

OWNER'S MANUAL

FOR

MODEL: CM-147 U3993

DO NOT DESTROY

IMPORTANT: Read and understand the entire contents of this manual, with special emphasis on the safety material throughout the manual, before installing, operating, or maintaining this equipment. This equipment and this manual are for use only by persons trained and experienced in the safe operation of welding equipment. Do not allow untrained persons to install, operate or maintain this equipment. Contact your distributor if you do not fully understand this manual.

DAIHEN Corporation WELDING PRODUCTS DIVISION

1: August 23, 1994

At your contact, tell MODEL and MANUAL NO.

SAFETY PRECAUTIONS

WARNING : These Safety Precautions are for your protection. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below. Failure to observe these Safety Precautions can result in personal injury or death.

1. **PERSONAL PROTECTION** . . . Skin and eye burn resulting from body exposure to the electric-arc rays or hot metal of MAG welding, or other welding processes can be more severe than sunburn. Therefore:
 - a. Use a proper face shield fitted with the correct filter and cover plates to protect your eyes, face, neck, and ears from sparks and arc rays when operating or observing welding. **WARN** bystanders not to watch the arc nor expose themselves to the electric-arc rays or to hot metal.
 - b. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes and a welding helmet or cap for hair protection to protect the skin from arc rays and hot sparks or hot metal.
A flameproof apron may also be desirable as protection against radiated heat and sparks.
 - c. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned, and pockets eliminated from the front of clothing.
 - d. Protect other nearby personal from arc rays and hot sparks with a suitable non-flammable partition.
 - e. Always wear safety glasses or goggles when in a welding area. Use safety glasses with side shields or goggles when chipping slag or grinding. Chipped slag is hot and may travel considerable distances. Bystanders should also wear safety glasses or goggles.

2. **FIRE PREVENTION** . . . Hot slag or sparks can cause serious fires when in contact with combustible solids, liquids, or gases. Therefore:
 - a. Remove all combustible materials well away from the welding area or completely cover the materials with a non-flammable covering. Such combustible materials include wood, clothing, sawdust, gasoline, kerosene, paints, solvents, natural-gas, acetylene, propane, and similar combustible articles.
 - b. Hot sparks or hot metal can fall into cracks in floors or wall openings and cause a hidden smoldering fire. Make certain that such openings are protected from hot sparks and metal.
 - c. Do not weld on used barrels, drums, tanks or other containers until they have been completely cleaned so that there are no substances in the container which might produce flammable or toxic vapors.
 - d. For fire protection, have fire extinguishing equipment handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher.
 - e. After completing operation, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire.

3. **ELECTRICAL SHOCK** . . . Exposed hot conductors or other bare metal in welding circuit or in ungrounded, electrically **HOT** equipment can fatally shock a person whose body becomes a conductor. **DO NOT STAND, SIT, LIE, LEAN ON, OR TOUCH** a wet surface when welding without suitable protection.
 - a. Never allow live metal parts to touch bare skin or any wet clothing. Be sure gloves are dry.
 - b. When standing on metal or operating in a damp area, make certain that you are well insulated by wearing dry gloves and rubber-soled shoes and standing on a dry board or platform.

- c. Always ground the welding machine by connecting a ground wire between the machine and a good electrical ground.
 - d. Do not use worn or damaged cables. Do not overload the cable. Use well maintained equipment.
 - e. When not operating, turn off the equipment. Accidental grounding can cause overheating and create a fire hazard. Do not coil or loop the welding cable around parts of the body.
 - f. Be sure the ground cable is connected to the workpiece as close to the operating area as possible. Grounds connected to building framework or other remote locations from the operating area increase the possibility of the output current passing through lifting chains, crane cables or various electrical paths.
 - g. Keep everything dry, including clothing, work area, cables, electrode holder and welding machine. Fix water leaks immediately.
4. VENTILATION . . . Welding fumes, particularly in confined spaces, can cause discomfort and physical harm if breathed over an extended period of time. Therefore:
- a. At all times provide adequate ventilation in the operating area by natural ventilation or mechanical ventilation means. Do not weld on galvanized, zinc, lead, beryllium, or cadmium materials unless positive mechanical ventilation is provided to prevent breathing fumes from these materials.
 - b. Do not weld or cut in locations close to chlorinated hydrocarbon vapors coming from degreasing or spraying operations. The heat or arc rays can react with solvent vapors to form phosgene, a highly toxic gas, and other irritant gases.
 - c. If you develop momentary eye, nose, or throat irritation during the operation, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the opening area. Do not continue to operate if physical discomfort persists.
 - d. Fumes from the welding operation can be toxic. An adequate suction type ventilating system must always be provided to remove all visible smoke from the vicinity of the operator.
5. EQUIPMENT MAINTENANCE . . . Faulty or improperly maintained equipment can produce poor work, but most importantly it can cause physical injury or death through fires or electrical shock. Therefore:
- a. Whenever possible, have qualified personnel perform the installation, troubleshooting, and maintenance work on the welding machine. Do not perform any electrical work on the machine unless you are qualified to perform such work.
 - b. Before performing any maintenance work inside the welding machine, disconnect the machine from the electrical power source.
 - c. Maintain cables, grounding wire and connections, power cord and welding machine in safe working order. Do not operate the machine or equipment in a faulty condition.
 - d. Do not abuse the welding machine or accessory equipment. Keep the equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
 - e. Keep all safety devices and cabinet covers in position and in good repair.
 - f. Use welding machine for its intended purpose and do not modify in any manner.

Before installation, inspection, or service of equipment, shut OFF all power and remove line fuses (or lock or red tag switches) to prevent accidental turning ON of power. Disconnect all cables from welding power source, and pull all volts line cord plugs.

CONTENTS

1. GENERAL	2
------------------	---

OPERATION

2. CONSTRUCTION	2
3. INSTALLATION	4
4. EXTERNAL CONNECTION	5
5. PREPARATION FOR WELDING	6

MAINTENANCE

6. PERIODICAL CHECK	8
7. PARTS LIST	10

1. GENERAL

This instruction manual is prepared for the user to make the most of this Wire Feeder. Model CMLL-231 is designed to be used for CO₂ gas shielded arc welding in combination with welding power supply. Especially that combination with long torch(10m), it has 4-roll driving method and powerful wire feeding force. If adapter is attached to it, the combination with back wire is possible.

OPERATION

2. CONSTRUCTION

2.1 Specification

Model	CM-147 (Air cooled type)		
Applicable wire size	Hard aluminum .040, 3/64 ϕ		
	Mild aluminum 3/64 ϕ		
	Stainless steel (.040), (.045) ϕ		
Wire feed speed	5.9~59 ft/min.		
Applicable wire reel	Shaft dia.	2 ϕ	
	Outer dia.	Max. 12 ϕ	
	Width	4 ϕ	
Applicable wire mass	Max. 55 lbs		
Mass	24 lbs		

2.2 Combination power source

CPVPA-350 (S-1) INVERTER MIG PULSE AUTO 350

2.3 Combination torch

Rated curr.	for Aluminum MIG	for Stainless steel MIG Mild steel MAG	Remarks
250A	WTCA-2501	WTCS-2501	curved

2.4 Standard accessories

Description	Parts No.	Q'ty	Remarks
Feed roll	K1821W00	(2)	Built in body
Pressure roll	K1822X00	(2)	
Gas hose	U3178H00	1	9.8 ft
Welding cable (Torch side)	U1997H00	1	5.2 ft
Welding cable (Base metal side)	U1997J00	1	5.9 ft
Hex. wrench	No.5	1	

2.5 Optional accessories

Table 2. Extension cable and hoses

16.4 ft	BPA-3505
32.8 ft	BPA-3510
49.2 ft	BPA-3515
65.6 ft	BPA-3520

Table 3. Others

Description	Parts No.	Q'ty	Remarks
Feed roll (.035)	K1821U00	2	For steel
Feed roll (.040)	K1821V00	2	For steel
Argon gas flow meter regulator	RF-16	1	Max. flow 28 ℓ /min.
CO2 gas flow meter regulator (without heater)	NP-201	1	Max. flow 20 ℓ /min.
Caster	U1997G00	1	For wire feeder move
Feed roll (.045)	K1821Q00	2	for steel

3. INSTALLATION

3.1 Installation place

Select a place of less humidity, dirt and dust as far as possible. Place the wire feeder and other appliances on stable floor such as concrete, taking care so that they are not exposed to direct sun light, win, and rain.

3.2 Wind shielding

When welding is performed in open air where wind blows, or when fan is used during welding in summer, use a wind shield to protect arc from wind, otherwise blow hole may be caused.

3.3 Gas

Please choose according to welding method.

Welding method	Gas	Wire	Gas flow meter regulator
MIG	Aluminum	Ar	RF-16
MIG PULSE	Stainless steel	Ar + O ₂ (2%)	

3.4 Ventilation

When performing welding at a narrow place, be careful so that due ventilation is provided in order not to cause trouble by gas or fume generated during welding.

3.5 Light shielding

Since CO₂ gas-shielded welding process emits stronger light than manual welding, be sure to use helmet furnished with light shielded glass of sufficient capacity or hand shield. Besides, neck, face and hands of welding operator should be thoroughly protected from arc light.

Combination and welding current and shielding

Welding current	Less than 100A	100A~300A	More than 300A
Shielding	No.10, 11	No.12, 13	No.14, 15
JIST8141			

4. EXTERNAL CONNECTION

Perform connection correctly following the instructions given below, seeing Fig. 1.

- Be sure to turn OFF the line disconnect switch before connection.
- Securely tighten connecting parts of cables and hoses.

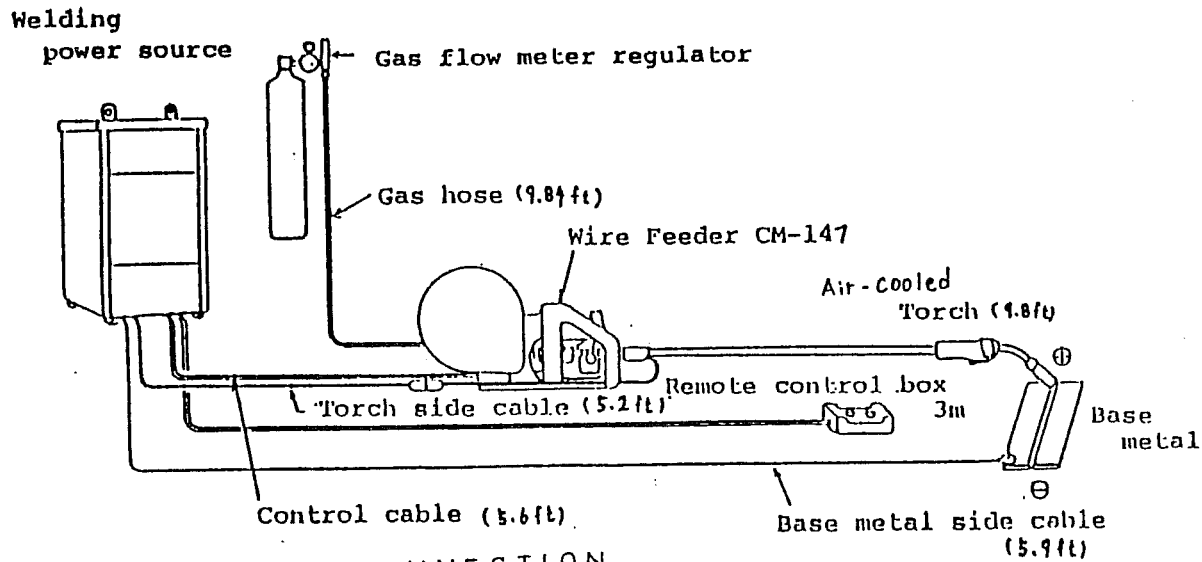


Fig. 1. CONNECTION

5. PREPARATION FOR WELDING

① Set feed roll of size suitable for diameter of welding wire to be used.

The CM-147 is delivered with feed roll for ".040 - 3/64 aluminum wire" installed. When using wire of other kind of size for welding, replace the feed roll referring to Table 4 below.

Table 4 Roll list

Wire material	Wire size (inch)	Feed roll	Pressure roll	Inlet guide	Center Guide
Aluminum	.040 - 3/64	K1821W00	K1821X00	U2344C10	K1822C07
Stainless steel	.035	K1821U00	K1822H00		
	.040	K1821V00			
	.045	K1821Q00			

The feed roll for steel or stainless steel have two size of groove, therefore they are applicable for two size of welding wires. In case of setting the feed roll, set to this side the wire size hallmark.

② Adjust wire pressing force.

→ Turn the pressure handle, and adjust suitable wire pressure.

Table 5 Recommended wire pressure (inch)

ADJUSTMENT OF PRESSURE			
Aluminum		Steel	Pressure handle scale
Hard	Soft		
1/16	—	.045	3~4
3/64	1/16	.035	2~3
.035	3/64	—	1~2

If torch cable is bent excessively, set higher than the above table.

NOTICE: The size of 1/16 is not used for this machine.

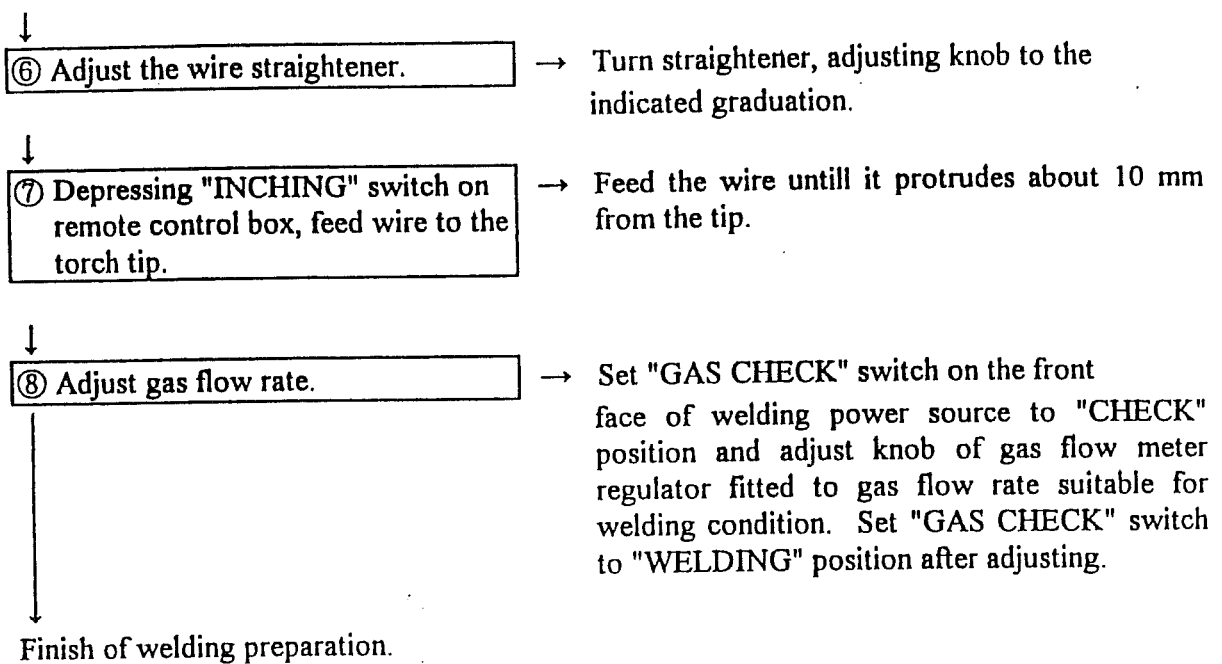
③ Install wire reel on spool shaft.

④ Set wire on the feed roll.

→ Turn the pressure handle this side to release pressure roll holder. Then, pass the wire through straight roll, outlet guide, and ensure that the wire is fitted into the groove in the feed roll snugly.

⑤ Press wire.

→ Turn the pressure roll holder toward this side, and set the pressure handle.



Note : As for welding operation, refer to the instruction manual of welding power source.

MAINTENANCE

The maintenance work comprises of periodical inspection for prevention of troubles and repair of damages. Since it is impossible to cover both of them in full details, please perform maintenance and checking work by fully grasping the construction and function of the Model CM-147 Wire feeder.

6. PERIODICAL INSPECTION

As to periodical inspection of welding power supply and torch, please refer to respective instruction manuals.

6.1 Daily checking

- 1) Clean the slots on the feed roll once every three pieces of wire consumed.
When the slots are worn to the extent to cause unstable wire feeding, replace the feed roll.
- 2) Checking to see that oil or dust is not struck to the wire passing on the wire straightener or other parts.
- 3) Check for abnormal heating of wire connections.
- 4) Check to see that cables are duly connected and insulated.
- 5) Check for cables which are about to be broken.

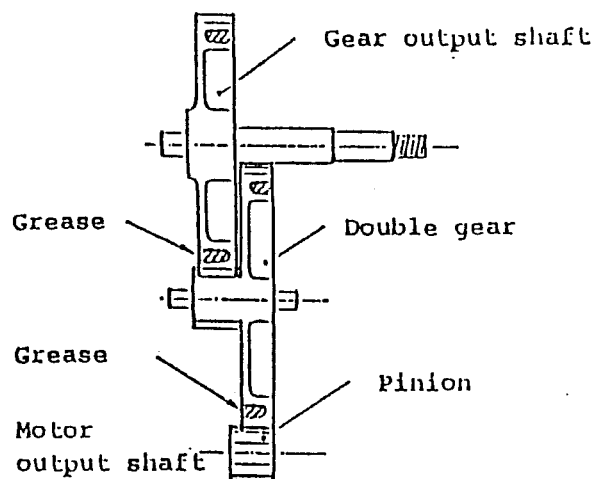
6.2 Yearly inspection

1) Wire feed motor

Usually service life of brush is about 4,000 hours (about two years, if it works six hours a day), though it may vary a little with loading condition and ambient temperature. Since construction of the motor does not allow easy access to the brush for checking of wear or replacement, periodically replace the whole motor.

2) Grease replacement of reduction gear

After removing aged grease, apply new one on the gear tooth surfaces and side faces as shown in Fig. 2. When delivered, the reduction gear is greased with "Sun Light Grease No. 1" of Showa Shell Oil Co., Ltd., use grease of this brand name. If this grease is not available, use lithium grease No. 1 of each manufacture.



NOTE: Apply grease on the side face of gear as shown in Fig. 2. Never fill the gear box with grease, otherwise motor will be burnt.

Fig. 2

7. PARTS LIST

Please order parts necessary for repair from OTC or its agents, indicating description, item No., and part No.. As to standard and optional accessories.

7.1 Wire feeding reduction gear (See Fig. 3)

Item	Parts No.	Description	Q'ty	Remarks
1	K1123B01	Gear case	1	
2	4802-006	Print motor	1	PMFE-12CBB
3	U2057B01	Pinion	1	
3-1		Screw	1	M6-6
4	K1821B02	2-step gear	1	
5	K1123B04	Geared output shaft	1	
6	3361-206	Key	3	4×4×8
7	K1123B05	Bush	2	
8	K1123B06	Insulating spacer	1	
9	3311-001	Radial ball bearing	1	No.6000ZZ
10	K1821C01	Gear case	1	
11	K1822C02	Insulating board	1	
12	K1123C04	Insulating sleeve	1	
13	3311-008	Radial ball bearing	1	No.6001LL
14	K1822C01	Bracket assembly	1	
15	K1822C03	Pressure roll holder (1)	1	
16	K1822C04	Pressure roll holder (2)	1	
17	K1821C04	Pressure roll pin	2	
18	K1821C05	Fulcrum pin	3	
19	3361-404	E type snap ring	6	For $\phi 5$
20	K1822C05	Pressure bolt	1	
21	U929C16	Pressure spring	1	
22	K1123D01	Pressure handle	1	
23		CS type snap ring	1	CSTW-6
24	K1123D03	Spring bearing	1	
25	K1123D05	Pressure nut	1	
26	K1822C06	Guide block	1	
27	K1822C07	Center guide	1	
28	K1822C09	Feed axis	2	
29	K1822C10	Spacer	3	
29-1	K1123B07	Spacer	1	
30	K1822C11	Intermediate gear	1	
31	K1821W00	Feed roll	2	For Aluminum
32	K1822X00	Pressure roll	2	For Aluminum
33	U2344B09	Guide adapter	1	
34	U785C09	Spring plate	1	
35	U785C11	Protection cover	1	

Item	Parts No.	Description	Q'ty	Remarks
36	K1123C08	Remote stopper	1	
37	K2469C01	Gear case cover	1	
	K1821J00	Wire straightener assembly	(1)	
38	K1821J01	Wire straightener body	1	
39	K1821J02	Fitting board	1	
40	K1821J03	Control screw	1	
41	U2344C04	Roller shaft	2	
42		Radial ball bearing	2	No.629ZZ
43		E type snap ring	3	For $\phi 7$
44	U2344C05	Slide shaft bearing	1	
45	U69C02	Radial ball bearing	1	
46	U2344C07	Adapter	1	
47	U2344C08	Pilot	1	
48		Narld knob	1	KN15
49	U2344C10	Inlet guide	1	

7.2 Others (See Fig. 5)

Item	Parts No.	Description	Q'ty	Remarks
50	U3569B00	Frame body	1	
51	U3178D00	Gas hose assembly	1	
51-1	4813-001	Gas solenoid valve	1	D.C 25V
52	U3926E00	Control cable	1	
52-1	4730-005	Receptacle plug	1	4P
53	K536A00	Spindle type wire reel	1	
54	U3593C01	Wire reel cover	1	
55	U1779C01	Cable clamp	1	

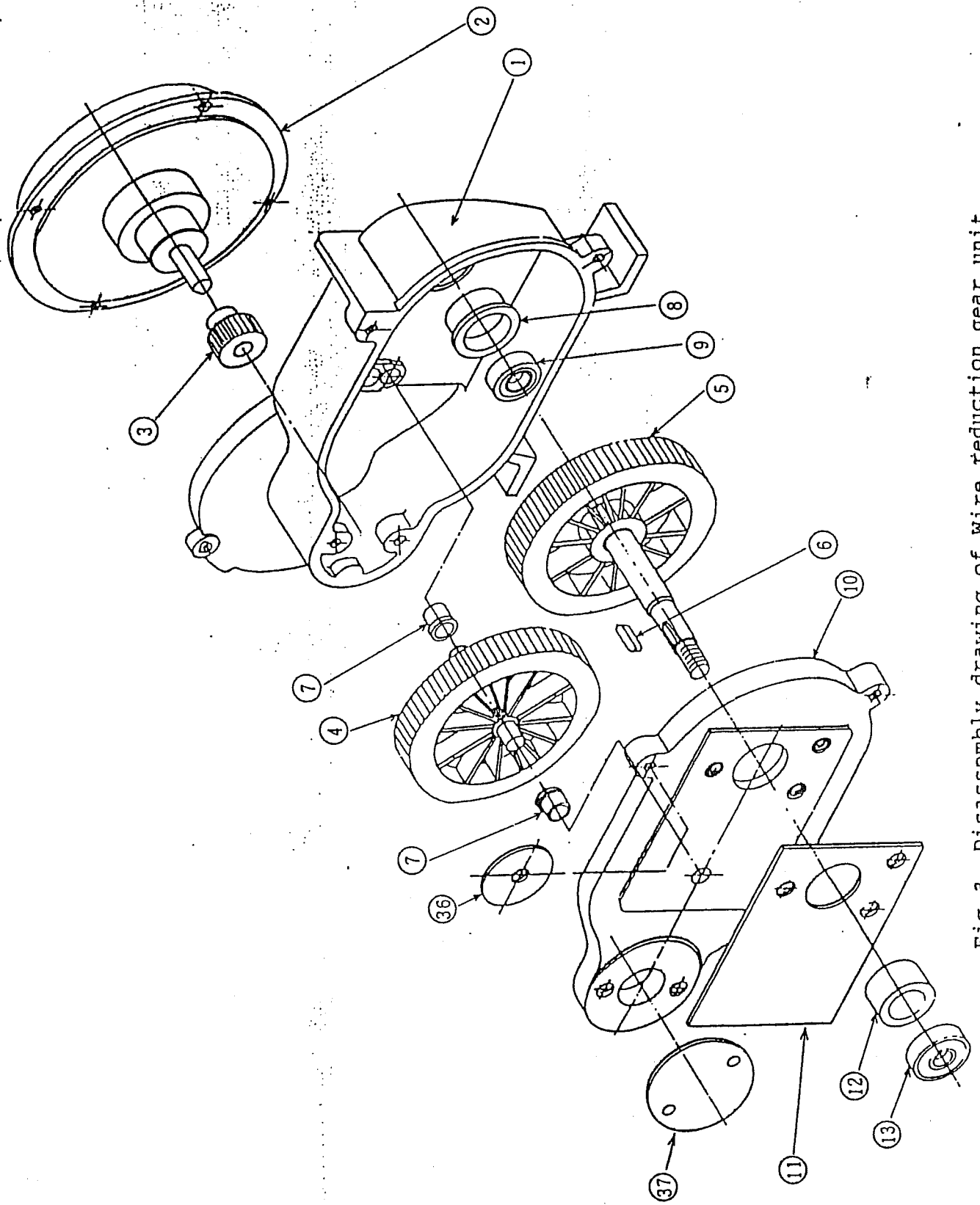


Fig. 3 Disassembly drawing of Wire reduction gear unit

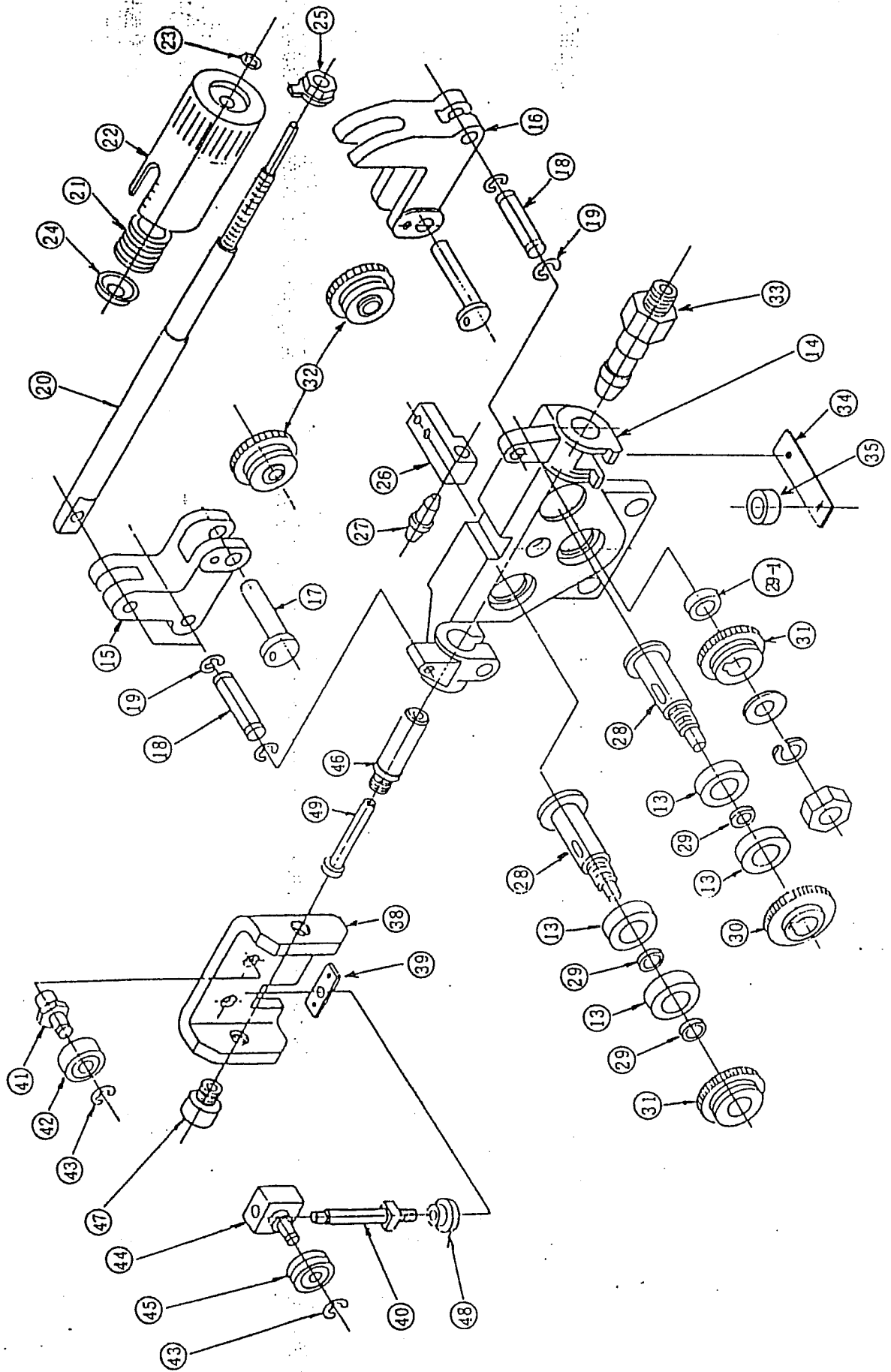


Fig. 4 Disassembly Drawing of Wire Feed, Parts of Pressure

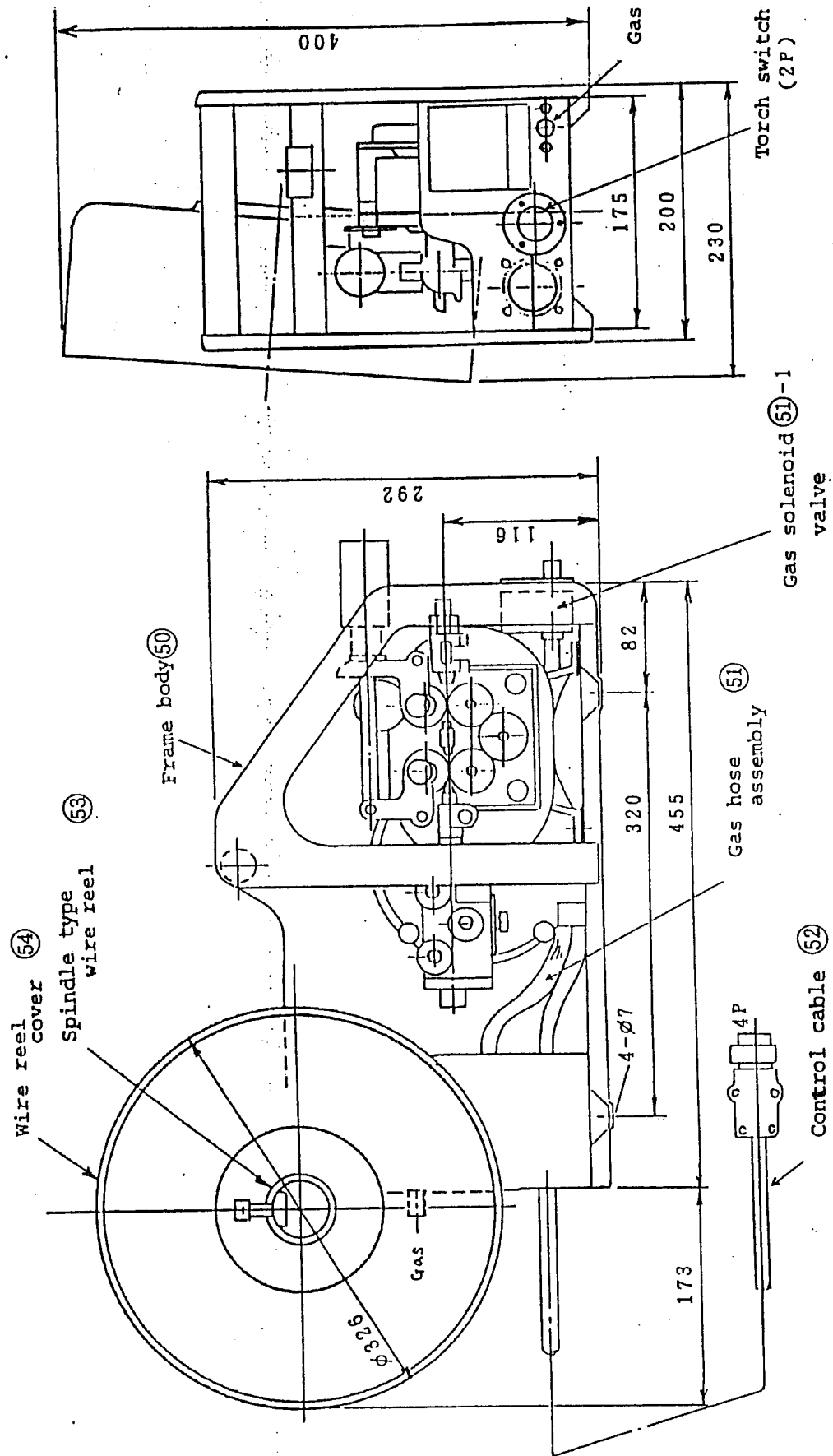


Fig. 5 External view of Model CM-147 Wire Feeder

