or 110 volt, d-c.
804 2526	220 volt, 60 cycle, single phase a-c or 220 volt, d-c.

C. DESCRIPTION OF PARTS

For proper designation in the following discussion, the rear of the machine is where the indexed speed control is mounted.

1. Machine Body

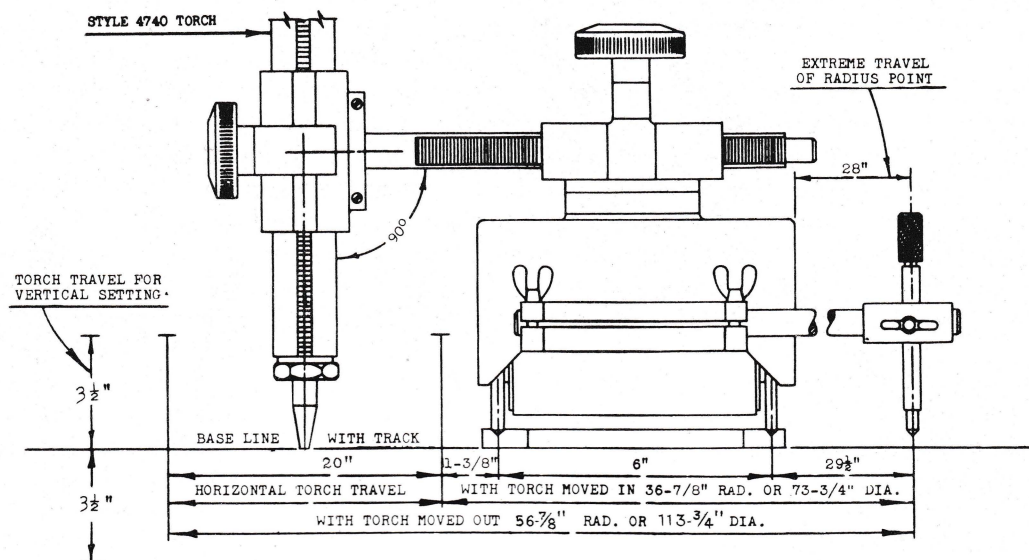
The machine body completely encloses the motor, transmission, terminal board and resistor. A handle is provided under the keyed hole at the front of the body for carrying the machine.

The center of the rear of the body has a bored hole for the governor and speed control unit. Two sockets are provided at each side of the rear for the caster wheels. These wheels can be allowed to swivel freely or be clamped in position.

A screen on the bottom of the carriage serves as a cover to protect the parts within the machine body and allow for ventilation. The screwdriver included with the Radiagraphs is for removal of this

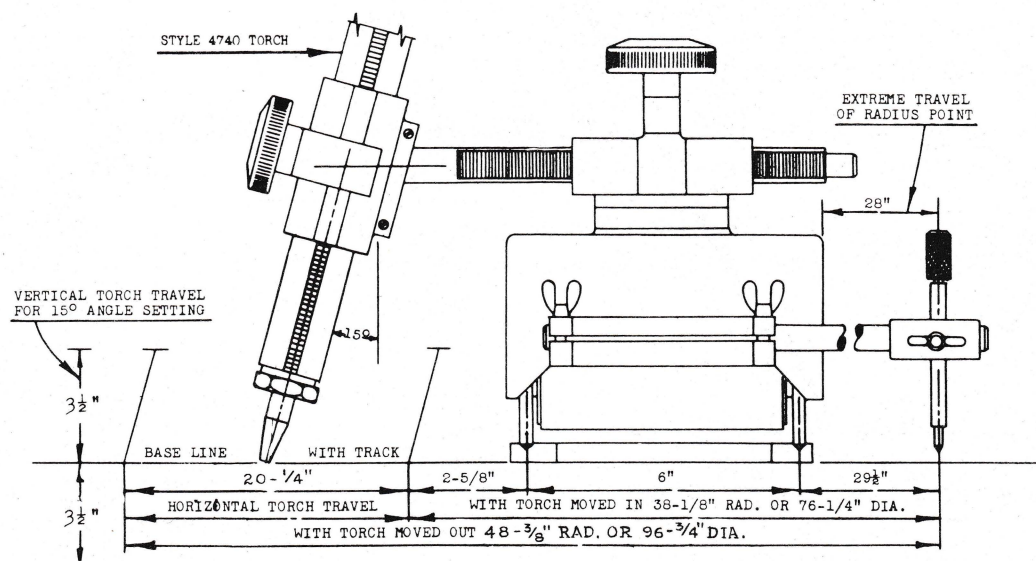
OPERATING DIMENSIONS

Fig. 2A – Straight Line and Large Circle Cutting with Torch Vertical



Position and dimensions of travel of torch and radius point with relation to Radiagraph for straight line and large circle cutting with torch vertical. When using the Radiagraph for straight line cutting, the Radiagraph and torch position will be as shown. For circle cutting, or when used without the track, the machine and torch position will be $\frac{1}{4}$ " lower.

Fig. 2B – Straight Line and Large Circle Cutting with Torch at 15° Angle



Positions and dimensions of torch and radius point with relation to Radiagraph for straight line and large circle cutting with torch set at 15° angle. When using Radiagraph without track, the machine and torch position will be 1/4" lower.

OPERATING DIMENSIONS

Fig 2C – Straight Line and Large Circle Cutting with Torch at 45° Angle

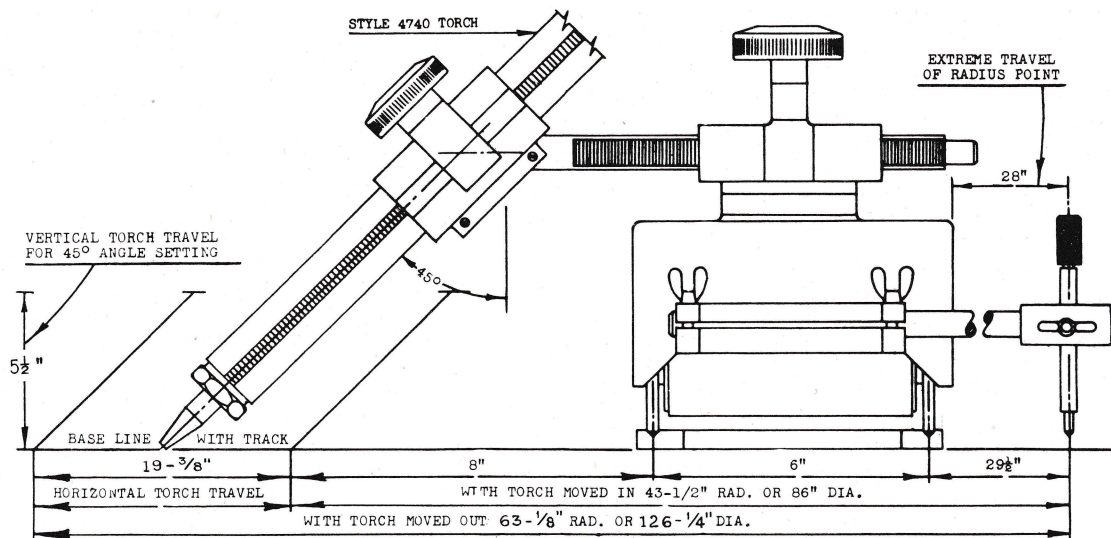
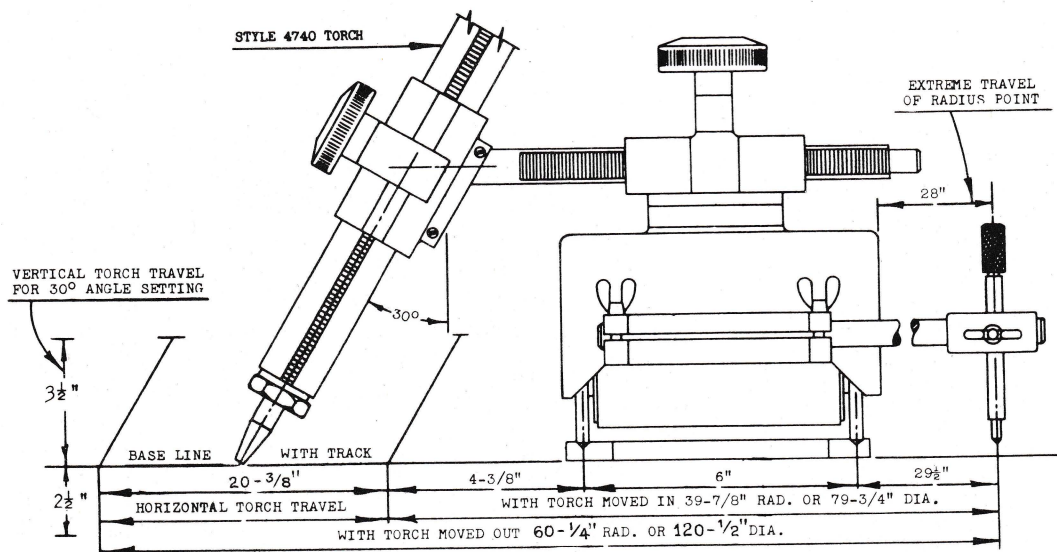


Fig. 2D – Straight Line and Large Circle Cutting with Torch at 30° Angle



screen, when required. On the top of the body is mounted the switch place, clutch lever, torch-holder post, and hose connection bracket. The transmission assembly, terminal board, and condenser are mounted within the body.

a. Clutch Lever: The clutch lever (Shifter Bearing Arm) is located on top of the machine near the operating switch. Swinging the lever toward the rear of the machine disengages the clutch so that the machine can be free-wheeled along the track. Moving the lever to the front of the machine engages the clutch, connecting the drive wheels to the motor.

b. Caster Wheels: A forged brass fork, fitted with a hardened, knurled steel wheel forms a caster-wheel unit. The shaft that fits into each of the two vertical sockets at the rear of the machine has an annular groove which permits the caster to swivel when not tightly clamped. Tightening the wing-bolt in either socket locks the caster in position.

c. Torch Holder Assembly: The torch holder assembly consists, basically, of a torch holder body and pinion assembly, torch holder bracket and pinion assembly, torch holder clamp assembly and rack. The rack (round or hexagonal shape) is a steel bar, approximately 24 inches long with machined teeth on one side. The rack is guided through the torch holder body and pinion assembly attached to the torch holder post.

The torch holder body and pinion assembly can be rotated 360 degrees. A knurled hand-wheel on the assembly, when rotated, turns a pinion which engages the teeth on the rack. This permits the rack to be moved at the desired position from the machine body to provide alignment of the torch over the proposed cut. The thumbscrew on the assembly is used to lock the rack in position once the torch position has been set.

The torch holder clamp is mounted at either end of the rack. A hand wheel on the clamp is used to move the torch to the desired distance above the workpiece. The clamp can be adjusted so that the torch is set for cutting bevels. Graduations, in increments of 5 degrees (up to 45 degrees), are marked on each side of the clamp.

d. Radius Rod and Center Point: The radius-rod and center point is used for cutting circles and arcs of circles. It consists of a rod, center-point holder, and center-point. The rod is 36 inches long with a key-way throughout its entire length. The forged brass center-point holder has a key to fit the key-way of the radius rod.

Generally, one caster wheel clamp is released when cutting circles, but it may be clamped at a position which aligns with the radius of the circle to be cut. The released caster wheel is normally the one located at the center-point side of the machine; however, the correct machine balance is the final consideration.

With the standard length rod, square-edged circles from 2 inches to 7 feet in diameter can be cut. When large quantities of small circles are to be cut, the standard rod may be too long for convenient operation. In such cases it should be cut to a desirable length.

e. Hose Connection Bracket Assembly: The hose connection bracket assembly is attached to the top of the Radiograph body. It receives the gas hoses from the supply sources and the hoses from the cutting torch.

Tracks are supplied in standard lengths for a five-foot cut. When laid progressively, straight line cuts are limited only by the length of the gas hoses and electric cord.

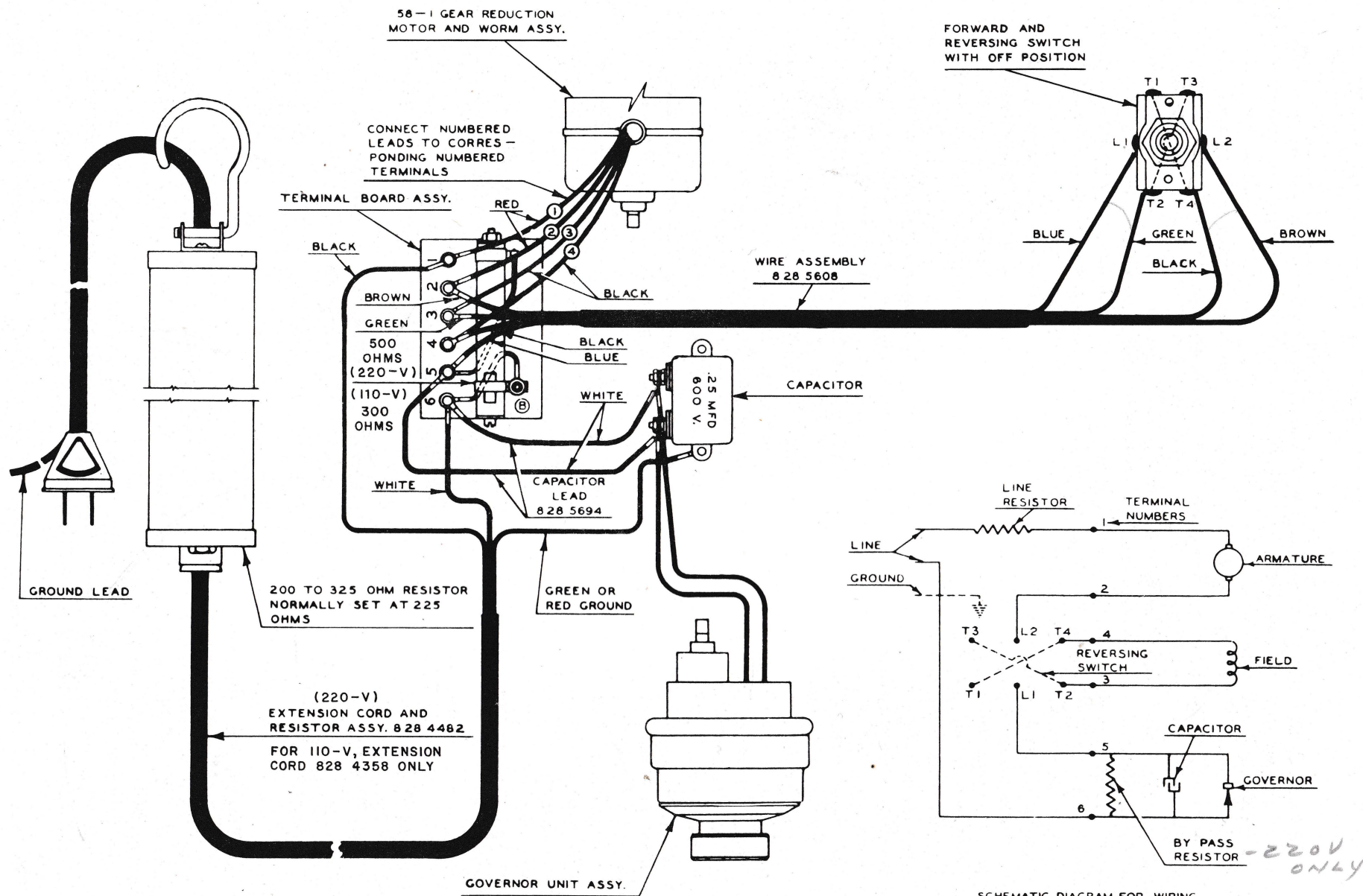
2. Transmission Assembly

The transmission assembly, mounted on the underside of the carriage, consists of the transmission housing, drive motor, clutch, clutch release fork, spring and lever, drive shaft bearings, bearing flanges, wheels, and gaskets.

The drive from the motor to the wheels is through a worm and wormwheel. The fixed clutch assembly is integral with the wormwheel and makes interlocking contact with the sliding clutch member. This member is held in position by a phosphor-bronze spring and transmits power to the drive shaft.

The steel drive-wheels are knurled diagonally for positive traction, and hardened for long wear. A clamping feature at the hub of each wheel is provided by a wedge pin. Gaskets are used between the bearing flanges and the transmission housing, and also under the top cover plate.

Fig. 3 Wiring Diagram



3. Motor and Governor

Machines are supplied for operations on 110 volt and 220 volt a-c and d-c circuits. The machines work from *single-phase circuits only* and will operate satisfactorily on 25 to 60 cycles. Machines equipped for 220-volt operation have a resistor installed in the electric cord (refer to Fig. 3 for wiring diagram).

The three-conductor rubber-covered electric cord (25-ft. long) is held in the upper left at the rear of the machine body with a strain relief bushing. The green lead at the machine end is grounded to the machine body. The other end of the electric cord is fitted with a two-prong connector with a green ground-lead; install a suitable plug connector for grounded circuits.

The 110-volt universal motor has ball bearings, enclosed gear-reduction unit, and a totally enclosed case. The motor is capable of speeds exceeding 10,000 RPM. The governor is a complete and separate unit. It is held within the motor body by three 10-32 Allen head cap-screws. This unit is made up of the governor brushes and springs, and the indexed speed control. The governor, although designed for heavy currents, and capable of high speeds, has a sensitivity that assures a constant speed. The governor shaft is connected to the motor armature shaft by a flexible coupling.

Speed regulation is obtained from the indexed speed control. Turning the dial to the left increases travel speed; to the right decreases the speed. The entire speed range is covered in one revolution of the dial.

Checking the actual speed of travel for each setting on the indexed dial should be done. A reference chart should be prepared and used as a reference for setting cutting speeds.

An identical setting on different machines does not indicate that the machine speeds will be the same; each machine should be charted. Should governor units be replaced or repaired, the machine speeds should again be charted. The chart should be checked about every three months, and revised to compensate for any changes that may occur.

II. INSTALLATION

A. GENERAL SET-UP FOR NORMAL OPERATIONS

- (1). Lay the track on a suitable support with the grooves facing up.
- (2). Place the carriage on the track so that the side of the carriage which bears the nameplate faces the operator.
- (3). Insert the torch into the torch holder. Adjust the torch holder clamping screws to allow firm, easy racking of the torch. Insert the required tip into the torch.
- (4). Connect the hoses from the supply regulators to the hose connection bracket. Connect the torch hoses to the outlet of the connection bracket. Firmly tighten the fittings.

If the electric plug is inserted into the power receptacle the machine can then be used for straight line cutting, either square or beveled-edged.

**CAUTION: BE SURE TO GROUND THE LEAD EXTENDING
FROM THE ELECTRIC PLUG.**

If the machine is to be used without the track for cutting circles, clamp the radius rod and center-point assembly in the keyed hole on the front of the carriage.

B. GENERAL SET UP FOR AUXILIARY CUTTING OPERATIONS

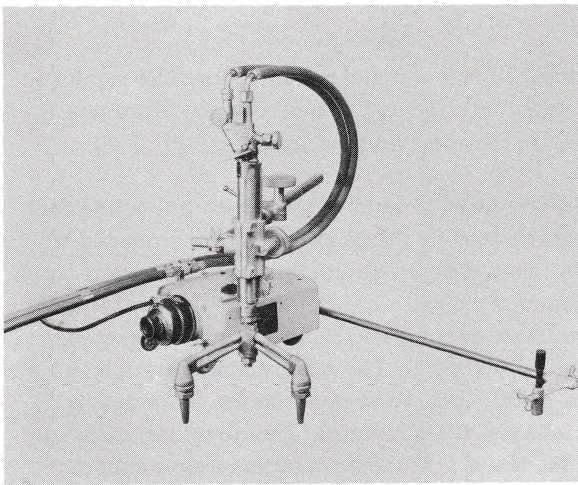


Fig. 4A

2. Structural Beam Cutting

Fig. 4-B, illustrates the Radiograph working on the inside of a channel iron, cutting ship frames. Side rollers (which are required) are positioned above the drive wheel level.

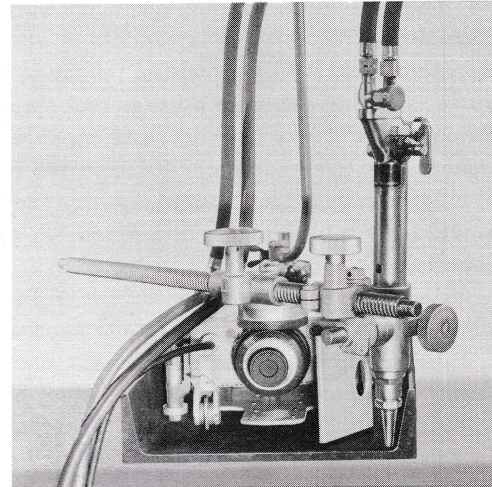


Fig. 4B

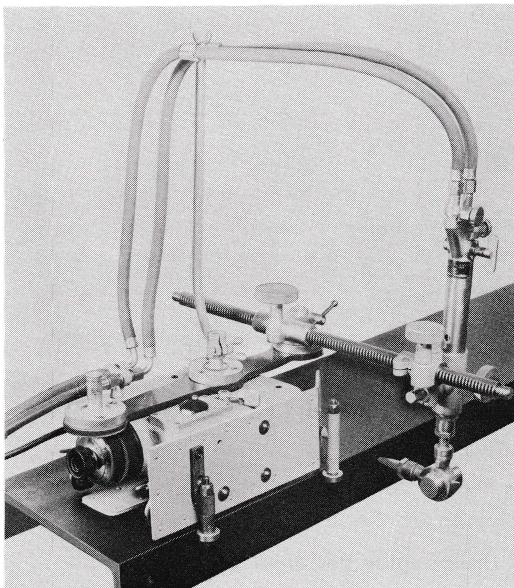


Fig. 4C

Figure 4-D illustrates the Radiograph set-up to rip flanges off an I-Beam, using the AIRCO Adjustable Angular Torch Heads. (For 4700 Series. Stock No. 831-2100) For 2500 Series Stock No. 831-2420)

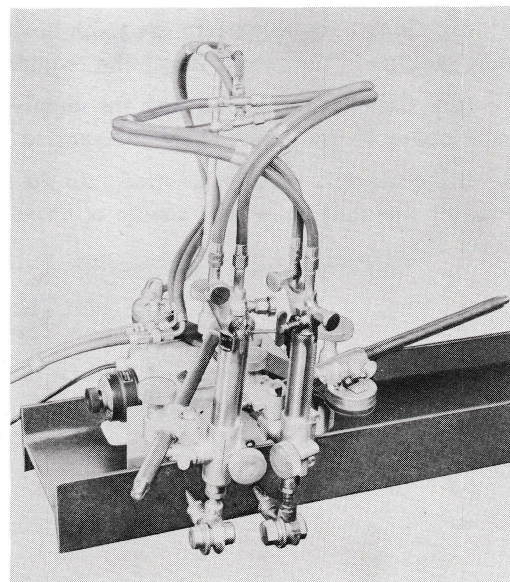


Fig. 4D

III. OPERATION

A. SAFETY

- (1). Do not operate the Radiograph on any electric power line but that for which the machine is intended.
- (2). Do not use the speed control knob as a shut-off switch. Although the motor does not run with the dial at the lowest setting, current still flows through the motor and windings.
- (3). Complete familiarity with, and adherence to the following AWS publications is recommended:
 "Safety In Electric and Gas Welding and Cutting Operations"
 American Standard Z49. 1-50
 "Safe Practices For Welding and Cutting Containers That Have Held Combustibles"
 No. A6.0-52
- (4). Under no circumstances should maintenance procedures be undertaken without removing the electrical power plug from the receptacle.
- (5). Adequate purging procedures should be used on initial starting, and after equipment has been shut down for a period of time.

B. PROCEDURE

- (1). Align the torch over the proposed cut.
- (2). Check work for levelness and proper positioning.
- (3). Set correct gas pressures in accordance with thickness of metal and desired quality of cut - see Table I.

TABLE I
Cutting Guide When Using Style 144 Cutting Tip*

Thickness In.	Tip Size	Pressure - P.S.I.**		Cutting Speed - IPM	Kerf Width In.	Cleaning Drill No.	
		Oxygen	Acetylene			Cutting Orifice	Preheat Orifice
1/8	00	30	1 1/2	23	.060	69	66
1/4	0	30	2	20	.075	64	64
3/8	1	30	3	19	.095	57	62
1/2	1	40	3	17	.095	57	62
3/4	2	40	3	15	.110	55	60
1	2	50	3	14	.110	55	60
1 1/2	3	45	3	12	.130	53	59
2	3	50	3	10	.130	53	59
2 1/2	4	50	3	9	.145	50	57
3	5	45	4	8	.165	47	57
4	5	60	4	7	.165	47	57
5	6	50	5	6	.190	42	56
6	6	55	5	5	.190	42	56
7	6	65	5	4 1/2	.190	42	56
8	7	60	6	4	.220	36	56
10	7	70	6	3 1/2	.220	36	56
12	8	70	6	3	.260	1/8	55
14	9	85	6	3	.295	27	54
15	10	85	6	3	.345	19	54

*Style 144 Cutting Tip is also used for cutting steel castings. Sizes 11-13 have straight bore cutting hole for rivet washing and gouging.

**Pressures measured at entry of 25 feet 3/8" I.D. hose.

- (4). Set speed control to required value.
- (5). Adjust torch to position just above edge of starting point of cut.
- (6). Open torch valves and ignite gases at tip. Adjust flame in normal manner.
- (7). With torch valves throttled for required flame, make final adjustments on gas regulators.
- (8). For square-edge cutting, align the tip with one of the preheating flames leading. For bevel cutting, align the tip with the flames straddling the cut, increase the preheat and decrease the cutting speed.
- (9). When cutting heavy materials, satisfactory starting may require an initial undercutting operation.

1. Cutting Techniques

The quality of the steel or type of the work being done may justify slight variations in operating technique: (Fig. 5).

- (10). If the cut is lost the preheat should be increased or the speed decreased.
- (11). If the top edges melt down decrease the preheat.
- (12). For rough serving use higher speeds and larger tips or slightly higher pressures.
- (13). If the drag unfavorably affects the quality of the shape cuts, reduce the speed.
- (14). If the drag is shorter than necessary on straight line cutting, decrease the pressure or increase the speed.

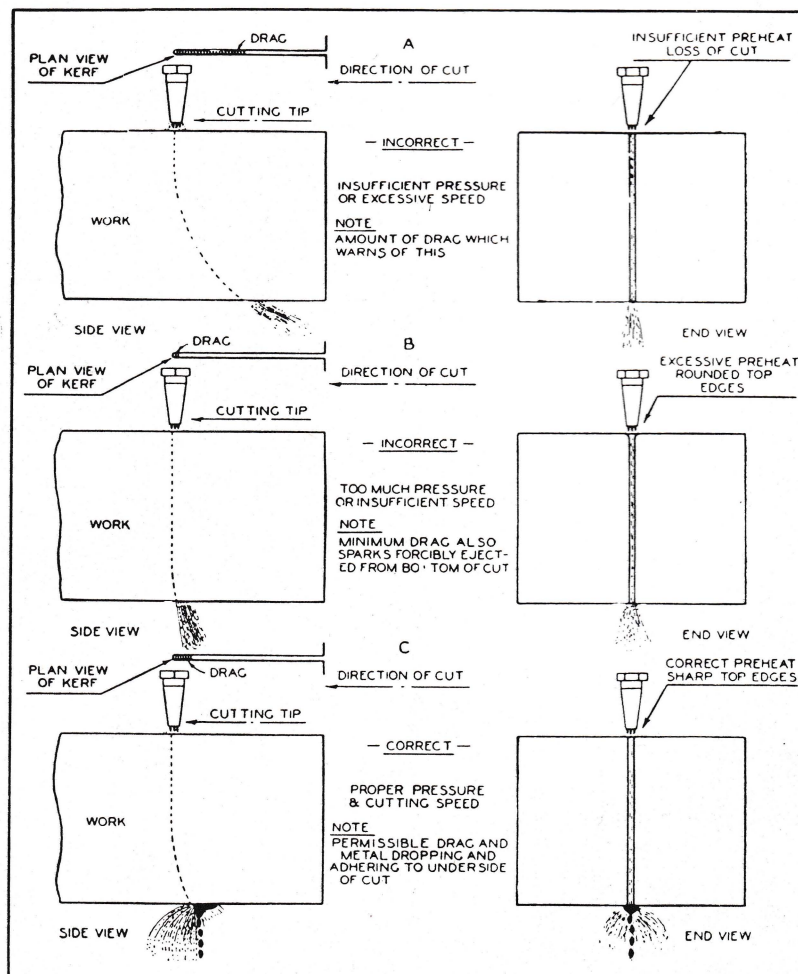


Fig. 5 Cutting Adjustments

2. Typical Operations

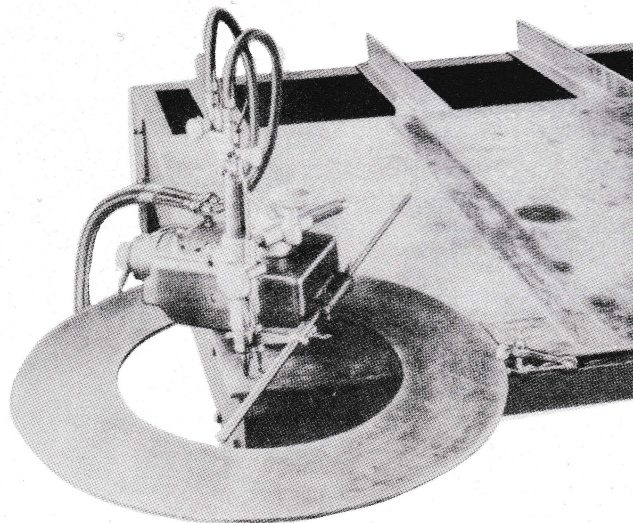
The following photographs (Fig. 6) illustrate typical methods employed in cutting operations with the Radiagraph.

A set-up of the No. 10 Radiagraph for small circles on the extreme edge of a plate. The machine is set to cut a 2-inch diameter circle Fig. 6-A.

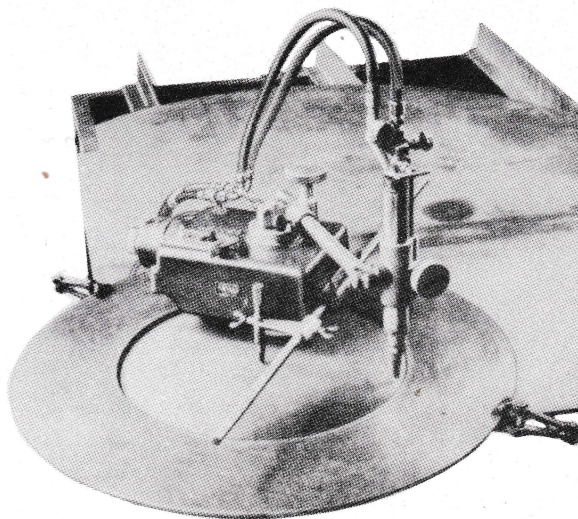
A set-up for cutting 16-inch diameter circle on the extreme edge of a plate. For cutting circles 15 1/2 inches in diameter, and larger, the plate supporting-ring is not required since the machine can be supported on the circle cut Fig. 6-B.

When cutting circles 15 1/2 inches in diameter, and larger, the No. 10 Radiagraph is supported directly on the plate Fig. 6-C.

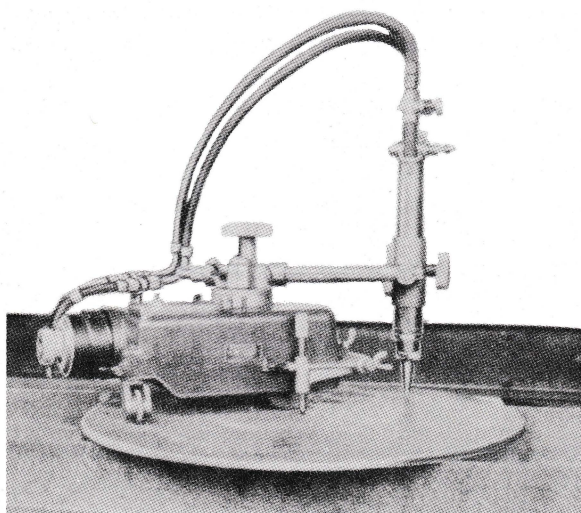
With the scrap removed, the 15 1/2-inch diameter circle supports the machine. This photo shows how circles of this diameter (or larger) may be cut on the extreme edge of a plate, or on individual plates, without a plate supporting-ring Fig. 6-D.



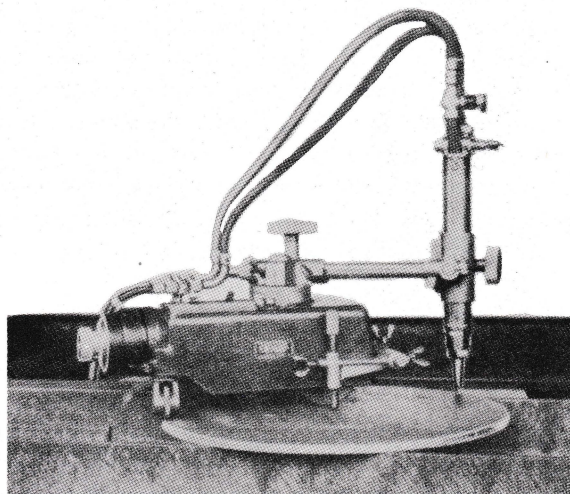
A.



B.



C.



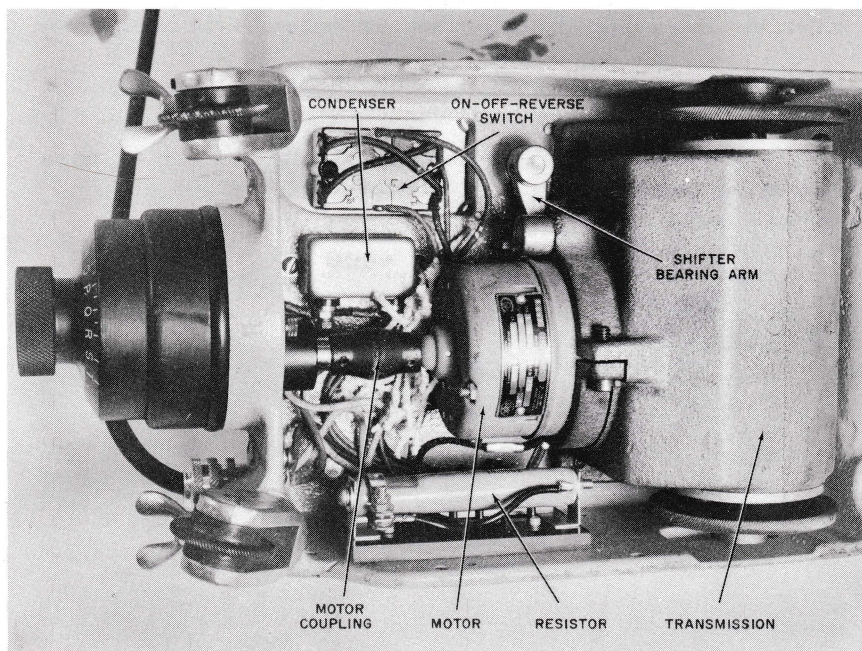
D.

Fig. 6 Typical Operating Set-ups

IV. MAINTENANCE

A. LUBRICATION

The Radiograph requires lubrication at two places; the motor and transmission assembly, and the axle of the caster wheel (Fig. 7).



A.



B.

Fig. 7

When delivered, the machine contains the correct amount of grease and should require no further attention for about a year. For the motor and transmission assembly, the Keystone Lubricating Company's No. 84 (Light) grease, or equivalent, is recommended for service at temperature down to zero (832 9907). For service at temperatures below zero, use a lighter grease. Four ounces of grease is sufficient for one application. Any grease used should have properties that keep it at approximately the same consistency over a wide temperature range.

In order to grease the transmission assembly remove the screen from the underside of the machine, backout the four Allen-head cap screws from the top of the machine and remove the two flat-head screws which fasten terminal board assembly. After removing flexible coupling and electric leads, the motor and transmission assembly may be removed. Remove cover and gasket, wash out all old grease and apply a quarter-pound of grease to gears and clutch.

The caster wheel axle should be lubricated with light machine oil about once a week.

B. CHANGING OPERATING VOLTAGE

A machine originally purchased for 110 volt operation may be converted for 220 volt operation. Two changes are required: (1) Remove the electric cord (828 4358) used for 110 volts and replace with the electric cord and resistor assembly (828 4482) for 220 volts. (2) Remove terminal board (828 4088) used for 110 volt and replace with the terminal board (828 4760) used for 220 volt.

By reversing the procedure a 220 volt machine may be converted to operate on 110 volt circuits.

NOTE: When making changes on electrical input characteristics the voltage plate should be changed to correspond.

C. MOTOR REPAIR AND REPLACEMENT

Limited field repairs to the electrical system of the Radiograph should be restricted to replacement of the following:

Name	Stock No.
Motor Brush and Spring Assembly	828 5375
Motor Brush Clip	828 5377
Motor Brush Plug	828 5376
Governor	828 5175
Governor Brush	828 5405
Reversing Switch and Wire Assembly	828 5911

If, after making replacements the motor does not work properly, a new motor should be installed. Installation of the new motor will require the use of motor alignment fixture 828 2185. If necessary, the complete motor and transmission assembly can be removed and a factory reconditioned unit installed without the use of the motor and alignment fixture.

If after making replacements, the governor control unit does not function properly, remove the governor control unit (see Section D) from the machine and replace. A replacement unit can be installed in the machine using the Allen wrenches supplied.

If repairs to any part of the governor control unit or motor and transmission assembly is necessary, it is recommended that the complete unit be replaced.

1. Alignment of Motor and Transmission Assembly

Set the motor assembly fixture, Fig. 8, on the work bench. Turn the motor and transmission assembly upside down and lay the flat surfaces of the transmission on the parallel guides of the fixture. Insert the motor shaft into the .252" reamed hole of the fixture and tighten in place with the thumb screw. Line up one of the rear 1/4"-20 tapped holes of the transmission housing with the elongated hole in one of the fixture guides and pin the two together with the knurled pin.

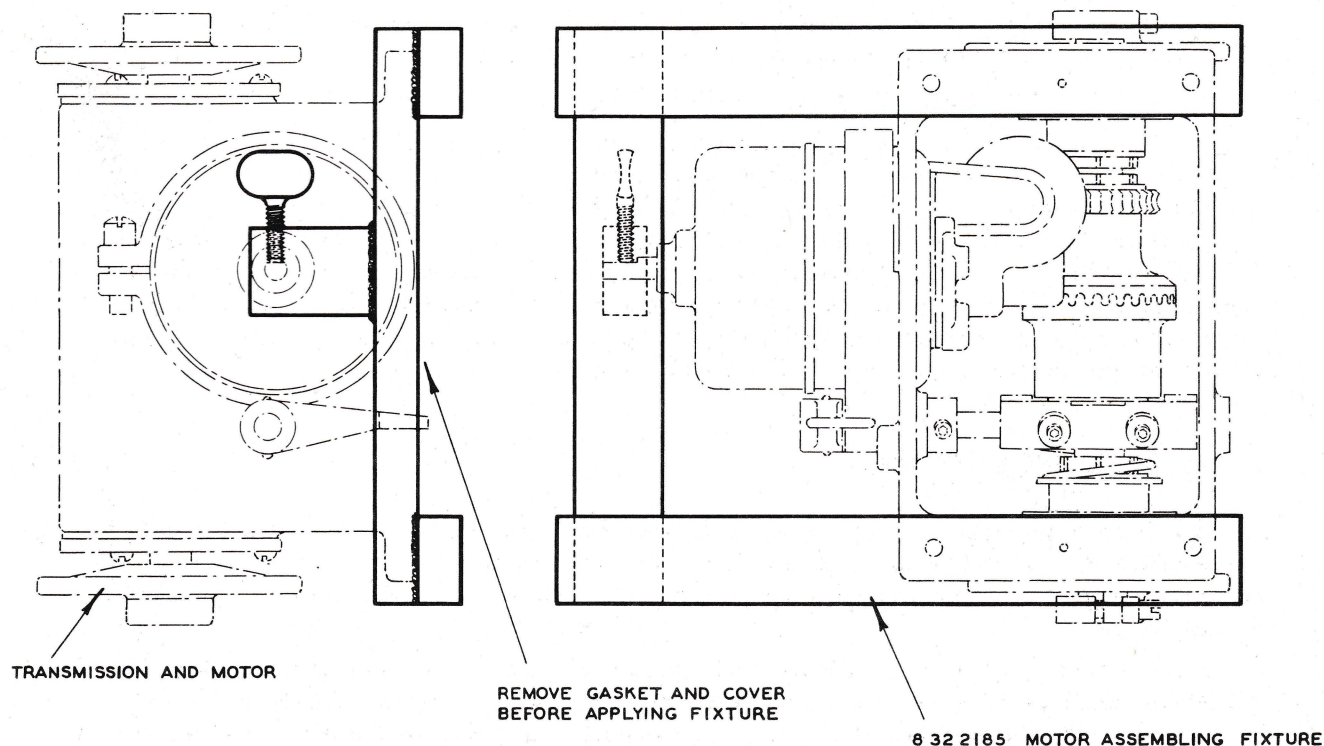


Fig. 8 Motor Alignment Fixture 832-2185

With a soft mallet, tap the top surface of the transmission housing. This aids in lining up the motor and transmission. With a parallel clamp, clamp the transmission and motor fixture firmly together.

Turn this assembly over so that the opening in the transmission is up. Mount the transmission between the jaws of a bench vise. Press down on the top of the worm gear shaft and, at the same time move the mating gear in the transmission back and forth. The total amount of movement should be less than $1/32''$. There should be a slight amount of clearance between the worm on the motor and the gear. However, it must not be excessive as it will produce an excessive amount of backlash. The amount of clearance should be about $.010''$.

If the assembly is too tight, tap the transmission end of the motor out. If it is too loose, tap the motor in. When this adjustment is satisfactory, tighten the oval-head cap screw firmly in place. Again test the assembly for play. If tightening has moved the motor, tap slightly to secure the required tolerance. When the tolerance is correct, tighten up on the cap screw. Remove the motor assembly fixture from the transmission.

2. Motor Brush Replacement

- (1). Disconnect the electric cord from the supply line.
- (2). Remove the screen guard.
- (3). Remove the brush plug from the motor case.
- (4). Compress the brush retaining clip, between the thumb and forefinger and remove from motor case.
- (5). Withdraw the brush and spring assembly and examine the length of the brush. (*Brush replacement is recommended when the length of the brush has been reduced to approximately $3/16''$.*)

Should the motor require new brushes, replacement may be made by removing the motor and transmission assembly from the machine as follows:

- (6). Loosen the set screw at the motor end of the flexible coupling (use $5/64''$ hex wrench).
- (7). Place one hand under the transmission case to support the loosened assembly and turn the machine bottom side up.
- (8). Back-off the motor shaft from the flexible coupling.
- (9). The motor and transmission case assembly may now be supported so that both motor brush plugs are accessible.

When inserting the new brush, make certain that the curved surface of the brush coincides with the curvature of the commutator. Slide the brush into the brush holder several times to be assured there is no binding or sticking. Tap the brush against the commutator several times to make certain there is physical contact between the brush and commutator. To reassemble the transmission and motor, reverse the above procedure. When fastening the coupling set screw to the motor shaft, make certain that the screw bears against the flat on the motor shaft.

D. DISASSEMBLING GOVERNOR

The governor and governor brushes may be inspected or replaced by disassembly of the indexed speed control and governor housing (refer to Fig. 9). To disassemble the indexed speed control, turn the knob in a clockwise direction until the graduated disc has reached the first division line and bears against the stop.

In the recessed portion of the indexed knob are two holes. In one of these holes is a $8-32''$ Allen-type, headless set screw "B". Loosen this set screw until the recessed disc "E" can be easily turned. With the graduated dial held against the stop, turn the recessed disc counterclockwise as far as it will go (this should be about $1-1/4$ turns).

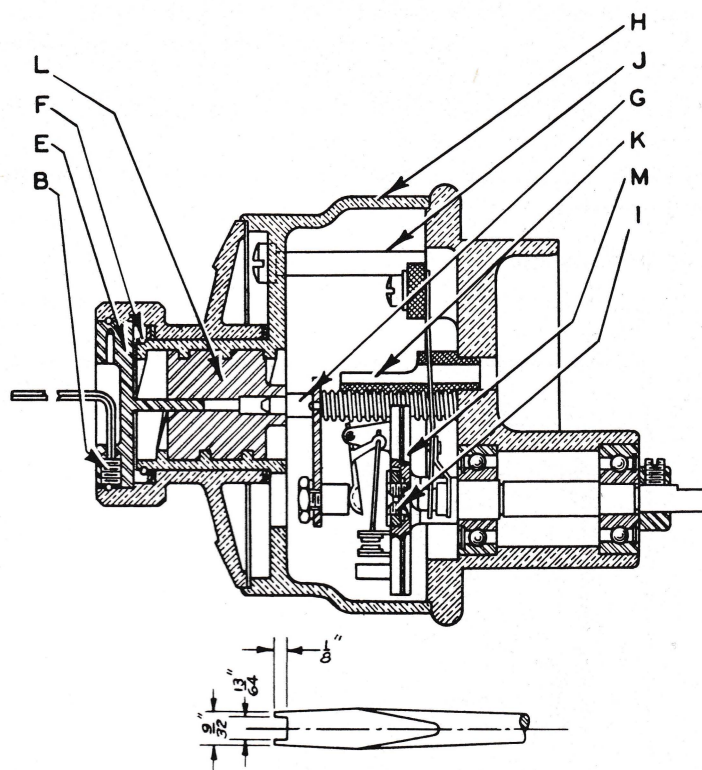


Fig. 9 Dissassembling Indexed Speed Control

With a firm grip on the knurled knob turn counterclockwise. The recessed disc "E" will be forced out and can be lifted out of place. This will make the remaining parts accessible. Remove the snap ring "F". The graduated dial may now be withdrawn.

NOTE: Do not drop or lose spacing rings or washer in counterbore of dial knob.

Unscrew the two fillister-head screws "J" that hold governor housing "H" to body. After removal of these screws, the governor housing can be withdrawn.

1. Replacement Governor

Lift out control plate assembly "G" and springs. A special screwdriver, (Stock No. 832 2409) ground as shown in Fig. 9 is required to remove governor lock nut "I". Insert screwdriver into governor lock nut; while holding the governor at its outer edge to prevent rotation of the shaft, rotate screwdriver counterclockwise. After removing the nut, slide governor "M" from shaft.

Examine the governor points for pitting. Excessive pitting is usually evidenced by fluctuations in speed; particularly in the lower speed range. The points of a governor are excessively pitted when a clean break is not obtained when the points are slightly separated. There is no satisfactory method for reconditioning governor points.

The annular rings on the underside of the governor should be examined for evidence of scoring or arcing. The annular rings can be cleaned and polished with crocus cloth. *No coarser grit than crocus cloth should be used on these rings.*

If close examination of the annular rings reveal a depression at one or more spots, arcing between the governor brush and annular ring has occurred.

A dull matted-appearing annular ring is usually an indication that a continuous arc existed between the governor brush and annular ring. This is usually caused by a space between brush and annular ring or by lack of sufficient pressure.

If either of these conditions cannot be removed by polishing with crocus cloth, the governor is not suitable for continued use. After polishing, all grit and brass dust should be removed with particular care given to the space or groove between the annular rings.

The action of the governor bell crank may be checked by pressing down and releasing bell crank pedal. A smooth action, free from jerks, should be evident.

The governor setting should be such that contact points separate before the pedal makes contact with the top surface of the governor.

2. Replacing Governor Brushes

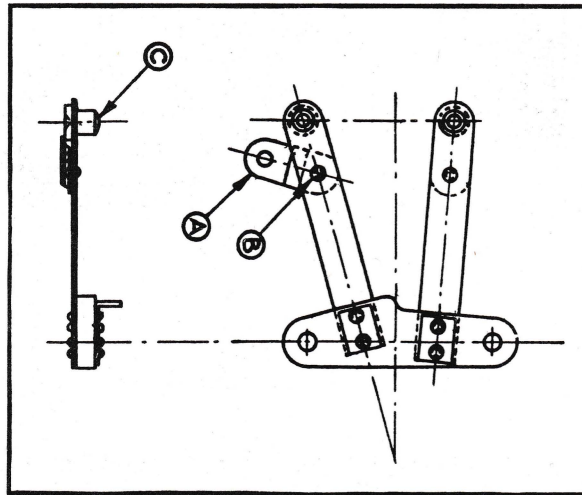


Fig. 10 Governor Brush Holder Assembly

To replace or renew the governor brushes, it is first necessary to remove the governor from the governor shaft (see Maintenance, Section D). The governor brush holder assembly is shown in Fig. 10. Swing the clip "A" which swivels about pivot "B". Push out from the top side the worn brush and insert the new brush "C" (828 5405) from the bottom. Swing the clip "A" back to locking position.

3. Reassembling Governor (Refer To Fig. 9)

To reassemble, place governor over governor shaft and fit groove in governor hub over pin in governor shaft. Fasten nut with special screwdriver.

IMPORTANT: To prevent the nut from becoming loose from the shaft, slightly upset or displace metal at the end of the shaft with small, round-edge chisel inserted into screwdriver slot of the nut. Carefully check assembly of governor by placing control plate "G" and springs in normal position and actuate by hand. Press control against stop "K" and make certain the clearance exists between governor shaft or fastening nut.

Replace control plate and springs in normal position. Actuate control plate by hand several times to make certain that governor is actuated properly. Place governor housing "H" over body, making certain that the control plate pin of "H" enters the regulating screw "L". Adjust housing so that the hole in the top of the case coincides with the nut on top of the control plate. Fasten housing in place with the filister-head screws. Place indexed dial over barrel in proper position. *Make certain that dial is in proper relation to stop pin.* Place snap ring "F" in groove provided. Prior to inserting "E" mark the hole in which set screw "B" is located. Insert recessed disc "E" by pushing or striking with a light, sharp blow. It is sometimes necessary to compress the wire ring into the grooves.

Connect the machine to the line current and start the motor. With the Allen wrench inserted in the set screw "B" rotate "E" clockwise to decrease the speed, and counterclockwise to increase the speed. With the dial set at the first division line and held against the stop, adjust the recessed plug to the point where the motor just ceases to rotate. Tighten set screw "B".

V. REPLACEMENT PARTS

The following illustrations contain replacement part information. The various parts of the Radiagraphs are indicated, with their AIRCO Stock Nos. When ordering replacement parts, please specify the appropriate Stock Number.

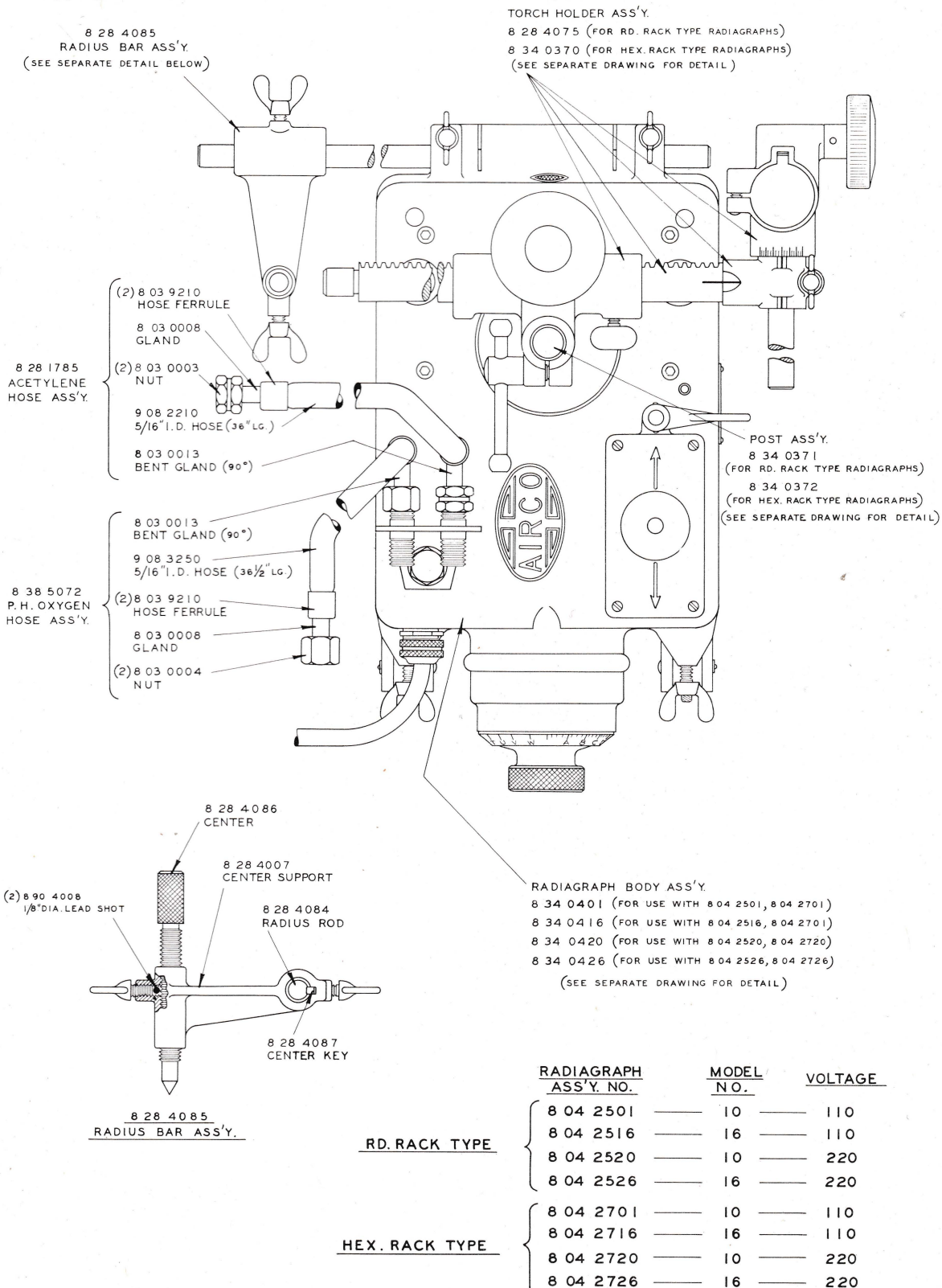
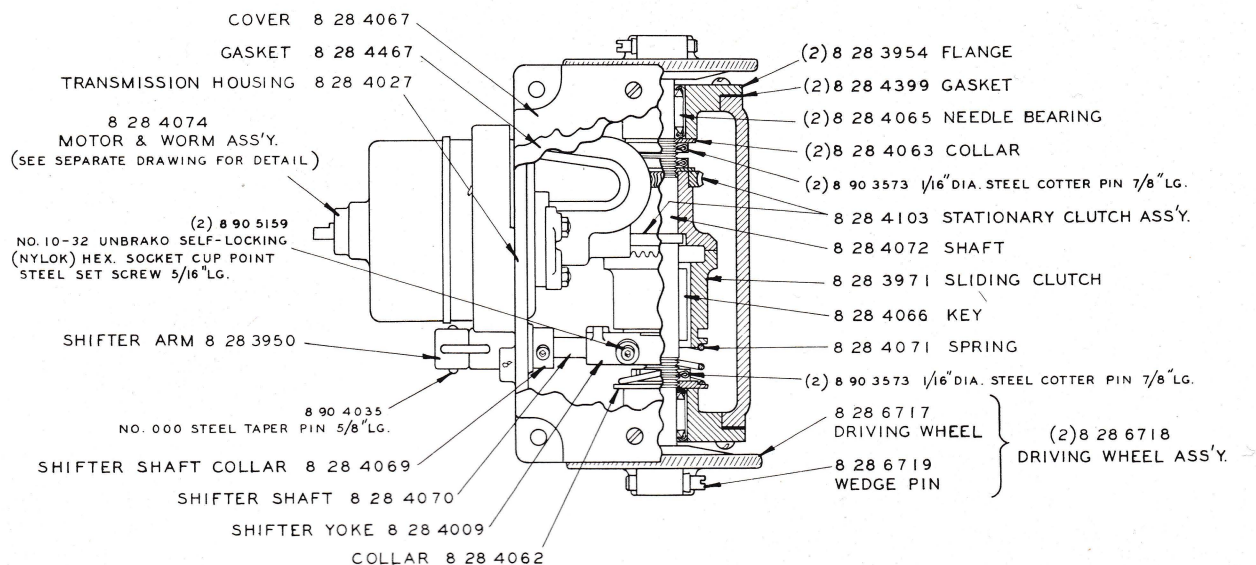
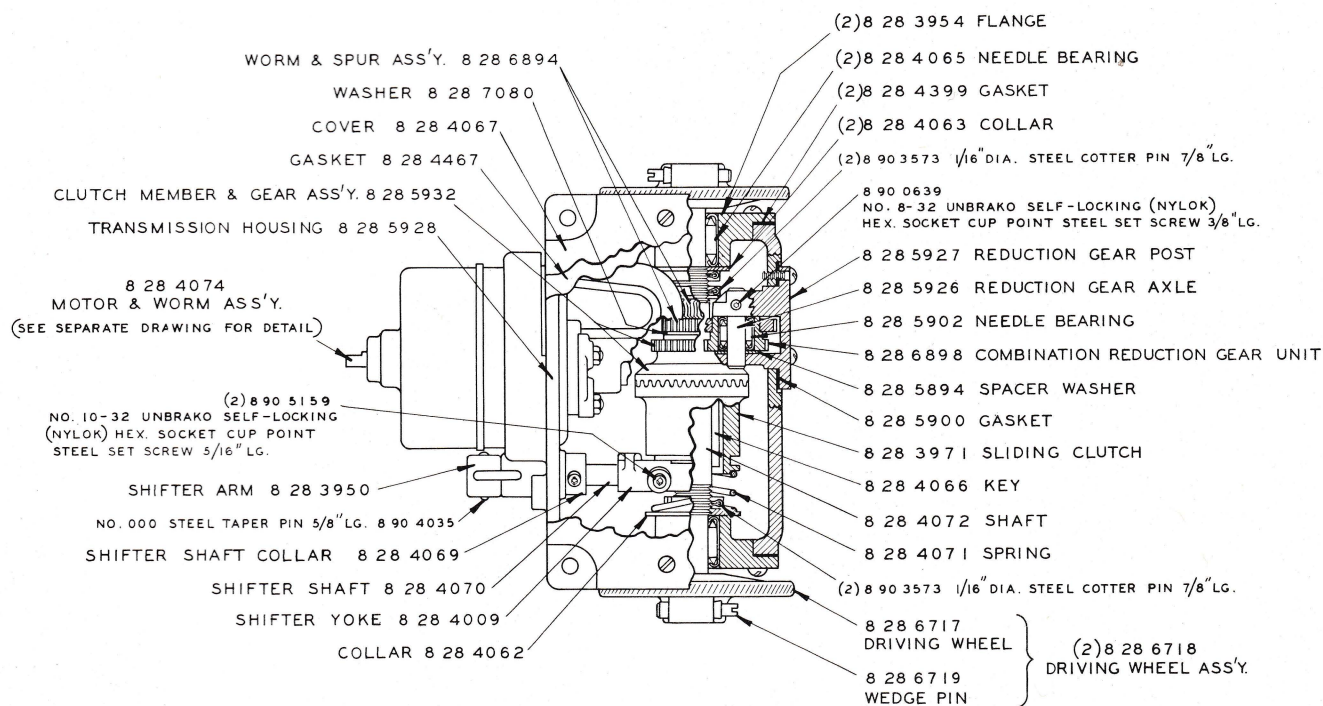


Fig. 11 Torch Holder, Body, Rack

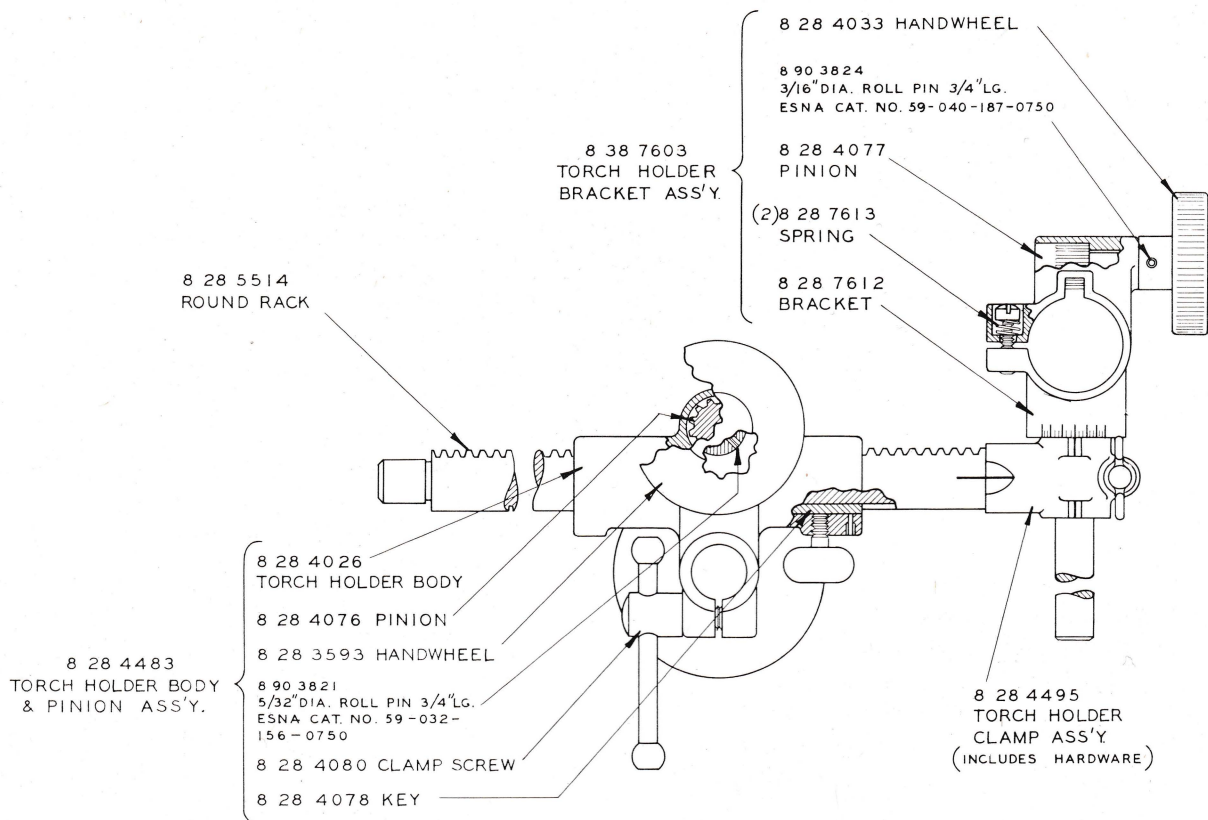


8 28 4060
TRANSMISSION ASSEMBLY
(FOR USE WITH NO. 10 RADIOGRAPH)

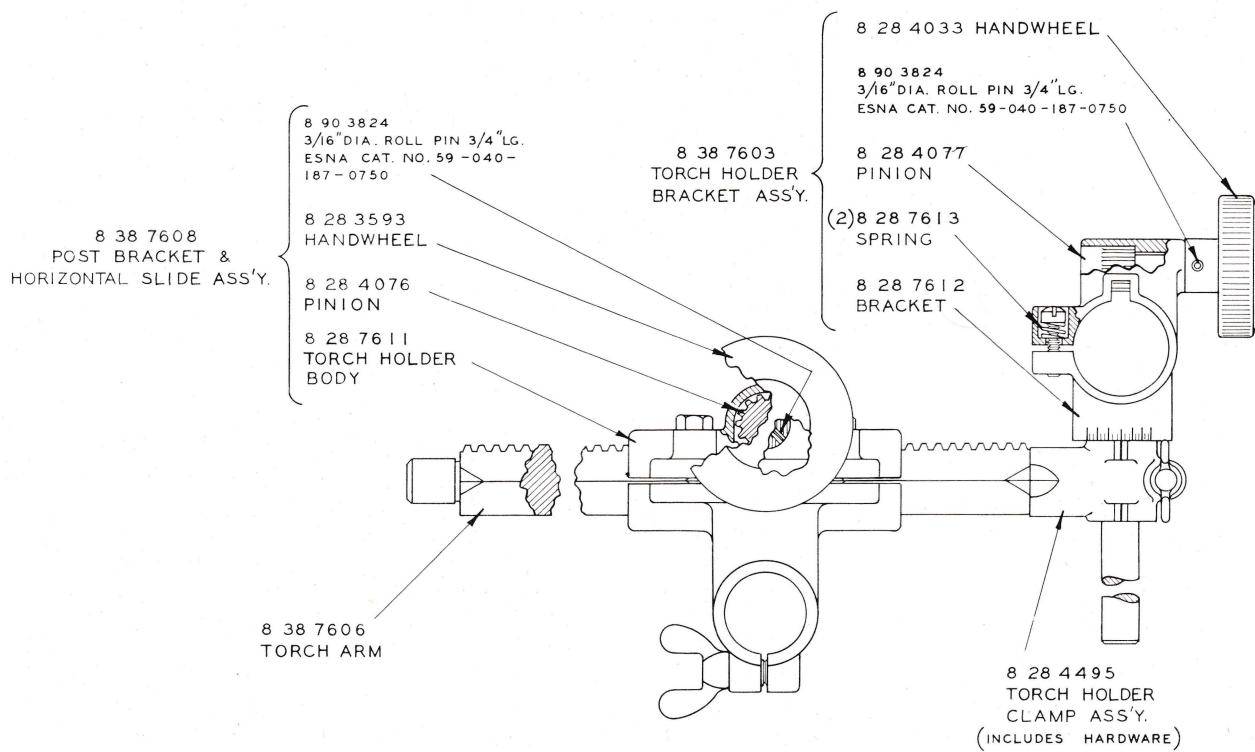


8 28 5929
TRANSMISSION ASSEMBLY
(FOR USE WITH NO. 16 RADIOGRAPH)

Fig. 13 Transmission Ass'y.

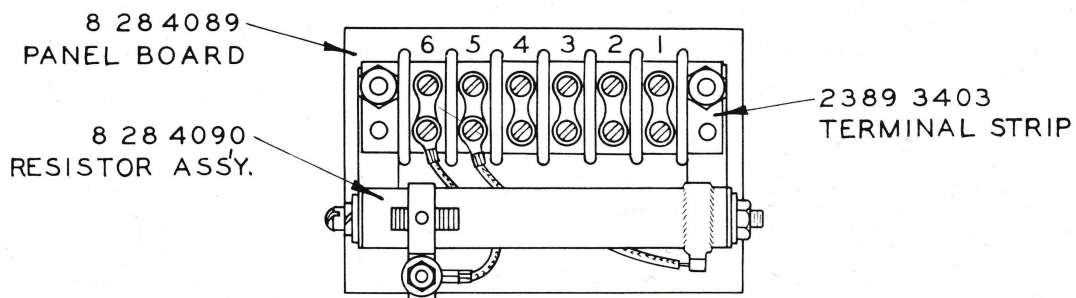


8 28 4075
TORCH HOLDER ASSEMBLY
(ROUND RACK)

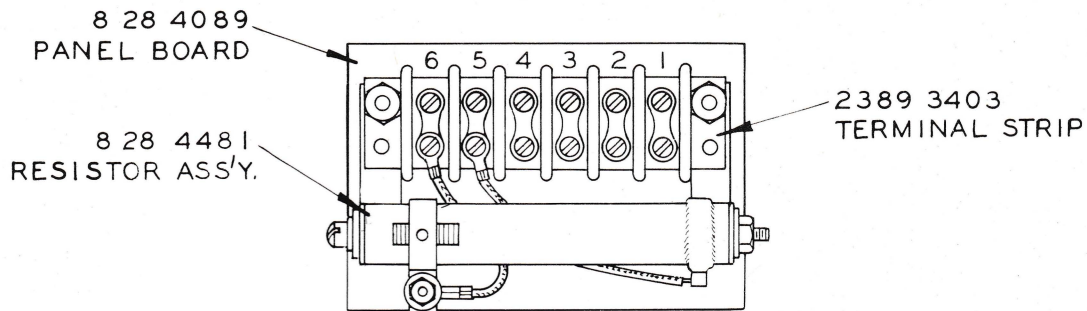


8 34 0370
TORCH HOLDER ASSEMBLY
(HEX. RACK)

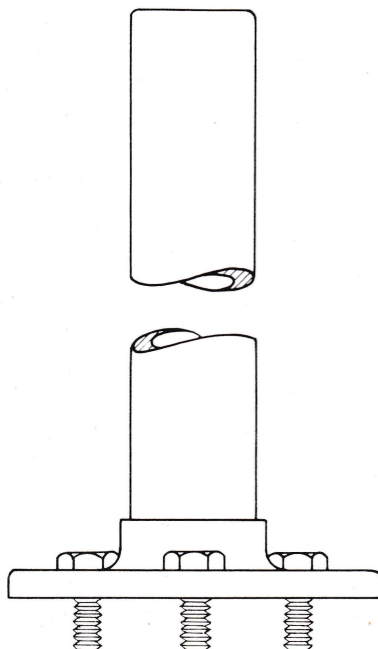
Fig. 14 Torch Holder Ass'y



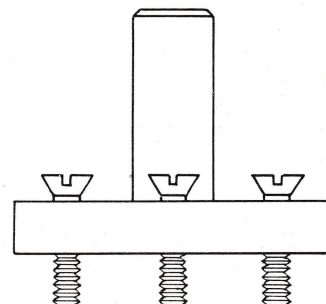
8 28 4088
TERMINAL BOARD ASSEMBLY
(FOR USE WITH 110 VOLT CIRCUIT)



8 28 4760
TERMINAL BOARD ASSEMBLY
(FOR USE WITH 220 VOLT CIRCUIT)



8 34 0372
POST ASS'Y. (INCLUDES SCREWS)
(FOR USE WITH HEX.
RACK TORCH HOLDER)



8 34 0371
POST ASS'Y. (INCLUDES SCREWS)
(FOR USE WITH ROUND
RACK TORCH HOLDER)

Fig. 15 Terminal Board Ass'y.

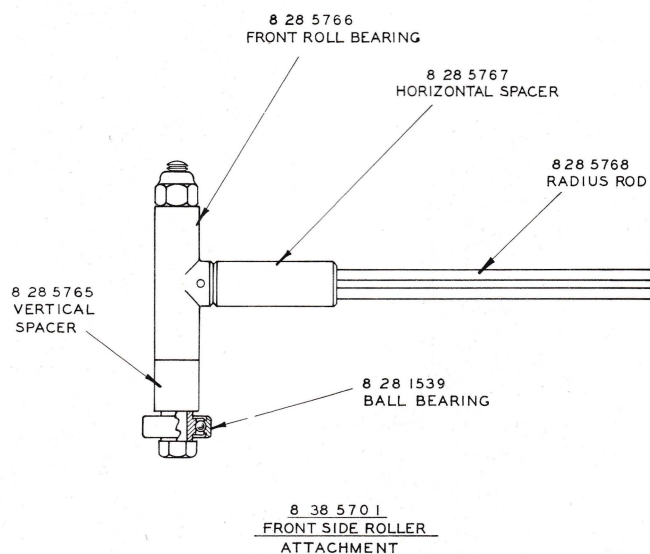
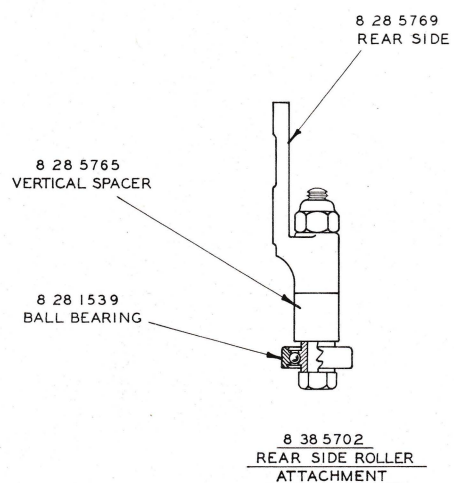
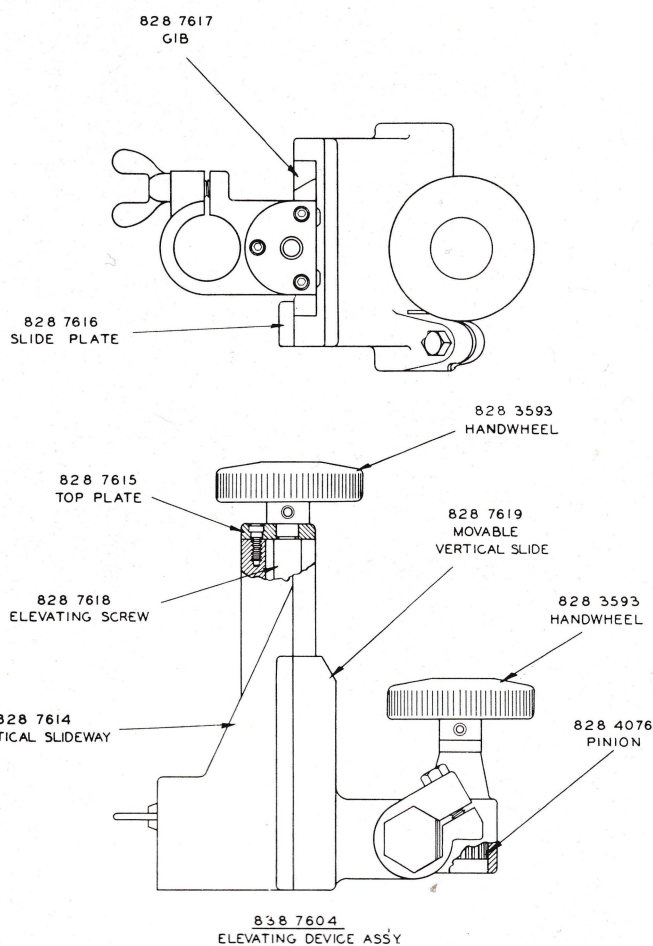
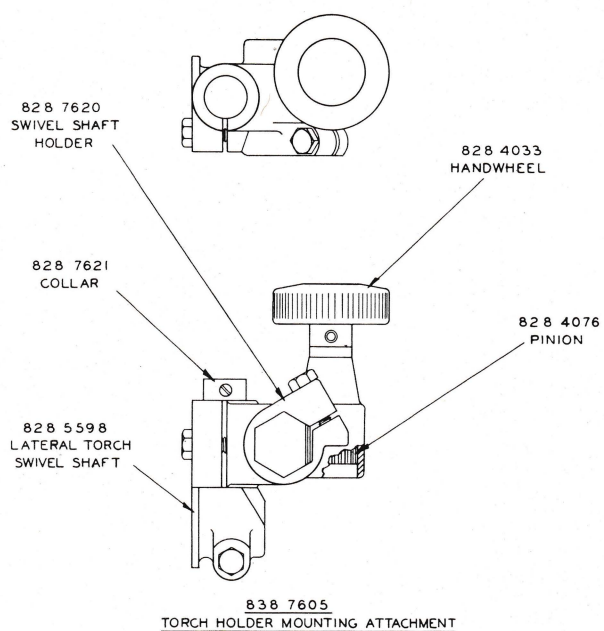


Fig. 16 Accessories

NAME OF PART	STOCK NO.
Governor Control Unit	828-4316
Consisting of:	
Calibrated Control Head	828-3475
Plug Adjusting Cover	828-3477
Assembly Snap Ring	828-3479
Thrust Washer	828-3493
Cover Lock Ring	828-3494
Stop Pin	828-3507
Spacing Washer (2 required)	828-3539
Control Unit Body	828-5170
Control Unit Base	828-5171
Speed Adjusting Plug	828-5173
Governor Lock Nut	828-5174
Governor	828-5175
Governor Shaft	828-5179
Bearing New Departure #77038	828-5180
Bearing New Departure #77037	828-5181
Governor Shaft Retaining Collar	828-5182
Brush Holder and Mounting Block Assembly	828-5183
Control Lever Assembly	828-5184
Control Lever Spring	828-5185
Conduit Tube	828-5186
Governor Lead (2 required)	828-5187
Control Body Screw (2 required)	828-5188
Governor Brush (2 required)	828-5405
No. 6-32 Fil. Hd. Steel Machine Screw 3/8" Long (2 required)	890-0010
No. 8-32 Allen Hd. Fil. Point Steel Set Screw 3/16" Long (2 required)	890-0558

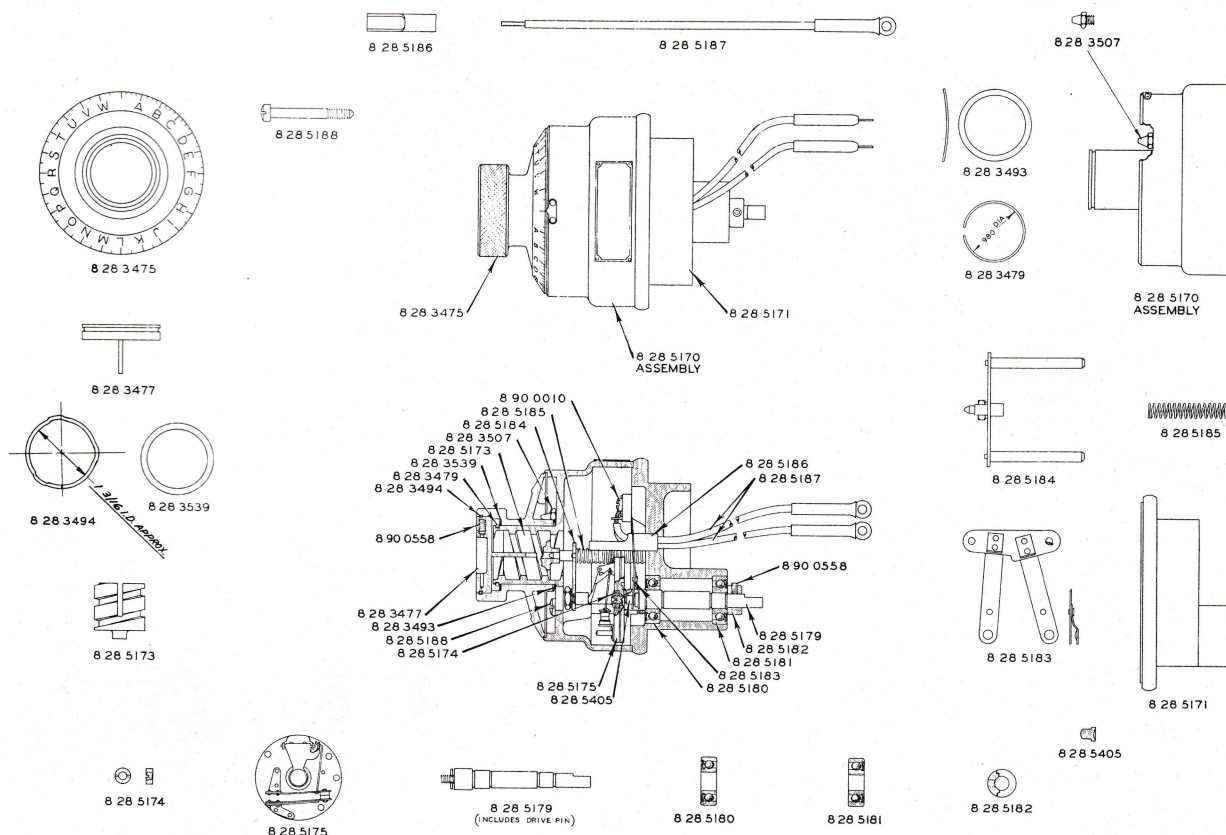
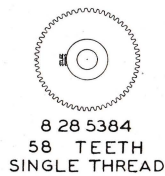


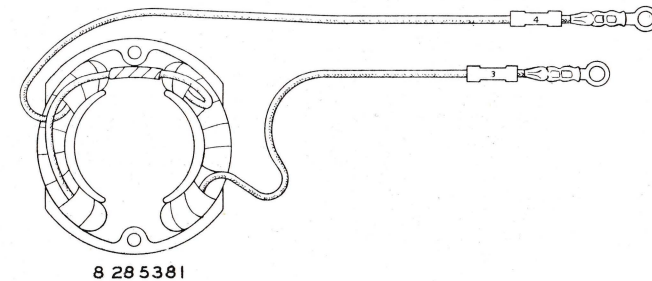
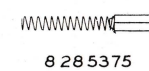
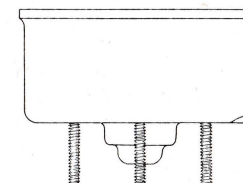
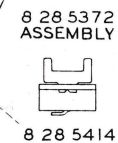
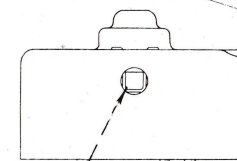
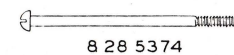
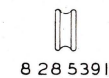
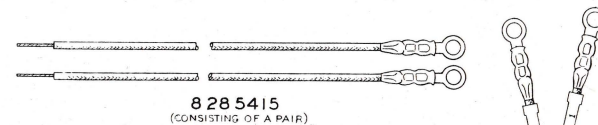
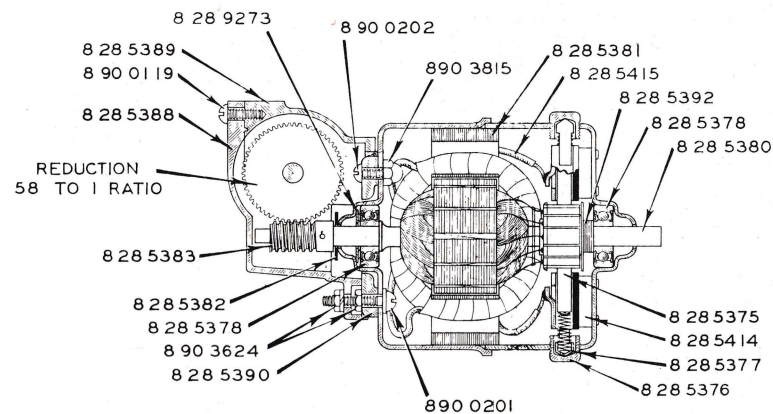
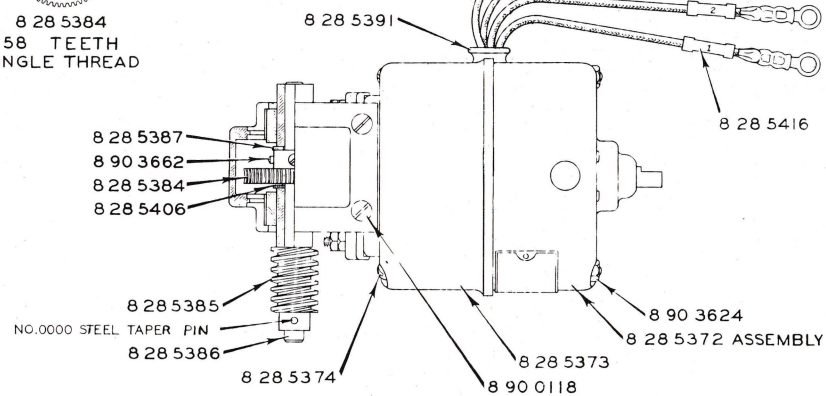
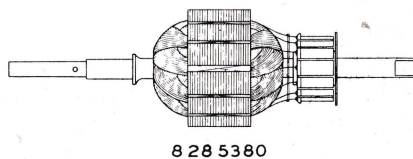
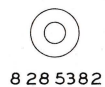
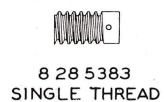
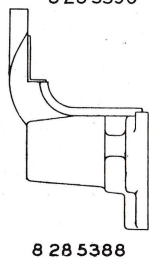
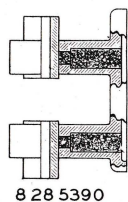
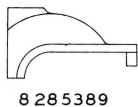
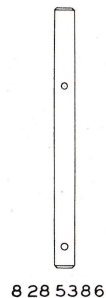
Fig. 17 Governor Unit

Fig. 18 Motor Ass'y.

8 28 5406 8 28 5387



8 28 5416

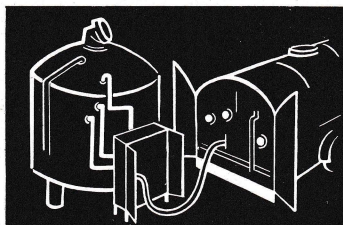


NAME OF PART	STOCK NO.
Motor & Worm Assembly 1/25 H.P., 115 volts A.C., D.C.	828-4074
Consisting of:	
Motor Case with Brush Holder and Motor Lead	828-5372
Reduction Gear End Motor Case	828-5373
Motor Case Stud (2 required)	828-5374
Brush and Spring (2 required)	828-5375
Motor Brush Cap (2 required)	828-5376
Spring Retainer (2 required)	828-5377
Shielded Type Bearing New Departure #77111 (2 required)	828-5378
Armature	828-5380
Motor Field Unit	828-5381
Fibre Washer	828-5382
Driving Worm 58 to 1 Ratio	828-5383
Worm Gear 58 teeth - Single Thread	828-5384
Motor Worm	828-5385
Reduction Gear Shaft	828-5386
Armature Shaft Washer (.015 thick-7/16" O.D.-1/4" I.D.)	828-5387
Gear Unit Bottom Housing	828-5388
Gear Unit Top Housing	828-5389
Motor Worm Shaft Support and Bearings	828-5390
Case Grommet	828-5391
Washer (5 required)	828-5392
Steel Washer (2 required)	828-5406
Brush Holder (2 required)	828-5414
Lead (2 required)	828-5415
Yaxley Cable Marker (4 required)	828-5416
No. 6-32 Rd. Hd. Steel Machine Screw 5/16" Long	890-0081
No. 6-32 Flat Hd. Steel Machine Screw 3/16" Long (2 required)	890-0118
No. 6-32 Rd. Hd. Steel Machine Screw	890-0119
No. 6-32 Standard Hex. Steel Nut (11 required)	890-3624
No. 00000 Std. Steel Taper Pin 3/8" Long	890-3662
No. 00000 Std. Steel Taper Pin 1/2" Long	890-4030
Preload Spring	828-9273

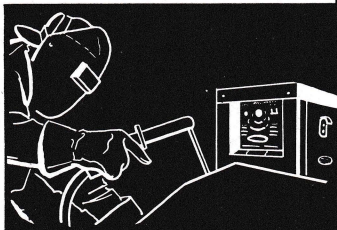
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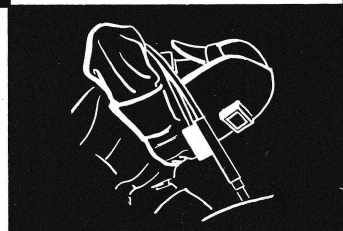
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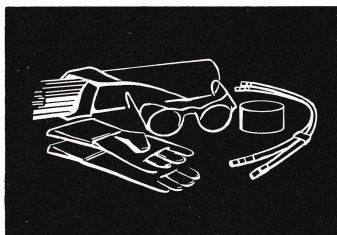
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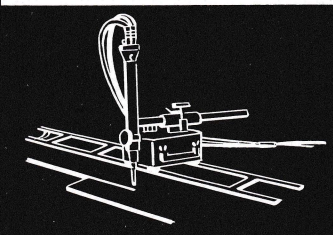
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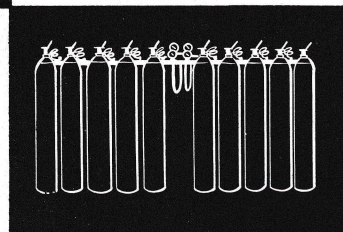
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