KIRBY

SERVICE

MANUAL

S144-470
Cleaner

THE SCOTT & FETZER COMPANY
CLEVELAND 2, OHIO

INDEX

Printed in U.S.A.

THE IMPORTANCE of GOOD SERVICE

FOREWORD

The purpose of this Service Manual is:

(1) To assist Kirby Distributors in the building and operation of a Service Department which will be able to make all necessary repairs required on Kirby equipment from the most minor to a complete overhaul with factory quality standards prevailing.

(2) To reacquaint Kirby Distributors and their people with the various Kirby Guarantees and the rights and privileges of the customer under these guarantees.

(3) To lead the Distributor to increased profits by building up his clientele of "Boosters for Kirby".

The selection of your Service Department Personnel:

(1) The Distributor, in the interest of organizing an efficient and successful sales organization, should select a capable, dependable and trustworthy man as a service manager.

(2) Considering the vast number of Kirbys in the field today it is difficult to visualize any area of the country in which a profitable service operation could not function.

(3) In the interest of a successful organization, the activities of the service manager should be limited to service and conversely those of the sales department to sales. In this manner you will eliminate any questions a customer may have regarding the type of consideration given to her service call.

If this manual is of assistance to you to the degree we anticipate, then we will consider the time, money and effort well spent.

Fred H. Eilmann
Service Manager

KIRBY WARRANTIES

The Kirby guarantees and warranties are designed specifically for the protection only of the original purchaser of Kirby equipment. They cannot be applied to second-hand equipment or that which had not been obtained as new from an authorized Kirby representative.

The Kirby warranties are null and void if the serial nameplate is altered, defaced or removed from the machine. Also, evidence of unauthorized repairs or tampering resulting in damage to the unit or causing extra, unnecessary service requirements, shall eliminate the Kirby in question from the warranties.

When a service representative or the customer has any questions arising from circumstances not covered above, they should address such matters directly to the factory service department in Cleveland.

The One Year Warranty

Equipment requiring replacement during the first year of operation as a result of defective material or workmanship should be adjusted through the service department of the distributor responsible for the sale. As stated in the instruction book, this warranty does not include a no charge service call at a customer's home and the availability of such a call is entirely at the discretion of the distributor involved. Should it be necessary for the customer or the distributor to send a particular part to the factory service department for adjustment, then the transportation charges involved must be the responsibility of the distributor or the customer. In all cases there must be unmistakable evidence that there is a defect in material or workmanship or free replacement should not be made.

Equipment judged defective by the distributor and replaced gratis to his customer, should be forwarded to the factory for examination and replacement where warranted. While the factory cannot consider replacement of obviously broken or damaged articles, you may be assured that every consideration will be given to the possibility of making a no charge replacement of the items returned. In-warranty replacement of equipment is, in most cases, dependent upon more than the "judgment" of a service representative. Records are maintained at the factory service department of the dates of all engineering modifications and changes effecting the various components of the Kirby. These records determine the eligibility of a part in question for qualification in the in-warranty program.

General Service Insurance (Factory Rebuild Guarantee)

The Factory Rebuild Guarantee as stated in the Guarantee and Instruction book for each model of Kirby is not only the responsibility of the company but also the distributor. Under the terms of this warranty, the original purchaser is entitled to whatever repairs or replacements may be required as a result of normal fair wear and tear. It is quite understandable and relatively easy to explain to the customer that the Rebuild Guarantee is not an insurance program against breakage or loss but rather a program to provide service at a minimum cost to cover the effects of normal fair wear and tear. It should be pointed out to the customer at the time a unit is deposited at your service department for repairs that the replacement of lost, missing or broken parts can only be made at a cost in excess of the basic rebuild charge.

The cost of service under the terms of the Factory Rebuild Guarantee varies with the model of Kirby involved. The table below shows the basic maximum charge for repairs made at our factory and the maximum charge for the rebuilding service when performed by the distributor.

MODEL	FACTORY COST	DISTRIBUTOR COST
Model C Kirby thru Model 4C	$10.00	$15.00
Model 505 Kirby thru 511	$12.50	$17.50
Model 512 Kirby thru 515	$12.50	$17.50
Model 516 Kirby thru 519	$17.50	$22.50
Model 560 thru ( )*	$22.50	$27.50

The Factory rebuild service is designed to include repairs or replacement of all equipment which had been included in the original purchase. There are no exceptions or limitations to the extent of repairs. If the distributor cannot see his way clear to extend service to this extent, then he should suggest to his customer that the Kirby be sent to the factory in Cleveland for repairs.

The repair costs quoted for factory service naturally do not include transportation and such additional charges must be the responsibility of the customer. In the case of the distributor's rebuild charge, the transportation is theoretically included in the increased cost figures. The rebuild prices listed above and in the instruction book DO NOT include SERVICE CALL FEES for a call made at a customer's home or other special services.

To prevent any misunderstanding with your customers, the necessity for any additional charge over the basic rebuild cost should be clearly set forth when the Kirby is presented to you for repairs. At this time, the company policy as set forth above as well as any other reasons you may have for increased costs, may be explained to the customer who then may authorize or refuse the required repairs. This preexplanation of all charges will very definitely increase the efficiency of your service department by eliminating the misunderstandings and disagreements associated with unquoted, high repair costs. This will also help eliminate storage problems resulting from the customer's inability to pay for the repairs when presented with a relatively high statement of costs when attempting to pick up the repaired unit.

Many of the distributors choose to avoid the low profit feature of rebuilding Kirbys locally. If this should also be your desire, then most certainly you are encouraged to join them in taking advantage of the facilities of your factory service department for rebuilding Kirbys for your customers. Of course, the factory service department is also available for whatever repairs you may wish to authorize on a straight charge for parts plus labor basis. To clarify this matter, the following service bulletin was issued effective December 1, 1955.

( )* Denotes current models.

A SERVICE BULLETIN OF PRIME IMPORTANCE
TO ALL DISTRIBUTORS & AREA-DISTRIBUTORS

Effective December 1, 1955

All Kirbys sent to us for rebuilding under the terms of the Kirby Service Insurance Guarantee, when rebuilt, will be returned DIRECT TO THE CUSTOMER'S HOME from the factory. Whenever you send in a Kirby for rebuilding under the terms of the Service Insurance Guarantee, be sure the CORRECT name and address of the owner are included, in order that the rebuilt Kirby reaches the proper destination with the least possible delay.

When we return the customer's rebuilt Kirby to her, we will send it C.O.D. at the factory guarantee rebuilt price, plus transportation charges. Therefore, we suggest that the customers' Kirbys you send to us for rebuilding be sent transportation charges collect, so the incoming transportation charges can be added to the C.O.D. charge we make to the customer. Naturally, then, you will make no charge to the customer, since we will bill her for all charges. Motor freight charges are usually based on cwt and anything weighing less than one hundred pounds is charged at the minimum cost of one hundred pounds. Railway Express charges, on the other hand, are based on the actual weight. Therefore, we further suggest that customers' Kirbys be returned to us by Railway Express collect rather than motor freight. In order to ensure that exact transportation charges are added to each rebuild, please ship each Kirby separately. Do not include extraneous parts not belonging to the customer.

A notice will be sent to you the same day the rebuilt Kirby is returned to the owner, stating we have rebuilt the customer's Kirby in accordance with the terms of the Service Insurance Guarantee. Many leads for the sale of new Kirbys should result from a prompt follow-up by one of your dealers.

The original name tag will be replaced on all units rebuilt with a special name plate reading:

to enable us to have an effective check on all factory rebuilds out in the field.

Some few distributors send traded, demonstrated or reverted Kirbys to us for reconditioning and rebuilding. These, of course, do not come under the terms of the Service Insurance Guarantee.

Neither, perhaps, would you want them tagged "REBUILT". Therefore, if you do from time to time send us Kirbys not owned by a customer, but rather by you or one of your dealers or subs, be sure to tell us. We will not tag them "REBUILT".

The cost for such rebuilding, or reconditioning, will be based on the list price of parts involved, less your usual discount, plus actual cost of labor.

THE SCOTT & FETZER COMPANY

Service Department

Coverage of Loss by Fire

All claims for Service under the terms of the "Coverage of Loss by Fire Guarantee" must be presented directly to the Scott & Fetzer Company in Cleveland in accordance with the instructions contained in the guarantee and instruction book. The Kirby distributor is not to replace material lost or damaged by fire as the company will not recognize such claim settlements. The distributor may assist the customer in the preparation of a claim and it is for this reason we review below the two methods of presenting a Fire Claim.

(a) Whenever possible the fire damaged remains should be returned to the factory. A letter of instructions covering such a shipment should include the following information:

(1) The date and residence at time of purchase.

(2) The name of the Kirby distributor from whom the unit was purchased.

(3) A listing of those items which may not be included in the shipment as a result of the customer's inability to salvage the same from the fire area.

It is not necessary to have this statement notarized as the fire-damaged remains are evidence in themselves of the loss experienced.

(b) When, as a result of fire, the remains of the Kirby equipment are not available, then a statement should be prepared containing the following information:

(1) The Model and Serial number as well as the name of the distributor from whom the unit was purchased.

(2) The date of such purchase and residence at the time of purchase.

(3) The extent of Kirby equipment involved in the claim (the customer is entitled to include in his claim all Kirby equipment which had been included in the original purchase).

(4) A statement outlining the circumstances under which fire loss was experienced.

(5) A statement to the effect that this is an initial claim and has not been presented at any previous date to either a Kirby distributor or our company in Cleveland.

This statement must then be notarized and submitted to the factory.

The Cost of Replacement Under The "Fire Guarantee"

The cost of repair or replacement under the fire guarantee also varies with the model of Kirby involved. The following schedule outlines these charges; however, as with the rebuild prices, transportation costs are not included.

MODEL	FIRE SERVICE COST
Model 2C thru 4C	$10.00
Model 505 thru 515	$12.50
Model 516 up to Serial #238000	$17.50 (all inclusive)
Model 516, #238000 thru Model 519	
Upright Unit	$17.50
Attachment Set	5.00
Power Polisher	7.00
Handi Butler	8.00
Flexible Shaft	5.00
Surface Nozzle	3.00
Model 560 thru Model ( )*	
Upright Unit	$22.50
Attachment Set	5.00
Power Polisher	7.00
Handi Butler	8.00
Flexible Shaft	5.00
Surface Nozzle	3.00

Time Limit on Fire Claims

Beginning with the 516 Model of Kirby, a 90-day limitation has been included in all fire guarantees and all claims on such units must be submitted to our factory within this 90-day period in order to be honored. This limitation is not retroactive and, therefore, earlier model units will not be affected. However, they will be screened very thoroughly when received at our factory.

Return Shipment of Fire Processed or Replaced Equipment

As with the Factory Rebuild Guarantees, the return shipment of serviced or replaced fire claim equipment must be made directly to the residence of the customer involved. If such return is not possible as a result of fire loss, we will be willing to delay the return shipment for a period not to exceed 90 days without incurring additional costs in the form of storage charges. It is our opinion that such a delay will permit the reestablishment of a customer in a permanent residence where the possession of his Kirby will prove advantageous.

( )* Denotes current model.

DEPARTMENT OPERATION

1. Management Suggestions

The physical layout of your service department will depend largely on the size and shape of the space available. However, regardless of the layout, such things as cleanliness, orderliness (a place for everything--everything in its place), and proper handling of necessary paper work are very important.

* * * * *

A good service department should be partitioned off from the rest of the office so as to exclude the casual trespasser. A dutch-type door with a shelf topping the bottom half is quite universally used.

* * * * *

A "work schedule or planning" board separated into the days of the week should be provided, so that the amount of work and the promised completion date of each job can be ascertained at a glance. Businesslike handling and scheduling of service work is invaluable in building good will and future sales.

* * * * *

A packing and wrapping table, equipped with wrapping paper and a gummed tape dispenser would be convenient. A storage space for reserve supplies of repacking papers should be adjacent to this table.

* * * * *

A printed memorandum form should be supplied for service calls, re-demonstration notices--anything pertaining to the work to be done by the service department. On this form there should be a space for the name of the person to whom the note is directed, the subject or type of work to be done, the date of the note, the name and address of the customer, space for detailed instructions, and, finally, a space for the signature of the person making the note.

* * * * *

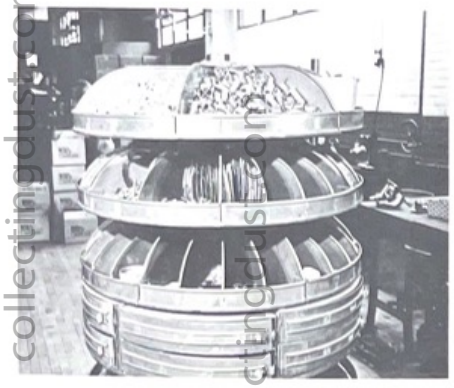
A telephone should be convenient to this department.

* * * * *

Bright but glareless light should be supplied. Poor lighting adds strain to the working conditions. Naturally, proper ventilation and heating conditions should prevail. Courtesy should characterize all contacts.

2. Shop Arrangement.

The pictures below show a layout of a model service department in which all parts are readily accessible with a minimum of lost motion.

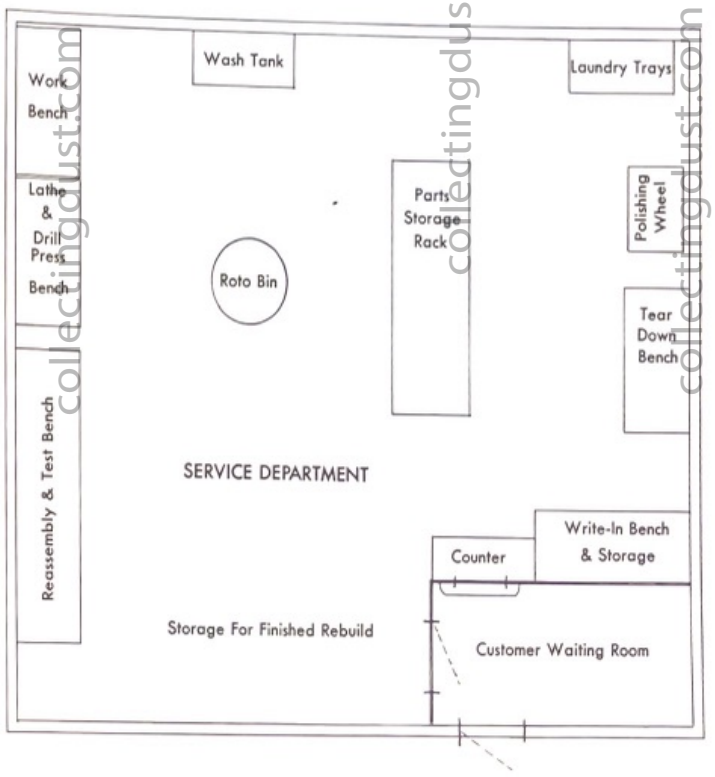


A roto bin provides for convenient, readily accessible storage of small parts. It is manufactured by Frick-Gallagher Mfg. Co., Wellston, Ohio.

Storage bins for parts too large for the roto bins can be constructed by a local carpenter or handy man to fit the requirements and the available space.

3. Department Layout

The accompanying sketch shows what we believe to be the ideal floor plan for a service department. The diagrammed area is approximately 15 feet square; however, the principal of flow of work material, as expressed in this diagram, can be incorporated under modified area circumstances. This area has been planned on the assumption that you will be performing the factory rebuild service or a major overhaul on a straight charge plus labor basis. If it is not your intent to enter into extensive repairs, then perhaps a mere storage bin and a combination service counter and workbench would be sufficient.



4. Tools and Special Tools

With the exception of the few special Kirby tools as outlined on the current parts price list, all necessary tools may be purchased locally at a hardware dealer of your choice. A list of those items which would be considered as standard tools consist of the following:

Sturdy Bench Vise to open 4" or more
Quick Heating Soldering Iron
Ball Peen Hammers, size 8 oz.
Screwdriver - 5/16" blade
Screwdriver - 1/4" blade
Screwdriver - 7/32" blade
Pliers - Heavy duty combination - 6" long
Pliers - Electricians' diagonal cutting pliers - 5" long
Pliers - Needle nose - 8" long
Chisel Steel - 3/8" blade
Round Rattail File - 8" long
1/4" Pillar File - #4 grade - 6" long

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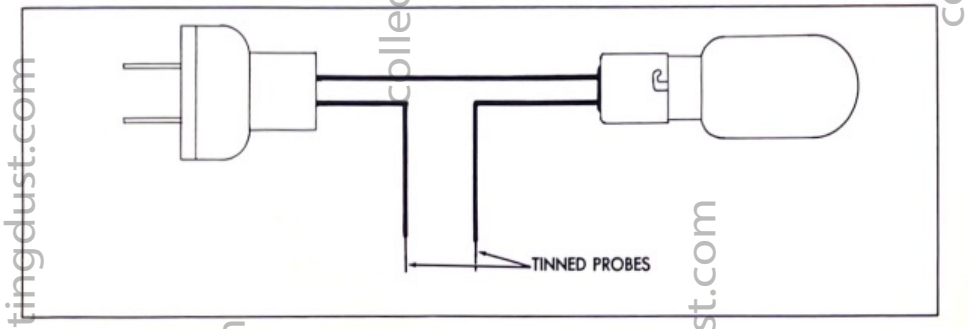
A most important Service Department tool is a Test Lamp which you can construct yourself. A very satisfactory Test Lamp can be made from a Model 505 through 515 Headlight Socket and Wire (A1082S). To prepare this tool, you should first connect the exposed ends of the wire leads to an Attachment Male Plug (F1923). Next you should tin or solder the stripped-off area of the longer wire. After tinning, cut the wire in the center of the tinned area, thus producing two probes which will not fray during use.

The test lamp you have constructed in accordance with the above directions may be used with comparative safety in a great variety of situations. When plugged into an electrical outlet or extension cord only one probe will be HOT. The amount of current used as a testing charge will be limited to the wattage of the bulb in the test lamp socket. A partial list of the test lamp applications would include the following:

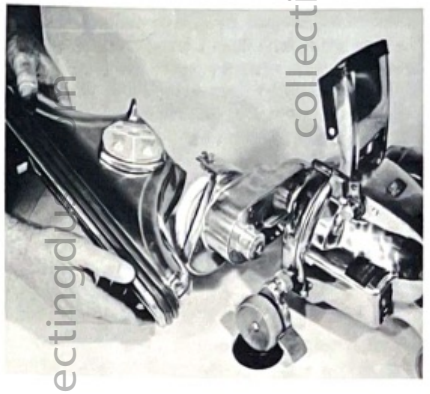
To check continuity of cords
To check foot switch or safety switch
Check for 'Dead' grounds in the motor
To check for an 'Open' field
To check miscellaneous wiring defects

Alligator clamps may be attached to the ends of the probe wires if desired. When alligator clamps are used however, they should be properly sheathed in an insulating sleeve to prevent handling the bare terminals.



Test Lamp Diagram

For a new distributor, the Handi Butler attachment will suffice as a satisfactory polisher for touching up the minor scuffs and scratches of demonstrator units, thus placing them in satisfactory condition for resale. If very deep scratches are presented, then we suggest that a very fine grade of emery cloth be used before polishing is attempted on the Handi Butler. As a matter of fact, a handy tool can be made by wrapping this fine emery cloth around a flat file or a 12" rule, fastening it at either end with a heavy rubber band.



Handi Butler Used as a Polisher

PARTS AND ORDERING PROCEDURE

Every distributor and service agency should maintain a minimum stock of expendable items as well as a limited stock of casting parts if practical. A listing of such minimum inventory is available from the factory in Cleveland. Due to frequent changes, it is not practical to reproduce this listing in this publication. If you desire more information on this matter, please write directly to your Factory Service Department.

Regardless of the inventory you may carry, there will be a time when you will run out of a particular item. To help prevent this condition, we would suggest that you determine from your experience, or from our suggested list, a minimum stock of each item used. Then as your daily activity lowers the reserve in any stock bin to the minimum figure, you may make the necessary notation to reorder this item from the factory.

Every effort will be made on the part of your factory service department to expedite the processing of the parts orders you send to us. A properly negotiated parts order, whether it be for two items or a hundred, will not create a problem when received at the factory. The importance of clearly and distinctly designating the items required cannot be overemphasized. Your attention is invited to the following bulletin #6032 dated August 16, 1960 which deals specifically with the procedure you should follow when ordering parts from the factory. Please help us help you by following this directive.

SERVICE BULLETIN

SUBJECT: Parts Ordering Procedure — August 16, 1960

All available Kirby Service Parts are listed on the current Parts Price List. Association of these parts to the appropriate section may be made by referring to the Parts Picture Series or its supplements.

Use the PARTS PRICE LIST (SP55) when ordering six (6) or more items. If you wish you can extend the charges in the appropriate column and compute the exact value of your order. Many Distributors remit in advance (CWO Terms) and thus save many dollars in unnecessary C.O.D. fees.

When less than six (6) items are required, the PURCHASE ORDER FORM (SP56) should be used. To save time, you may use only the S&F Part Code Numbers. The use of the Code numbers will also be advantageous when ordering by wire or phone.

Whenever possible, parts orders are shipped via Parcel Post. However, when weight and size limitations are exceeded, then Rail Express or Truck shipments are made. Insurance costs and minimum rates on split shipments make processing of more than one carton per invoice via Parcel Post impractical.

Bulletin #6032 — Service Manager

From time to time certain parts of the Kirby may be discontinued or superseded by improved items of production. When this condition exists, then a modifying bulletin will be circulated for the benefit of service departments in the field.

SECTION 1
MOTOR GROUP

INDEX

*For current models.

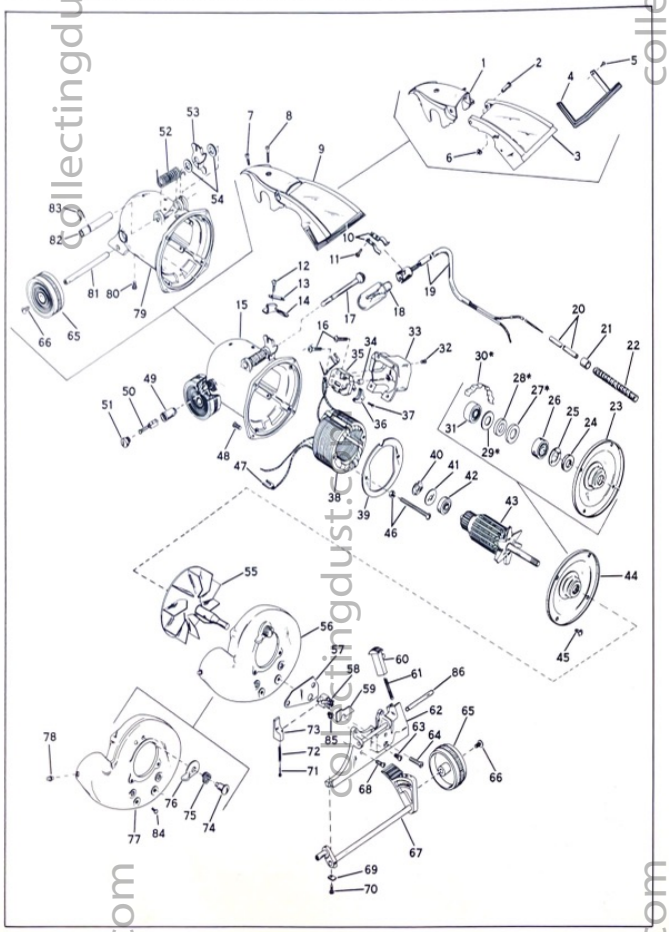


Figure 1-1. Motor group, exploded view. (Model 505 through 512)

1-1. ILLUSTRATED PARTS LIST.

The exploded view illustrations and the indexed legends which follow provide identification of the parts and give the proper relationships of associated parts as an aid to overhauling the motor assemblies.

Index No.	Part No.	Part Name	Quantity
1-1-1	A1630	Headlight Cap Rear Casting	1
-2	A1631	Headlight Cap Hinge Rivet	2
-3	A1600	Headlight Cap Front Casting (Includes items 4 and 5)	1
-4	A1619	Headlight Cap Bumper	1
-5	A1545	Headlight Bumper Rivet	2
-6	A1632	Headlight Cap Hinge Washer	2
-7	A1641	Headlight Cap Short Screw	1
-8	A1640	Headlight Cap Long Screw	1
-9	A1600S	Headlight Cap Complete	1
-10	A1610	Headlight Socket Clip	2
-11	A1021L	Lamp Socket Screw	2
-12	A1197	Handle Lock Screw	2
-13	A1196	Handle Lock Spring	1
-14	A1195	Handle Lock	1
-15	A1000S	Motor Housing Section	1
-16	A1121	Foot Switch Holding Screw	2
-17	A1660	Handle Fork Pin	1
-18	A1650	Headlight Bulb, 110 volt	1
	A1651	Headlight Bulb, 32 volt	1
-19	A1082S	Headlight Socket and Wire	1
-20	A1141	Safety Switch Wire Plastic Tube	1
-21	A1142	Safety Switch Rubber Grommet	1
-22	A1140	Safety Switch Wire Housing	1
-23	A1174	Front Bearing Plate Only	1
-24	A1164	Front Bearing Felt Washer	1
-25	A1170	Front Bearing Thrust Washer	1
-26	A1160	Front Bearing Only	1
-27*	A1171	Front Bearing Felt Retainer Cup	1
-28*	A1164	Front Bearing Felt Washer	1
-29*	A1170	Front Bearing Thrust Washer	1
-30*	A1172	Front Bearing Corrugated Strip	1
-31	A1160	Front Bearing Only	1
-32	A1123	Foot Switch Housing Screw	4
-33	A1120	Foot Switch Housing	1
-34	A1122	Foot Switch Insulating Tube	1
-35	A1100	Foot Switch	1
-36	A1101	Foot Switch Knob	1
-37	A1102	Foot Switch Knob Screw	1
-38	A1039W	Field (12065)	1
-39	A1047	Field Baffle Paper	1
-40	A1156	Rear Bearing Finger Spring	1
-41	A1157	Rear Bearing Grease Retainer Washer	1
-42	A1155	Rear Bearing	1
-43	A1149W	Armature (12062)	1

*Service parts only for old type front bearing plate.

Index No.	Part No.	Part Name	Quantity
1-1-44	A1174S	Front Bearing Plate Complete	1
-45	A1167	Front Bearing Plate Screw	4
-46	A1046	Field Screw and Nut	2
-47	A1045	Field Terminal U-Clip	2
-48	A1280	Fan Housing Screw	4
-49	A1072S	Commutator Brush Holder Section	2
-50	A1180	Commutator Carbon Brush, 110 volt	2
	A1183	Commutator Carbon Brush, 32 volt	2
-51	A1181	Commutator Brush Cap	2
-52	A1001	Handle Fork Spring	1
-53	A1003	Handle Fork Spring Plate	1
-54	A1004	Handle Fork Spring Washer	2
-55	A1189S	Fan and Pulley	1
-56	A1200S	Fan Housing Assembly	1
-57	A1352	Safety Switch Insulator (Large)	1
-58	A1130S	Safety Switch Base	1
-59	A1351	Safety Switch Insulator (Small)	1
-60	A1330	Ratchet Lock	1
-61	A1331	Ratchet Lock Spring	1
-62	A1300S	Front Wheel Bracket Casting	1
-63	A1360	Front Wheel Bracket Screw, 3/8 inch	2
-64	A1362	Front Wheel Bracket Screw, 1 inch	1
-65	A132056	Wheel	4
-66	A1321	Wheel Screw	4
-67	A1310S	Front Wheel Bracket Shaft Only	1
-68	A1361	Wheel Bracket Screw, 1/2 inch	1
-69	A1340	Front Shaft Clamp	2
-70	A1021F	Front Shaft Clamp Screw	2
-71	A1354	Rivet	1
-72	A1353	Safety Switch Slide Spring	1
-73	A1350	Safety Switch Slide	1
-74	A1211	Nozzle Lock Screw	1
-75	A1212	Nozzle Lock Spring	1
-76	A1210	Nozzle Lock	1
-77		Fan Housing Casting	1
-78	A1213	Emtor Connecting Pin	2
-79		Motor Housing Casting	1
-80	A1021R	Rear Wheel Shaft Screw	1
-81	A1020	Rear Wheel Shaft	1
-82	A1002	Handle Fork Spring Shaft	1
-83	A1005	Handle Fork Pin Spring Clip	1
-84	A1681	Name Plate Drive Screw	2
-85	A1134	Safety Switch Terminal Screw	2
-86	A121656	Nozzle Attaching Shaft	1

NOTE

The parts of models 513 through 515 are the same except for the switch parts shown in figure 1-2.

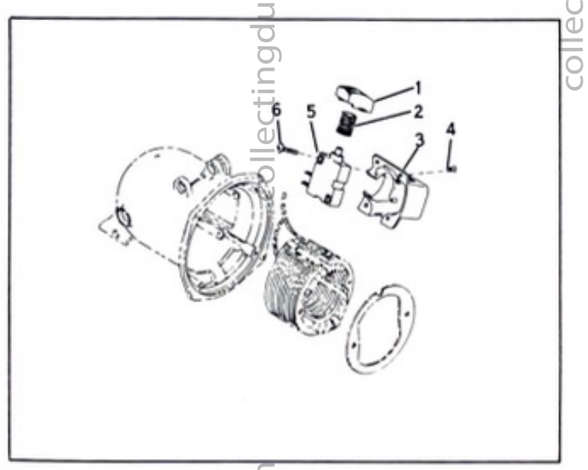


Figure 1-2. Foot switch parts. (Model 513 through 515)

Index No.	Part No.	Part Name	Quantity
1-2-1	A1103	Foot Switch Button	1
-2	A1104	Foot Switch Button Spring	1
-3	A1124	Foot Switch Housing	1
-4	A1123	Foot Switch Housing Screw	4
-5	A1105	Foot Switch	1
-6	A1125	Foot Switch Holding Screw	2

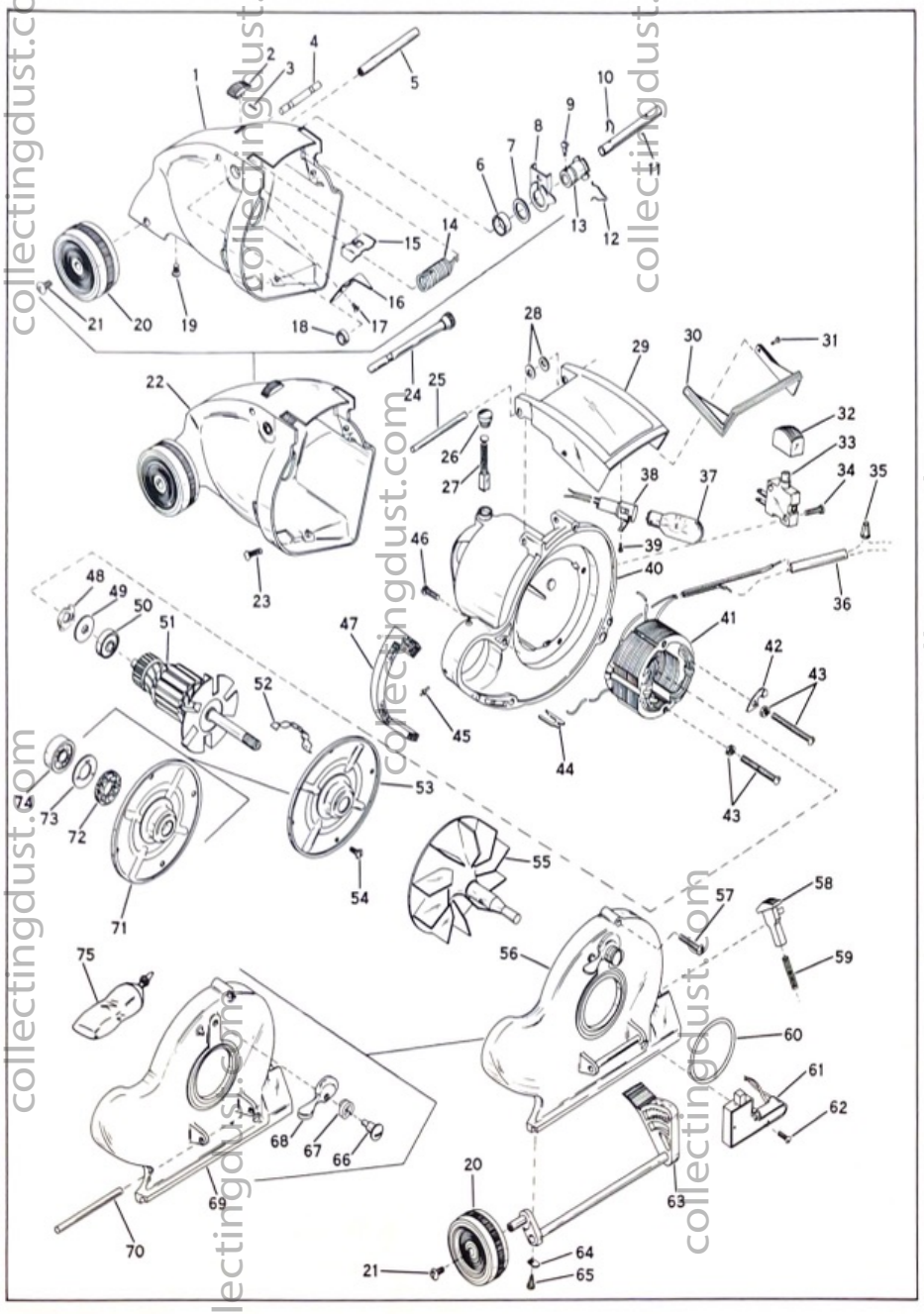


Figure 1-3. Motor group, exploded view. (Model 516 through 518)

Index No.	Part No.	Part Name	Quantity
1-3-1		Housing Shell Casting	1
-2	A136657	Handle Lock Button	1
-3	A136856	Handle Lock Retainer Pin	1
-4	A136956	Handle Lock Shaft	1
-5	A102056	Rear Wheel Shaft	1
-6	A135856	Housing Shell Bushing LH Large	1
-7	A137456	Handle Fork Fiber Washer	1
-8	A137556	Handle Fork Spring Yoke	1
-9	A137356	Handle Fork Spring Screw	1
-10	A1005	Handle Fork Pin Spring Clip	1
-11	A137156	Handle Fork Spring Shaft	1
-12	A136356	Handle Fork Spring Bushing Clip	1
-13	A137256	Handle Fork Spring Bushing	1
-14	A137056	Handle Fork Spring	1
-15	A136756	Handle Lock Button Spring	1
-16	A137656	Handle Fork Spring Spreader	1
-17	A137756	Handle Fork Spring Spreader Screw	1
-18	A135956	Housing Shell Bushing RH Small	1
-19	A1021R	Rear Wheel Shaft Screw	1
-20	A132056	Wheel, Grey	4
-21	A1321	Wheel Screw	4
-22	A135556S	Housing Shell Section	1
-23	A138456	Housing Shell Assembly Screw	3
-24	A137856	Handle Fork Pin	1
-25	A163156	Headlight Cap Hinge Pin	1
-26	A1181	Commutator Brush Cap	2
-27	A1180	Commutator Carbon Brush, 110 volt	2
	A1183	Commutator Carbon Brush, 32 volt	2
-28	A1632	Headlight Cap Hinge Washer	2
-29	A160056S	Headlight Cap Complete (Includes items 30 & 31)	1
-30	A161956	Headlight Cap Bumper	1
-31	A1545	Headlight Bumper Rivet	2
-32	A138556S	Foot Switch Button	1
-33	A1105	Foot Switch	1
-34	A1125	Foot Switch Holding Screw	2
-35	A134556	Safety Switch Wire Connector	1
-36	A109356	Field Wire Insulating Tubing	1
-37	A1650	Headlight Bulb, 110 volt	1
	A1651	Headlight Bulb, 32 volt	1
-38	A108256	Headlight Socket and Wire	1
-39	A102157	Headlight Socket Screw	1
-40	A100059S	Motor Housing Casting	1
-41	A1039W	Field (12065)	1

Index No.	Part No.	Part Name	Quantity
1-3-42	A108456	Headlight Wire Tubing Clamp	1
-43	A1046	Field Screw and Nut	2
-44	A1045	Field Terminal U-Clip	2
-45	A100656	Emtor Connecting Pin	3
-46	A134756	Motor Housing Screw, 5/8 inch	4
-47	A119256	Motor Housing Vent Rubber	1
-48	A1156	Rear Bearing Finger Spring	1
-49	A1157	Rear Bearing Grease Retainer Washer	1
-50	A1155	Rear Bearing	1
-51	A1149W	Armature (12062)	1
-52	A117256	Front Bearing Corrugated Strip	1
-53	A116856S	Front Bearing Plate Complete	1
-54	A1167	Front Bearing Plate Screw	4
-55	A119056S	Fan and Pulley	1
-56	A120056S	Fan Housing Assembly	1
-57	A134656	Fan Housing Screw, 1-1/8 inch	1
-58	A133056	Ratchet Lock	1
-59	A1331	Ratchet Lock Spring	1
-60	A122056	Nozzle Seal O-Ring, Rubber	1
-61	A134356	Safety Switch	1
-62	A134456	Safety Switch Attaching Screw	1
-63	A131656S	Front Wheel Bracket Shaft Only	1
-64	A1340	Front Shaft Clamp	2
-65	A134157	Front Shaft Clamp Screw	2
-66	A1211	Nozzle Lock Screw	1
-67	A1212	Nozzle Lock Spring	1
-68	A121056	Nozzle Lock	1
-69		Fan Housing Casting	1
-70	A121656	Nozzle Attaching Shaft	1
-71	A116656	Front Bearing Plate Only	1
-72	A116456	Front Bearing Felt Washer	1
-73	A116556	Front Bearing Thrust Washer	1
-74	A1160	Front Bearing Only	1
-75	A134856	Fan Housing Sealer Cement	1

NOTE

The parts of models 519 through 560 are the same as model 516 except for those parts shown in figure 1-4.

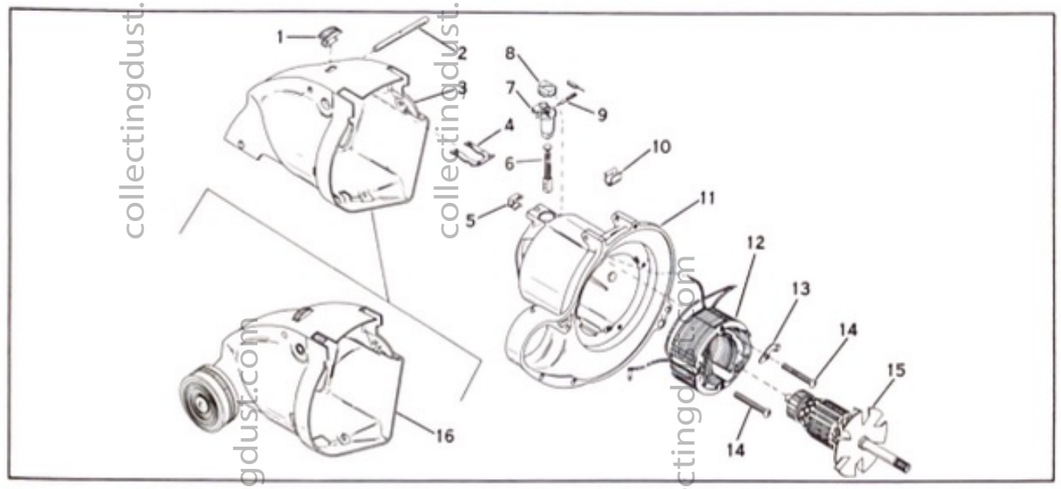


Figure 1-4. Motor group parts which are peculiar to models 519 through 560.

Index No.	Part No.	Part Name	Quantity
1-4-1	A136659	Handle Lock Button	1
-2	A136959	Handle Lock Shaft	1
-3		Housing Shell	1
-4	A136759	Handle Lock Spring	1
-5	A106859	Commutator Brush Retainer Clip	2
-6	A1180	Commutator Carbon Brush, 110 volt	2
	A1183	Commutator Carbon Brush, 32 volt	2
-7	A107259S	Commutator Brush Holder Section	2
-8	A107159	Commutator Brush Holder Cover	2
-9	A104559	Field Terminal Clip	2
-10	A163259	Spring Clip	1
-11	A100059S	Motor Housing Casting	1
-12	A103959E	Field (5BA45FN1) Model 519/( )*	1
	A103959W	Field (12065) Model 518/519	1
	A103969W	Field (12247) Model 560/( )*	1
-13	A108456	Headlight Wire Tubing Clamp	1
-14	A104659	Field Screw E (Short)	2
	A104859	Field Screw W (Long)	2
-15	A114959E	Armature, (5BA45FN1) Model 519/( )*	1
	A114960W	Armature, (12245) Model 560/( )*	1
-16	A135556S	Housing Shell Section	1

( )* denotes current model

SERVICE INSTRUCTIONS

1-2. CHECKING MOTOR UNIT. Remove the floor nozzle, handle, sani emtor and bag from the motor unit to be tested. Install a suction coupler and a cord which has been tested and found in good working order on the motor unit. The trouble shooting chart which follows lists the more frequent causes of various troubles and refers to the proper section of this manual where the appropriate repair instructions are to be found.

MOTOR RUNS IMPROPERLY				
			Models	
Trouble	Probable Cause	Remedy	505/515	516/560
Motor smokes after short period of operation	Defective armature	Replace armature	Par. 1-9	Par. 1-19
Motor runs slow with little suction or power	Defective armature Dirty or defective brushes	Replace armature Check brushes	Par. 1-9 Par. 1-7	Par. 1-19 Par. 1-17
Motor runs fast or overheats	Defective field Blocked ventilating air inlet	Replace field Clean ventilating inlet	Par. 1-9	Par. 1-19
Motor vibrates	Broken fan	Replace fan	Par. 1-9	Par. 1-19
Motor noisy, clicking or grating sound	Defective bearing Defective fan	Replace bearing Replace fan	Par. 1-9	Par. 1-19
MOTOR DOES NOT RUN				
			Models	
Trouble	Probable Cause	Remedy	505/515	516/560
Motor blows fuses, sparks when touching metal ground such as radiator or water pipes	Grounded motor	Return unit to factory for repair and testing on special equipment		
Motor dead, and headlight dead	Defective foot switch Defective cord	Replace foot switch Check cord	Par. 1-4 or 1-5 Sec. V	Par. 1-14 Sec. V
Motor dead, and headlight lights	Defective safety switch Defective brushes Loose or broken field lead	Replace safety switch Replace brushes Check field	Par. 1-6 Par. 1-7 Par. 1-9	Par. 1-15 Par. 1-17 Par. 1-19
Motor starts and stops	Defective brushes Defective cord Defective safety switch Defective field or armature	Replace brushes Check cord Check safety switch Check field and armature	Par. 1-7 Sec. V Par. 1-6 Par. 1-9	Par. 1-17 Sec. V Par. 1-15 Par. 1-19
HANDLE				
			Models	
Trouble	Probable Cause	Remedy	505/515	516/560
Handle will not stay in upright position	Weak or broken handle spring	Replace handle spring	Par. 1-12	Par. 1-22

Table I. Trouble Shooting Chart

Table I. Trouble Shooting Chart (Cont.)

1-3. HEADLIGHT (Models 505 through 515)

a. Removal.

(1) Pull the headlight socket from the clips (10, fig. 1-1) in the headlight cap front casting (3); depress and turn the bulb (18) counterclockwise to remove it from the socket.

(2) Remove the screws (7 and 8) that secure the headlight cap to the motor housing (15); remove the assembled headlight cap (9).

b. Inspection and replacement.

(1) Test the bulb in the socket of a unit known to be in good working order; replace the bulb if it is inoperative.

(2) If the socket clips are broken or distorted, remove the two screws (11) that secure them to the headlight cap front casting. Install new clips in the same position as the old ones and secure with the two screws.

(3) If the headlight cap bumper (4) is torn or excessively worn, drill out the two rivets (5) that secure it to the front casting; remove the old bumper and install a new one. Be sure to have the casting resting firmly on a work bench when upsetting the rivets to avoid cracking the casting.

(4) If either the headlight cap front casting or rear casting (1) is cracked or broken, drill out and remove the two rivets (2) and washers (6) that attach the parts. Replace the broken part. Position the washers between the front casting and rear casting; align the holes and secure with two new rivets.

(5) Inspect the headlight socket and wire (19) for burned condition, frayed leads, or grounds. To check for grounds, connect the test lamp (see page xi) to an electrical outlet, hold one probe on the exterior of the socket, and touch the other probe to each of the inner terminals in turn; the test lamp should not light. Replace the socket and wire if defective. It is necessary to disassemble the motor unit as directed in Section V to replace the headlight socket and wire.

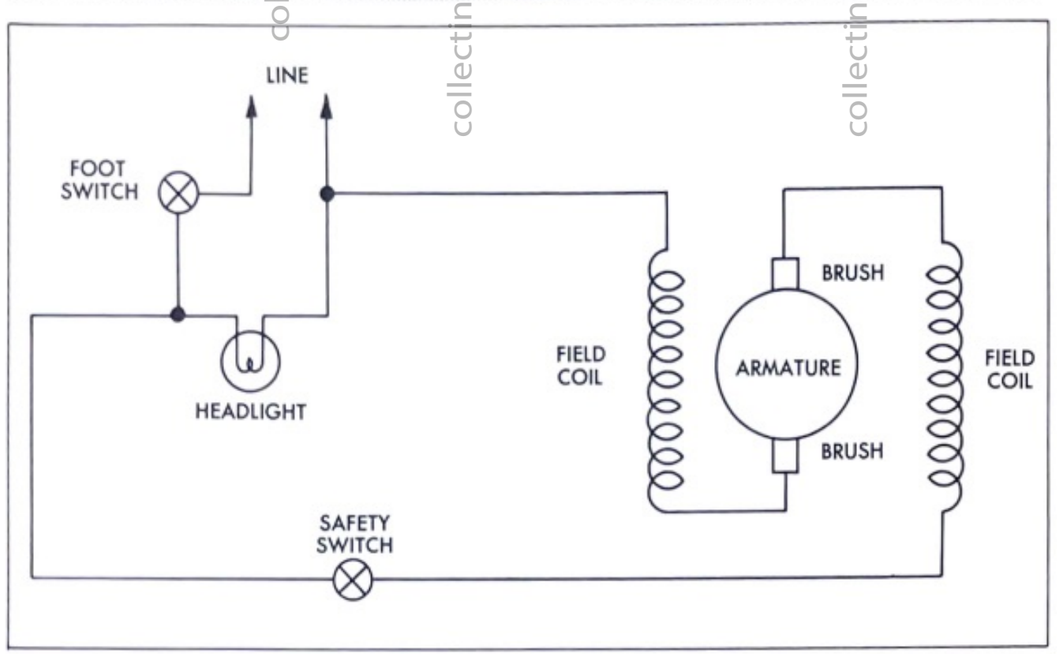


Figure 1-5. Wiring diagram, Model 505/515

c. Installation.

(1) Position the assembled headlight cap on the motor housing so that the holes are aligned with the tapped holes of housing; secure with the shorter screw (7) in the rear hole and the longer screw (8) in the front hole.

(2) Align the prongs of the bulb (18) with the socket; depress and turn the bulb to install it in the socket. Engage the headlight socket with the clips in the headlight cap.

1-4. FOOT SWITCH TEST AND REPLACEMENT (Models 505 through 512)

a. Removal.

(1) Remove the four screws (32, fig. 1-1) that secure the foot switch housing (33) to the motor housing as shown in figure 1-6.

(2) Turn the switch housing to the side so that the two screws (16, fig. 1-1) that secure the switch can be removed; remove the two screws, switch housing, and remove the insulating tube (34) from the switch.

b. Inspection and test.

(1) Inspect the switch for loose leads at the terminals, burned connectors, and for missing or broken spring that could cause loss of snap action.

(2) Connect the test lamp (see page xi) to an electrical outlet. Check the switch for

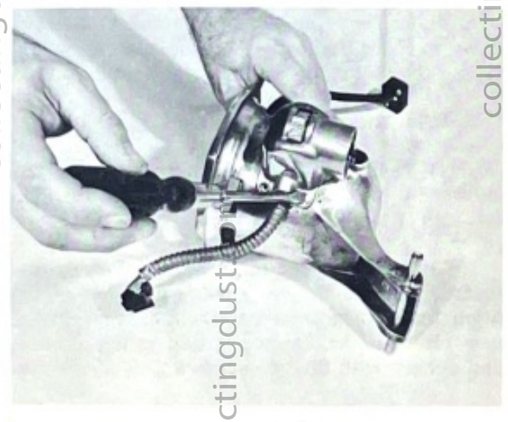


Figure 1-6. Removing foot switch housing

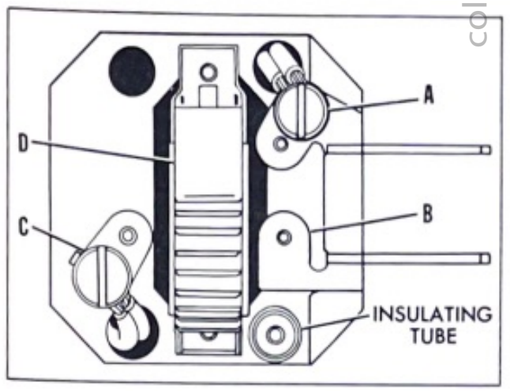


Figure 1-7. Foot switch and connections (Model 505/512)

proper operation by touching one probe of a test lamp to the connector prong (B, fig. 1-7) and the other probe to the switch terminal "C". With the switch closed (knob toward terminal "C"), the test lamp should light; with the switch open there should be no light.

(3) With the switch closed, check the foot switch for grounds by touching one probe of the test lamp to the switch knob "D" and the other probe first to terminal "A" and then to terminal "C". If the test lamp lights, it indicates the switch is grounded.

c. Replacement. If the switch is broken,

Figure 1-8. Positioning insulating tube on foot switch

grounded, or otherwise defective, replace it as follows:

(1) Disconnect the leads from the terminals; tag the leads with an indication of their positions.

(2) Clean the wires if dirty. Bend the longer lead from the headlight at the place where the insulation has been removed and insert it through the hole of the foot switch adjacent to terminal "C" as shown in figure 1-7. Connect the bare section of wire to the terminal.

(3) Insert the short lead from the field and the remaining headlight lead through the hole adjacent to terminal "A"; connect the leads to the terminal. Check that the connections agree with the wiring diagram, figure 1-5.

(4) Remove the screw (37, fig. 1-1) that secures the knob (36) to the old switch; pull the knob from the switch.

(5) Push the knob into place on the new switch shaft so that the hole is aligned; secure with the screw.

d. Installation.

(1) Insert the two screws (16) from the back of the switch; position the insulating tube

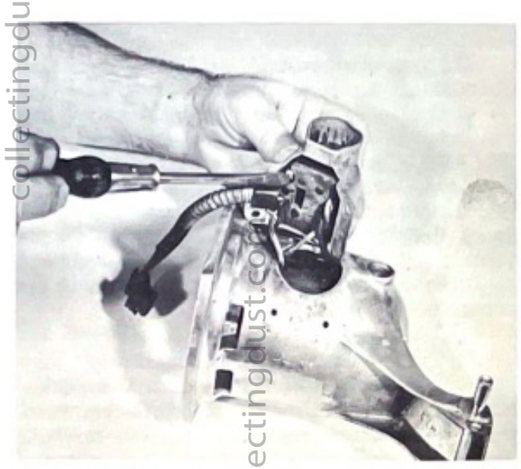


Figure 1-9. Installing foot switch in housing

(34) in the recess of the screw hole as shown in figure 1-8.

(2) Position the switch in the switch housing (33, fig. 1-1) so that the connector prongs enter the opening. Taking care that the insulating tube remains in position, secure the switch to the switch housing by tightening the two screws as shown in figure 1-9.

(3) Align the assembled foot switch and housing with the four mounting holes on the motor housing (15, fig. 1-1); secure with the four screws (32).

(4) Connect the cord and check for proper operation.

1-5. FOOT SWITCH TEST AND REPLACEMENT (Models 513 through 515)

a. Removal. Remove the four screws (4, fig. 1-2) that secure the foot switch housing (3) to the motor housing. Turn the switch housing to the side and remove the two screws (6) that secure the foot switch in the housing; lift the connected switch (5), spring (2), and switch button (1) from the switch housing.

b. Inspection and test.

(1) Inspect the foot switch for loose leads at the terminals, burned connectors, or for loss of snap action when the switch button is depressed.

(2) Test the switch for proper operation by touching one probe of a test lamp (see page xi) to the upper connector prong and the other test lamp probe to the terminal on the opposite side of the switch. With the switch closed the test lamp should light; after depressing the switch button the test lamp should not light. Check that there is proper continuity by touching one probe to the lower connector prong and the other to the terminal at the bottom of the switch; the lamp should light.

(3) To check the switch for shorts, disconnect the leads; tag the leads with an indication of their positions. Touch the test lamp probes to both connector prongs or to both terminals; there should be no light with the switch open or closed.

c. Replacement. If the foot switch is damaged, shorted, or does not work properly, disconnect the leads from the switch terminals, noting their positions. Clean the wires if dirty and connect the bared section of the long headlight lead to the side terminal of the new foot switch. Connect the remaining headlight lead and the short field lead to the bottom terminal of the switch.

d. Installation.

(1) Position the spring (2, fig. 1-2) in the switch button (1). Position the switch button, with the notched side upward, and the connected foot switch in the switch housing (3); secure with two screws (6).

(2) Carefully bend the leads to fit in the opening on the side of the motor housing and position the assembled foot switch and switch housing on the motor housing; secure with the four screws (4).

(3) Connect the cord to the motor unit and check for proper operation.

1-6. SAFETY SWITCH (Models 505 through 515)

a. Removal.

(1) Remove the four screws (63, 64, and 68, fig. 1-1), see figure 1-10, that secure the

Figure 1-10. Removing front wheel bracket screws

assembled front wheel bracket casting (62, fig. 1-1) to the fan housing (56).

(2) Pull the front wheel bracket casting away as far as the wires allow. Lift the large insulator (57) and safety switch slide (73), taking care not to lose spring (72) or rivet (71); remove the connected safety switch base (58) and small insulator (59) from the front wheel bracket casting.

(3) If the safety switch base is damaged, disconnect the two leads from it.

b. Inspection.

(1) Check that the insulation on the leads is not frayed and make sure the plastic tube (20) extends far enough to protect the leads where they enter the wire housing (22).

(2) Check that the spring contacts on the switch base are not cracked, distorted, or burned. Bend the contacts together if spread apart. Replace if damaged or burned.

(3) Check the switch slide for cracks, burned or excessively worn contact pin.

c. Installation.

(1) Clean the ends of the wires and connect the field lead to one terminal of the safety switch base (58) and the headlight lead to the other terminal. Make sure that the leads are securely attached to the terminals and that the insulation has not been stripped off too far so there is a chance of a short circuit to the casting.

(2) Position the small insulator (59) in the bottom of the opening in the wheel bracket casting.

(3) Position the spring (72) on the rivet (71) and insert the spring and rivet into the hole of the safety switch slide (73).

(4) Align the switch slide with the switch base and insert both into the opening of the wheel bracket casting. If necessary, use a screwdriver to align the rivet and spring with the hole of the slide.

Figure 1-11. Position large insulator over safety switch

(5) Position the large insulator (57) over the safety switch parts as shown in figure 1-11. While holding the safety switch parts in place, align the wheel bracket casting with the fan housing (56, fig. 1-1); secure with the two shorter screws (63) in the top holes and the screws (64) and (68) in the lower holes.

(6) Check that the safety switch slide operates without binding.

1-7. MOTOR BRUSH INSPECTION AND REPLACEMENT (Models 505 through 515)

a. Removal.

(1) Loosen the brush caps (51, fig. 1-1) by turning counterclockwise with a screwdriver as shown in figure 1-12; remove the caps.

(2) Pull the carbon brushes (50, fig. 1-1) from the brush holders.

b. Inspection.

(1) Examine the carbon brushes for cracks, disconnected lead, roughness, or burned condition. Replace the carbon brushes if defective, or worn to 3/8-inch length, with genuine Kirby brushes.

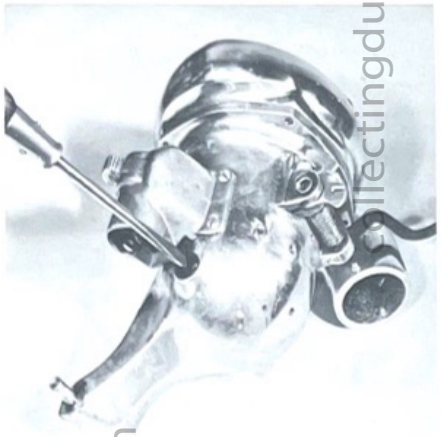


Figure 1-12. Removing commutator brush caps

(2) Inspect the armature commutator through the opening of the brush holder for roughness or excessively dirty condition. If the armature is rough or dirty it will have to be removed as directed in paragraph 1-9 for cleaning or replacement.

(3) If only one carbon brush is burned, while the other remains shiny and smooth, you may suspect the cause of this condition to be an accumulation of dust or lint in the commutator area. The armature will in most cases be good.

(4) If both carbon brushes are burned, you should then look for an "open" or defective armature.

c. Installation.

(1) Align the concave of the carbon brush (50) with the armature and insert into the brush holder (49).

(2) Position the brush cap (51) over the spring of the carbon brush; screw the brush cap into the brush holder.

1-8. MOTOR UNIT MAJOR OVERHAUL (Models 505 through 515). The following three paragraphs give the necessary instructions for complete disassembly, inspection, and rebuilding of the motor unit. It may not be necessary

Figure 1-13. Removing fan housing screws

in all cases to completely disassemble the unit in order to replace the defective components and repair the motor unit. Follow the disassembly steps which are necessary and then refer to the proper inspection and reassembly steps required to restore the unit to good working order.

1-9. DISASSEMBLY (Models 505 through 515)

a. Remove the four screws (48, fig. 1-1) that secure the assembled fan housing and front wheel bracket to the motor housing assembly (15) as shown in figure 1-13; move the fan housing to the side.

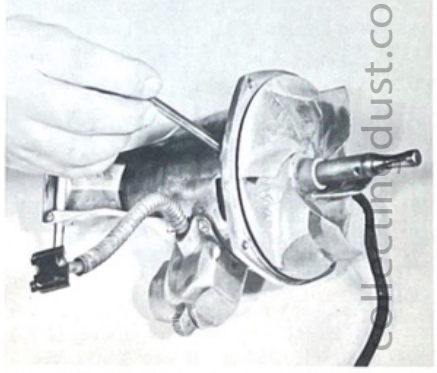


Figure 1-14. Holding armature for fan removal

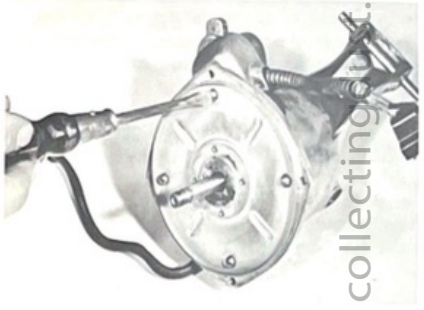


Figure 1-15. Removing front bearing plate screws

b. Insert a fan locking pin (T104) or an ice pick through the ventilating hole on the bottom of the motor housing and through the hole of the armature shaft as shown in figure 1-14 to hold the armature from turning.

c. While holding the armature, turn the fan and pulley (55, fig. 1-1) clockwise to remove it from the left hand threads of the armature shaft.

d. Remove the two carbon brushes from the holders as directed in paragraph 1-7a.

e. Remove the four screws (45) that secure the front bearing plate assembly (44) to the motor housing as shown in figure 1-15; remove the assembled front bearing plate and bearing.

NOTE

On all models 3C through 511 to serial number 383346 there is no provision for relubrication of the front bearing. The bearing and bearing plate must be replaced if defective. Beginning with model 511, serial number 383347, the front bearing can be removed from the bearing plate as directed below.

f. Use thumb pressure or, if necessary, use a screwdriver to push the front bearing (26, fig. 1-1) from the front bearing plate; remove the bearing, thrust washer (25 or 29), felt washer (24 or 28), and, if used, retainer cup (27) and corrugated strip (30).

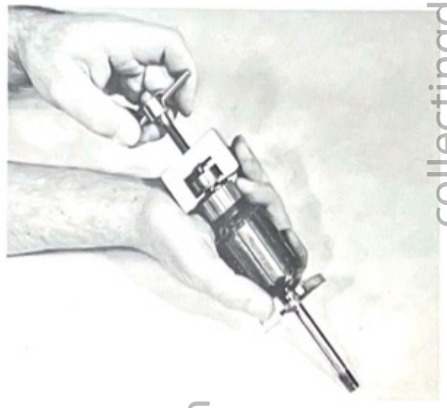


Figure 1-16. Removing rear bearing from armature

g. Lift the armature (43) from the field. The rear bearing (42) should come out with the armature, and the grease retainer washer (41) may stick to the rear bearing. If it does not come out with the rear bearing, remove the grease retainer washer and rear bearing finger spring (40) from the end of the armature bore, using a hooked wire.

h. Remove the rear bearing from the armature, using a rear bearing puller (SP125) as shown in figure 1-16.

i. If the field (38, fig. 1-1) must be removed, it is first necessary to remove the foot switch

Figure 1-17. Repacking bearing with grease

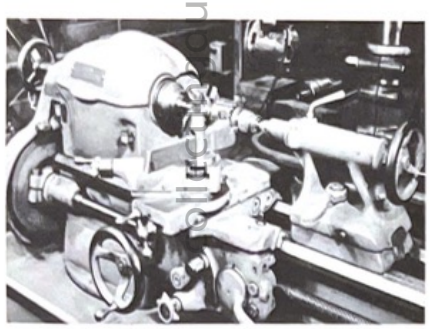


Figure 1-18. Turning down armature commutator

as directed in paragraph 1-4a or 1-5a, disconnect the safety switch as directed in paragraph 1-6a, and remove the headlight socket and wire (19) from the motor housing.

j. Loosen the nuts on the two screws (46) that secure the field in the motor housing; remove the screws and nuts and the field baffle (39).

k. Use long-nose pliers to disconnect the field terminal U-clips (47) from the brush holders; remove the field from the motor housing.

1-10. INSPECTION AND REPAIR

a. Inspect the fan for cracked or broken blades and for loosening of the fan on the shaft; replace if defective.

b. Inspect the front and rear bearings for rough or binding operation, excessive looseness or wear; replace the bearings if damaged. Wash the bearings with a solvent and allow to dry thoroughly. Repack the bearings as shown in figure 1-17 with a special grease of high consistency (such as T105, which is available in one pound cans).

c. Inspect the armature commutator; if worn or rough, use a small lathe as shown in figure 1-18 to take a cut equal to the depth of the worn part. Carefully clean all copper or carbon dust from the slots between the segments. Use No. 00 sandpaper to clean the commutator or to remove any small burs after turning down on a lathe.

d. Inspect the ventilating fan blades on the armature. Occasionally one of the blades will become bent as shown in figure 1-19 and cut the windings of the armature. If the armature windings appear burned, the commutator segments are burned from arcing, or the armature is otherwise damaged, it must be replaced. Refer to the chart, figure 1-20, for correct identification of the armature for replacement.

e. With a test lamp, check the field for open circuits by touching one probe of the test lamp to the field terminal U-clip and the other test lamp probe to the other lead of the same field coil. The test lamp should light; no light indicates an open field coil. Check the field for grounds by touching one probe of the test lamp to the field core and the other probe to each of the field leads in turn. There should be no light; if the lamp does light, it indicates that the field coil is grounded. Replace the field if windings are burned, or if it tests open or grounded. Refer to the chart, figure 1-20, for proper identification of the field for replacement.

f. If the motor housing casting (79, fig. 1-1) is cracked or broken, remove the headlight cap and handle spring parts as directed in paragraph 1-12a and handle lock as directed in paragraph 1-13b; remove the two screws (66), wheels (65), screw (80), and rear wheel shaft (81). Install the rear wheel shaft on the new motor housing; secure with the screw (80). Position a wheel on each end of the shaft and secure each with a screw (66); install handle lock as directed in paragraph 1-13d. Install the handle spring parts and headlight cap as directed in paragraph 1-12b. If the motor housing is dirty, it should be washed out with a suitable solvent while the field and

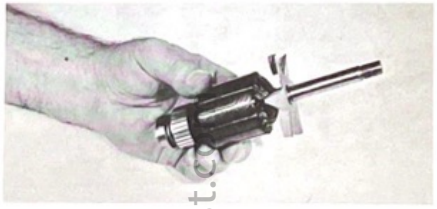


Figure 1-19. Bent armature ventilating fan blades

wiring are out; be sure to dry thoroughly with a clean cloth before beginning reassembly.

1-11. REASSEMBLY (Models 505 through 515)

a. Check that the U-clips are securely soldered to the leads of the field coils. Bend the leads, with the U-clips attached, partially inside the field and install into the motor housing so that the side with the leads is inward and the holes align with the tapped holes of the motor housing. Guide the two free leads out

We are no longer able to supply replacement armature and field sets carrying the following identification part numbers.

ARMATURES	FIELDS
10175	10176
3424	3424
4579	4579
4494	4494
4121	4121

When replacement of any one of the above is required it will be necessary to install a complete armature and field set of our current production type. The current motor set will fit all motor housings back to and including Model 3C.

The Model SS and 2C motor sets must also be discontinued at this time. Defective units in either of these series will have to be reclaimed or re-wound. Check in your locality for availability of this service.

The "Factory Rebuild" cost on all Kirbys will hold as prescribed in the instruction book for the particular model involved. Return shipment of rebuilds must be made "DIRECT TO THE CUSTOMER'S HOME", as stated in Service Bulletin of December 1, 1955.

Recent engineering improvements on the Kirby motor enable the following simplifications in Armature and Field Replacements:

ARMATURES

S&F PARTS CODE	CODE STAMPED ON ARMATURE	USE TO REPLACE ARMATURES #	MAY BE USED WITH FIELDS #
A1149W	12062	11320 10530 12062 5BA45BD12 5BA45BD12A 5BA45BD12B	11321 10531 12065 5BA45BD12 5BA45BD12A 5BA45BD12B
A114960W	12245	12245	12247
A114959E	5BA45FN1	5BA45FN1	5BA45FN1

Figure 1-20. Armature and field identification chart.

FIELDS

S&F PARTS CODE	CODE STAMPED ON FIELD	USE TO REPLACE FIELDS #	MAY BE USED WITH ARMATURES #
A1039W	12065	11321 10531 12065 5BA45BD12 5BA45BD12A 5BA45BD12B	11320 } Same 10530 } 12062 5BA45BD12 5BA45BD12A 5BA45BD12B
A103959W (Includes New Type Terminal Clips)	12065	12065	12062
A103959E	5BA45FN1	5BA45FN1	5BA45FN1
A103960W	12247	12247	12245

All other motors NOT listed above have been discontinued.

Match replacement Armature and Field sets to this list or select a complete replacement motor from corresponding code numbers.

Figure 1-20. Armature and field identification chart (cont).

through the opening where the foot switch is mounted as shown in figure 1-21.

b. Insert the leads from the headlight socket and wire (19, fig. 1-1) through the hole of the motor housing in front of the handle spring and around the field and out the hole for the foot switch until the headlight socket protrudes about seven inches from the motor housing.

c. Install a nut all the way on each of the long screws (46) that attaches the field. Position the field baffle (39) and start each of the screws through the field and into the motor housing but do not tighten.

d. If removed, install the two brush holders (49) so that the slots will be horizontal with the motor in a level position as shown in figure 1-22. This is important to obtain proper brush seating on the commutator and to facilitate installation of the field terminal U-clips. Tighten the two screws that secure the field just snug while holding the brush holders all the way in and properly aligned. Tighten the nuts to secure the field.

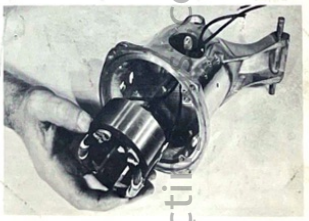


Figure 1-21. Installing field in motor housing.

Figure 1-22. Installing brush holders in motor housing

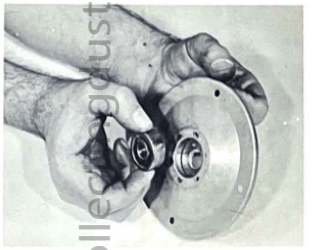


Figure 1-24. Installing front bearing in bearing plate

e. Install the field terminal U-clips on the slots of the brush holders. Make sure that the leads are positioned so they will not rub on the armature.

f. Connect the leads to the terminals and install the foot switch as directed in paragraph 1-4c and d or 1-5c and d.

g. Position the rear bearing finger spring (40, fig. 1-1) with flat side inward and the grease retainer washer (41) in the hole at the rear of the motor housing.

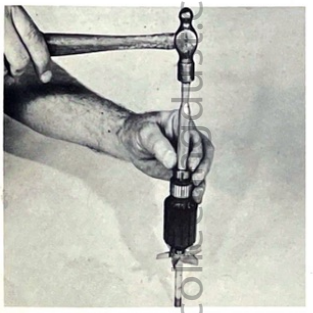


Figure 1-23. Installing rear bearing on armature

h. Position the rear bearing (42) with the open side away from the armature on the commutator end of the armature shaft. Drive into place, using a discarded fan pulley and hammer as shown in figure 1-23. Be sure that the bearing has been packed with fresh lubricant.

i. Install the assembled armature and bearing through the field into the motor housing. Make sure that the wires from the field are not in the way to cause interference with the armature.

j. Position the felt washer (24, fig. 1-1) and the thrust washer (25) with the bent tabs toward the felt washer in the front bearing plate (23). Make sure that the front bearing (26) has been packed with special high consistency grease and that the open side of the bearing is toward the thrust washer; push the front bearing firmly into place in the bearing plate as shown in figure 1-24. In models where used, or if the bearing is not a tight fit in the bearing plate, install a corrugated strip (30, fig. 1-1) in the bearing plate, so that the notch engages the slot of the bearing plate, before pushing the bearing into place.

k. Install the assembled front bearing plate and bearing, with the bearing inward as shown in figure 1-25, over the armature shaft and

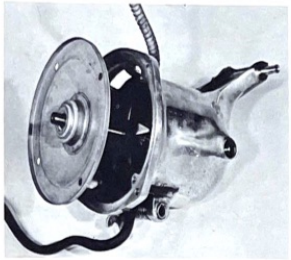


Figure 1-25. Installing front bearing plate

align with the holes of the motor housing; secure with the four screws (45, fig. 1-1). Check that the armature rotates freely in the field. If there is any interference, remove the front bearing plate and check that the field is secure and that there are no field leads preventing the field from seating properly in the motor housing. When the reason for interference has been corrected, reinstall the assembled front bearing plate and bearing.

l. Insert a fan locking pin or an ice pick through the ventilating hole of the housing and the hole in the armature shaft to hold the armature from turning as shown in figure 1-14; install the fan and pulley (55, fig. 1-1) by turning in a counterclockwise direction until snug.

m. Install the commutator brushes as directed in paragraph 1-7c.

n. Install the safety switch as directed in paragraph 1-6c.

o. Position the assembled safety switch, fan housing, and front wheel bracket on the motor housing; secure with the four screws (48). Check that the fan rotates in the housing without any interference.

p. Check the motor unit for proper operation as directed in paragraph 1-2.

1-12. HANDLE SPRING REPLACEMENT (Models 505 through 515). The tools required are a

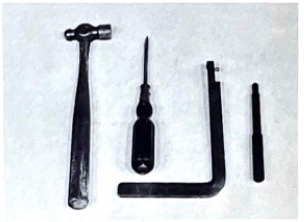


Figure 1-26. Tools required for handle spring replacement

hammer, screwdriver, spring crank, and tapered pin as shown in figure 1-26. The spring crank and tapered pin are available as spring tool set (SP124).

a. Disassembly.

(1) Remove the headlight socket from the clips in the headlight cap. Remove the two screws (7 and 8, fig. 1-1) that secure the assembled headlight cap to the motor housing; remove the headlight cap.

(2) Remove the handle fork pin (17) and the spring clip (83).

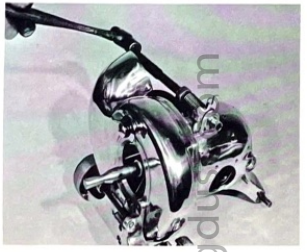


Figure 1-27. Driving out spring shaft

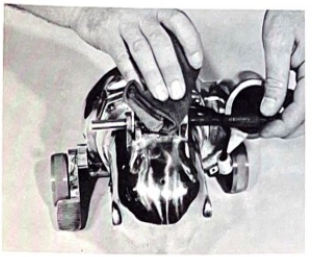


Figure 1-28. Removing handle spring

(3) From the side opposite the handle fork spring plate (53), drive the spring shaft (82) about three-fourths of the way through the handle spring (52) as shown in figure 1-27, using the special tapered pin.

(4) Place a rag over the handle spring as shown in figure 1-28 to avoid injury; withdraw the tapered pin and remove the spring.

(5) File the crimped end of the spring shaft smooth. Withdraw the spring shaft and remove the spring plate (53, fig. 1-1) and two washers (54).

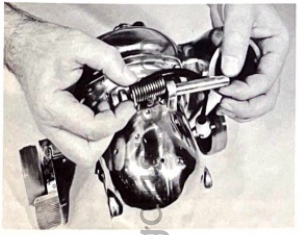


Figure 1-29. Installing spring shaft and handle spring

Figure 1-30. Winding tension into handle spring

b. Reassembly.

(1) Position the straight end of the handle spring (52) in the hole beside the single lug on the motor housing.

(2) Install the spring shaft (82), with the slot outward as shown in figure 1-29, through the single lug of the motor housing and through about three or four turns of the handle spring. If installed too far it will be impossible to wind the tension into the spring.

(3) Position the spring crank on the spring as shown in figure 1-30 and wind one turn of tension into the spring.

(4) Hold the spring crank securely and install the tapered pin as shown in figure 1-31,

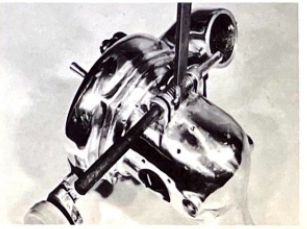


Figure 1-31. Using tapered pin as guide for spring shaft

Figure 1-32. Installing spring plate and washers

through the double lug of the housing, the spring, and into the end of the spring shaft. Using the tapered pin as a guide, tap the spring shaft through the spring and into the first section of the double lug.

(5) Remove the tapered pin and install the spring plate (53, fig. 1-1), with a washer (54) on each side of it as shown in figure 1-32, between the two lugs and in alignment with the hole. Reinsert the tapered pin to align the plate and washers.

(6) Drive the spring shaft into place so that the ends are flush with the motor housing.

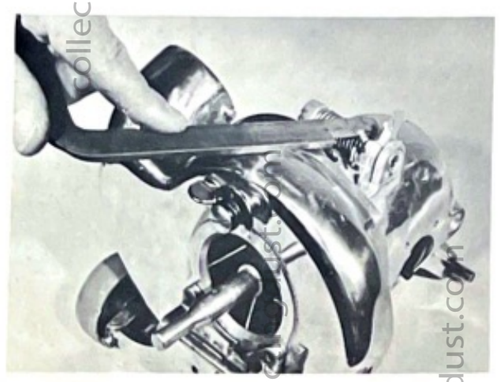


Figure 1-33. Positioning handle spring on spring plate

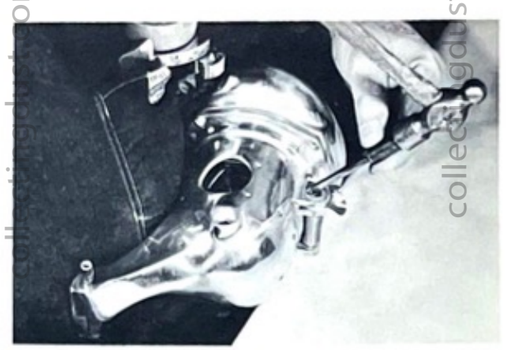


Figure 1-34. Crimping ends of spring shaft

(7) With the spring crank, bring the spring into alignment with the projection on the spring plate; twist the spring crank to the right to drop the hooked end of the spring into the notch of the spring plate as shown in figure 1-33.

(8) Turn the spring shaft so that the slot is perpendicular and toward the front of the motor housing; install the spring clip (83, fig. 1-1) with the straight side in the slot of the spring shaft.

(9) Crimp the ends of the spring shaft as shown in figure 1-34 to hold it securely in place.

(10) Position the headlight cap on the motor housing; secure with the screws (7 and 8, fig. 1-1). Engage the headlight socket with the clips in the headlight cap.

1-13. HANDLE LOCK REPLACEMENT (Models 505 through 515).

a. Remove the short screw (7, fig. 1-1) and long screw (8) that secure the headlight cap assembly (9) to the motor housing; remove the headlight cap.

b. Remove the two screws (12) that secure the handle lock spring (13) and handle lock (14) to the motor housing; remove the handle lock and handle lock spring.

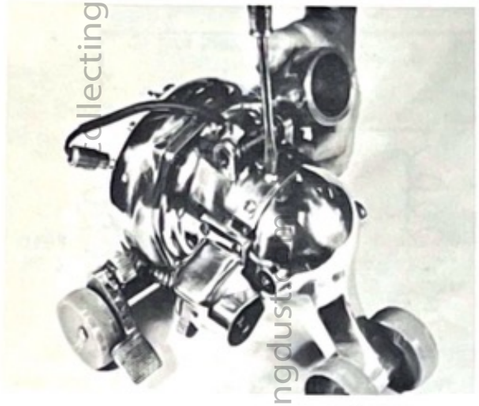


Figure 1-35. Installing handle lock

c. Replace the handle lock spring if cracked or the handle lock if excessively worn or distorted.

d. Position the handle lock (14), with the offset upward and toward the front as shown in figure 1-35, and the handle lock spring (13) so that they are aligned with the holes of the motor housing; secure with the two shouldered screws (12).

e. Position the headlight cap assembly on the motor housing; secure with the screws (7 and 8).

1-14. FOOT SWITCH (Models 516 through)*

a. Removal.

(1) Remove the foot switch button (32, fig. 1-3) by lifting up as shown in figure 1-36.

(2) Remove the three screws (23, fig. 1-3) that secure the housing shell section (22), to the motor housing casting as shown in figure 1-37; pull the housing shell straight back to remove it.

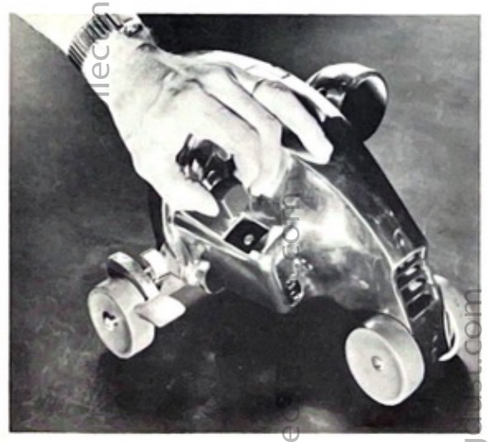


Figure 1-36. Removing foot switch button

* For current models.

Figure 1-37. Removing shell housing screws

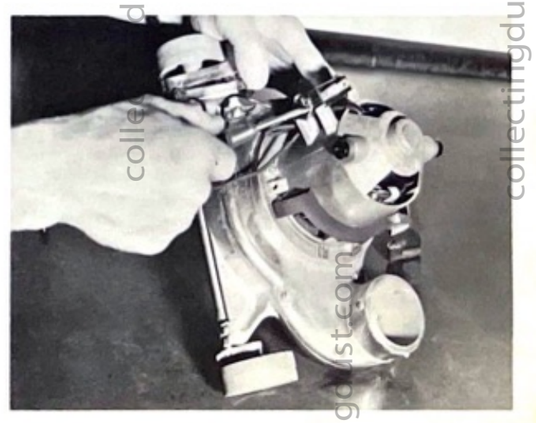


Figure 1-38. Installing leads on foot switch bottom terminal

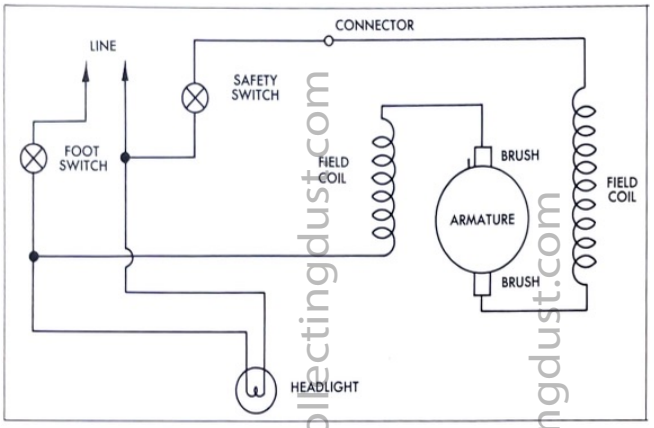


Figure 1-39. Wiring Diagram (Models 516/)*

(3) Remove the two screws (34, fig. 1-3) that secure the foot switch to the motor housing.

b. Inspection, test, and replacement. Inspect and test the foot switch in the same manner as directed in paragraph 1-5b. If the foot switch is defective, disconnect the leads, taking note of their respective positions. One headlight lead and one field lead should be connected to the terminal at the bottom of the foot switch (see fig. 1-38); the remaining headlight lead and one lead from the safety switch should be connected to the terminal at the side of the foot switch.

c. Installation.

(1) Position the foot switch with the connectors toward the rear on the motor housing; secure with the two screws (34, fig. 1-3).

(2) Position the housing shell section (22) over the motor housing casting; secure with the three screws (23).

(3) Install the foot switch button (32) by aligning it with the hole of the housing shell and pushing it into place on the foot switch.

(4) Connect the cord to the motor unit and check for proper operation.

1-15. SAFETY SWITCH (Models 516 through)*

a. Removal.

(1) Remove the foot switch as directed in paragraph 1-14a.

(2) Unscrew the wire connector (35, fig. 1-3) that connects the safety switch lead to the field lead; disconnect the leads.

(3) Loosen the bottom terminal screw on the foot switch; disconnect the safety switch lead and the headlight lead.

(4) Remove the screw (62) that secures the safety switch (61) to the fan housing (56); remove the safety switch.

* For current models.

b. Inspection and test.

(1) Inspect the leads for damaged insulation. Check that switch button moves all the way out when released.

(2) Connect a test lamp (see page xi) to the two leads of the safety switch; there should be no light with the switch button released. There should be light when the switch button is pressed down.

(3) Replace the safety switch if it or the leads are damaged, or if it does not operate properly.

c. Installation.

(1) Position the safety switch (61) on the fan housing (56) so that the leads extend through the hole of the fan housing and motor housing; secure with the screw (62).

(2) Connect one lead from the safety switch and one lead from the headlight to the bottom terminal of the foot switch.

(3) Connect the remaining lead from the safety switch to the free lead from the field; screw the wire connector (35) in place over the leads.

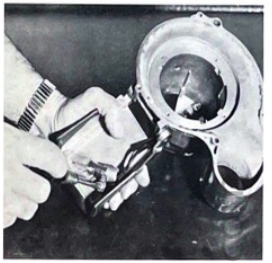


Figure 1-40. Removing headlight socket screw

* For current models.

(4) Install the foot switch as directed in paragraph 1-14c.

1-16. HEADLIGHT (Models 516 through)*

a. Headlight bulb replacement. Depress and turn the headlight bulb (37, fig. 1-3) to remove it from the socket. Test the bulb in the socket of a unit known to be in good working order; replace the bulb if inoperative. Align the prongs of the headlight bulb with the socket; depress and turn the bulb to install it into the socket.

b. Headlight socket and wire replacement.

(1) Remove the screw (39) that secures the headlight socket and wire (38) to the headlight cap as shown in figure 1-40.

(2) Disassemble the motor unit as directed in paragraph 1-19a through j.

(3) Disconnect the leads from the terminals of the foot switch.

(4) Remove the headlight socket and wire from the motor housing as directed in paragraph 1-19m(2).

(5) Install the new socket and wire so that the plastic insulating sleeve protects the leads where they extend through the motor housing and so that the sleeve is pushed back to prevent interference with the armature fan; secure the socket to the headlight cap with the screw (39, fig. 1-3).

(6) Reassemble the parts to the motor housing as directed in paragraph 1-21.

(7) Connect the leads to the foot switch as directed in paragraph 1-14b; install the foot switch as directed in paragraph 1-14c.

(8) If replacement of the headlight socket only is indicated, this can be accomplished by unsoldering the lamp contact points in the base of the socket as shown in figure 1-41. Discard the old socket and attach a new or serviceable replacement socket to the leads.

c. Headlight cap repair or replacement.

(1) Remove the screw (39, fig. 1-3) that secures the headlight socket to the headlight cap (29).

Figure 1-41. Unsoldering headlight wires from socket

(2) Remove the foot switch button and remove the housing shell from the motor housing as directed in paragraph 1-14a(1) and (2).

(3) Carefully examine the headlight cap pin (25) and you will note that one end is smooth and the other end is grooved; using a small punch, drive the pin from the smooth end (exhaust side) of the motor housing casting as shown in figure 1-42. Remove the headlight cap and the two washers (28, fig. 1-3).

(4) If the headlight cap bumper (30) is torn or excessively worn, drill out the two rivets (31) that secure it to the headlight cap; remove the bumper and install a new one. Install the new rivets with the heads outward and be sure to have the headlight cap resting firmly on the workbench when upsetting the rivets to avoid cracking the casting.

Figure 1-42. Removing headlight cap pin

(5) Position the headlight cap with a spring washer (28) on each side between it and the motor housing and aligned with the hole; install the headlight cap pin (25) with the grooved end outward from the side opposite the exhaust opening.

(6) Install the housing shell and foot switch button as directed in paragraph 1-14c(2) and (3).

(7) Secure the headlight socket to the headlight cap with the screw (39) (see figure 1-40).

1-17. MOTOR BRUSH INSPECTION AND REPLACEMENT (Models 516 through)*

a. Models 516 through 518.

(1) Remove the foot switch button (32, fig. 1-3) by pulling up on it.

Figure 1-43. Removing commutator brush caps and brushes

* For current models.

(2) Remove the three screws (23) that secure the housing shell section (22) to the motor housing casting (40); remove the housing shell by pulling straight back.

(3) Unscrew the commutator brush cap (26) and remove the carbon brush (27) from each of the brush holders as shown in figure 1-43.

(4) Inspect the carbon brushes and commutator as directed in paragraph 1-7b; if the armature is rough or dirty, remove it as directed in paragraph 1-19 for cleaning or replacement.

(5) Align the concave of the carbon brush (27, fig. 1-3) with the armature and insert into the brush holder.

(6) Position the brush cap (26) over the brush spring and screw the cap into the brush holder.

(7) Align the housing shell section with the motor housing casting; secure with the three screws (23).

(8) Align the foot switch button with the housing shell and the foot switch; push the foot switch button into place.

b. Models 519 through ( ).*

(1) Remove the foot switch button and the shell housing as directed in a(1) and (2) above.

(2) Pull the brush holder cover (8, fig. 1-4) from the brush holder (7). Straighten the field terminal clip (9) and remove it from the slot of the brush holder. Lift the brush (6) from each brush holder.

(3) Remove the retainer clip (5) that secures the brush holder to the motor housing casting (11); remove the brush holder.

(4) Inspect the carbon brushes and commutator as directed in paragraph 1-7b. Replace the brush holders if cracked or damaged.

(5) Position the brush holders on the motor housing casting; secure in place with the retaining clips (5).

* For current models.

(6) Align the concave of the carbon brush (6) with the armature and insert into the brush holder.

(7) Press the spring of the carbon brush down into the brush holder and insert the field terminal clip (9) through the slots of the brush holder. Bend up the end to secure in place and push the brush holder cover (8) into place.

(8) Install the housing shell and the foot switch button as directed in a(7) and (8) above.

1-18. MOTOR UNIT MAJOR OVERHAUL (Models 516 through) * The following three paragraphs give the necessary instructions for complete disassembly, inspection, and rebuilding of the motor unit. Follow the disassembly steps which are necessary and then refer to the proper inspection and reassembly steps required to restore the unit to good working order.

1-19. DISASSEMBLY (Models 516 through)*

a. Remove the foot switch button (32, fig. 1-3) by pulling it up; remove the three screws (23) that secure the housing shell section (22) to the motor housing as shown in figure 1-37. Remove the housing shell by pulling straight back.

b. Loosen the bottom terminal screw (see figure 1-38) of the foot switch and disconnect the safety switch lead and the headlight lead.

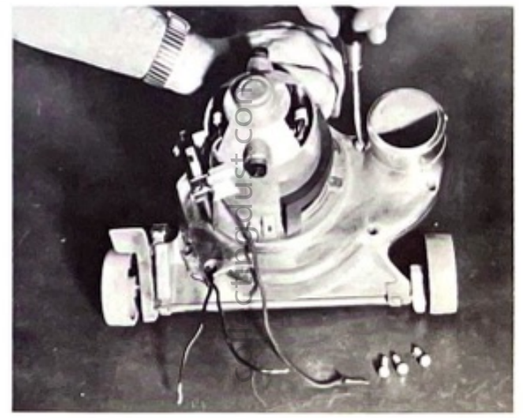


Figure 1-44. Removing rear fan housing screws.

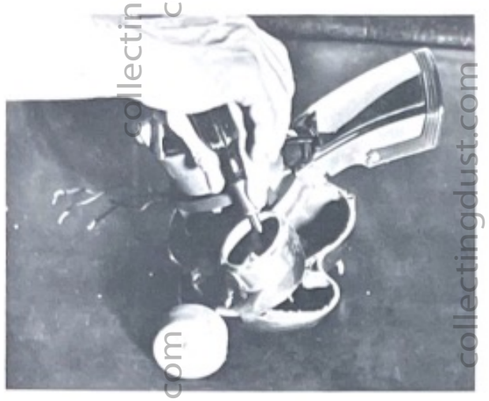


Figure 1-45. Separating fan housing from the motor housing.

c. Remove the wire connector (35, fig. 1-3) that secures the remaining safety switch lead to the field lead; disconnect the leads.

d. Remove the four screws (46) as shown in figure 1-44 and the one longer screw (57, fig. 1-3) in front under the headlight cap, that secure the fan housing (56) to the motor housing casting (40).

e. Separate the fan housing from the motor housing by inserting a blunt instrument, such as a screwdriver, through the rear opening and giving it a sharp rap with your hand as shown in figure 1-45 to break the adhesive seal.

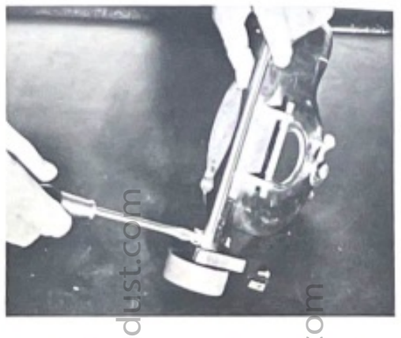


Figure 1-46. Removing front shaft clamps.

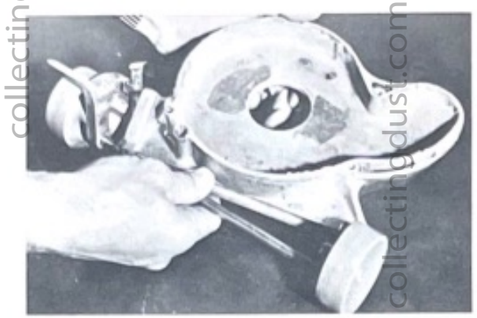


Figure 1-47. Removing wheel bracket shaft from fan housing.

f. Disassemble the fan housing as follows:

(1) Remove the screw (62, fig. 1-3) that secures the safety switch to the fan housing; remove the safety switch.

(2) Move the toe touch control to the No. 7 position. Remove the two screws (65) and front shaft clamps (64), as shown in figure 1-46, that secure the assembled front wheels and bracket shaft to the fan housing. Pull the end of the shaft opposite the toe touch control out first as shown in figure 1-47 and move the shaft toward the toe touch control to release the ratchet lock (58, fig. 1-3) and spring (59).

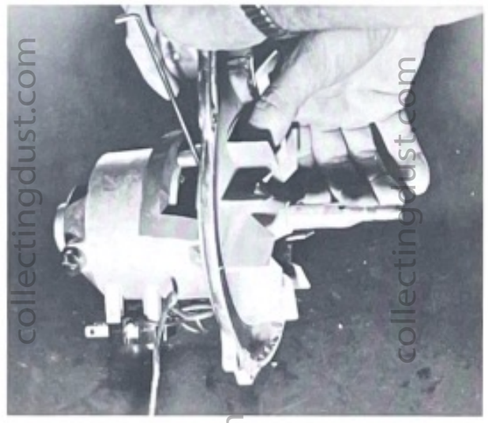


Figure 1-48. Removing fan and pulley from the armature.

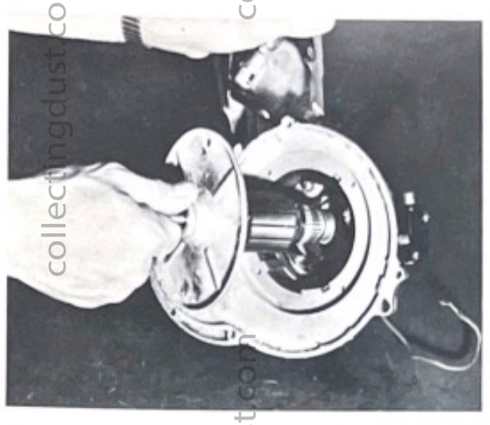


Figure 1-49. Removing armature and bearings from the motor housing.

(3) If worn or damaged, pull the seal O-ring (60) from the groove of the fan housing.

(4) If the nozzle lock (68) is damaged, center punch and drill out end of the screw (66); remove the screw, spring (67), and nozzle lock.

g. Insert a fan locking pin (T104) or an ice pick through the ventilating hole of the motor housing and through the hole in the armature shaft to hold the armature from turning as shown in figure 1-48; turn the fan and pulley (55, fig. 1-3) in a clockwise direction to remove it from the left hand threads of the armature shaft.

h. Remove the commutator brushes as directed in paragraph 1-17a or b.

i. Remove the four screws (54) that secure the front bearing plate assembly (53) to the motor housing.

j. Remove the assembled front bearing plate, armature (51), and bearings by pulling on the armature shaft as shown in figure 1-49. This is a tight fit and considerable effort may be required. Remove the grease retainer washer (49, fig. 1-3), which sometimes sticks to the rear bearing, and the bearing finger spring (48) from the motor housing.

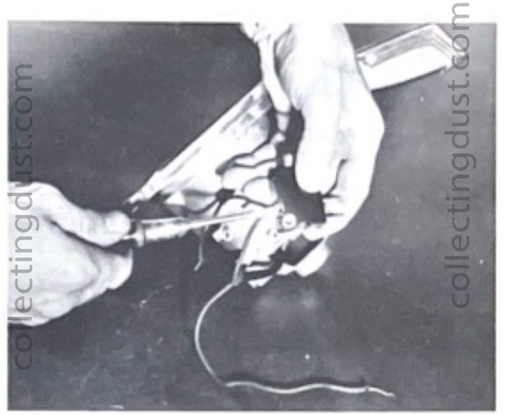


Figure 1-50. Removing leads from side terminal of foot switch.

k. Pull the assembled front bearing plate and bearing from the armature shaft. Use thumb pressure to remove the front bearing (74) from the front bearing plate (71); remove the thrust washer (73), felt washer (72), and corrugated strip (52) from the front bearing plate.

l. If necessary to remove the rear bearing (50) from the armature, use the special rear bearing puller (SP125) as shown in figure 1-16.

Figure 1-51. Removing headlight wires from motor housing.

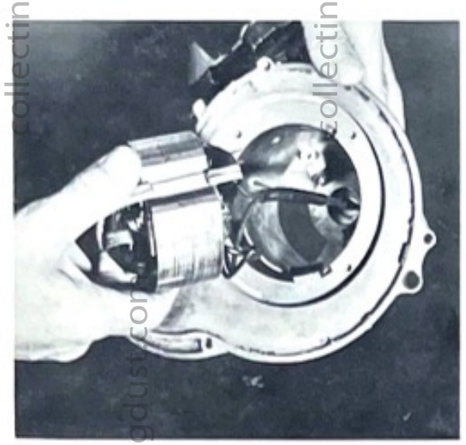


Figure 1-52. Removing the field from the motor housing.

m. If the field (41, fig. 1-3) must be removed, proceed as follows:

(1) Remove the two screws (34) that secure the foot switch (33) to the motor housing; disconnect the remaining headlight lead and the field lead from the terminal at the side of the switch as shown in figure 1-50.

(2) Remove the screw and nut (43, fig. 1-3) that secure the wire tubing clamp (42) and the field in the motor housing.

(3) Pull the headlight wires and insulating tubing from the motor housing as shown in figure 1-51.

(4) On models 516 through 518, remove the field U-clips (44, fig. 1-3) from the brush holders,using long-nose pliers.

(5) Remove the remaining screw and nut (43) that secure the field in the motor housing; pull the field from the motor housing as shown in figure 1-52.

(6) Remove the insulating tube (36, fig. 1-3) from the field leads.

n. If the motor housing is cracked or damaged and requires replacement, remove the headlight cap as directed in paragraph 1-16c and carefully pull the motor housing vent rubber (47) from the motor housing casting.

1-20. INSPECTION AND REPAIR. Inspect and repair the parts in the same manner as directed in paragraph 1-10.

1-21. REASSEMBLY (Models 516 through)*

a. If removed, position the motor housing vent rubber (47, fig. 1-3) around the ventilating outlet on the side of the motor housing casting so that the ends are against the flange and the self-sticking surface is against the surface of the motor housing as shown in figure 1-53. If the headlight cap was removed, install the headlight cap on the new motor housing casting as directed in paragraph 1-16c(5).

b. Install the field (41, fig. 1-3) as follows:

(1) Position the insulating tube (36) on the two long leads of the field. If damaged, install new U-clips (44) (models 516 through 518), or new terminal clips (9, fig. 1-4) (models 519 and later) on the short leads of the field.

(2) Align the field so that the longer leads with the insulating tube on them will extend out the hole of the motor housing adjacent to the foot switch and the two holes of the field

Figure 1-53. Installing vent rubber on motor housing.

* For current models.

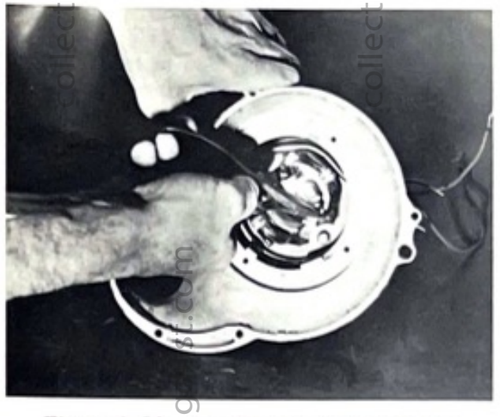


Figure 1-54. Installing field U-clips on brush holders

are aligned with the threaded holes of the housing (see figure 1-52); slide the field into place.

(3) Install the headlight socket and wire (38, fig. 1-3) so that the portion with the insulating tube extends through the hole at the top and out the hole at the side of the motor housing casting and the socket is at least six inches from the hole at the top.

(4) Position the wire tubing clamp (42) to secure the headlight insulating tube and align with the field mounting hole. Install the nuts on the field mounting screws (43) (not used on models 519 and later); insert the screws through the field and tighten until snug. Where used, turn the nuts down on the screws with a pliers until tight against the field.

(5) On models 516 through 518, use long-nose pliers to position the field U-clips on the brush holders as shown in figure 1-54. Make sure that the leads are positioned so there will be no interference with the armature.

(6) Position the field leads and insulating tube as shown in figure 1-55. Connect the shorter field lead and one of the headlight leads to the terminal at the side of the foot switch (see figure 1-49). Position the foot switch over the insulating tube on the motor housing casting so that the prongs extend to

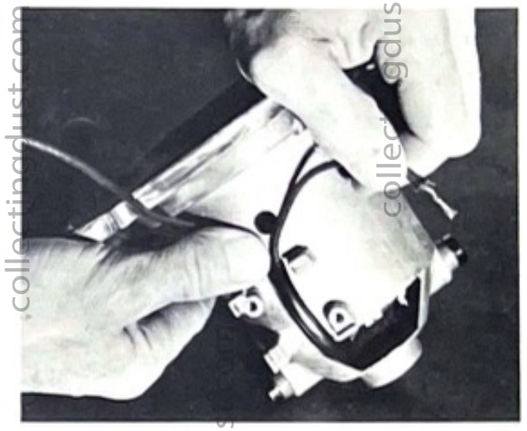


Figure 1-55. Positioning field leads and insulating tube

the rear; secure with the two screws (34, fig. 1-3).

c. Position the rear bearing finger spring (48), with the fingers upward, and the grease retaining washer (49) in the bore at the rear of the motor housing casting.

d. Install the rear bearing (50) after it has been repacked with grease, with the open side

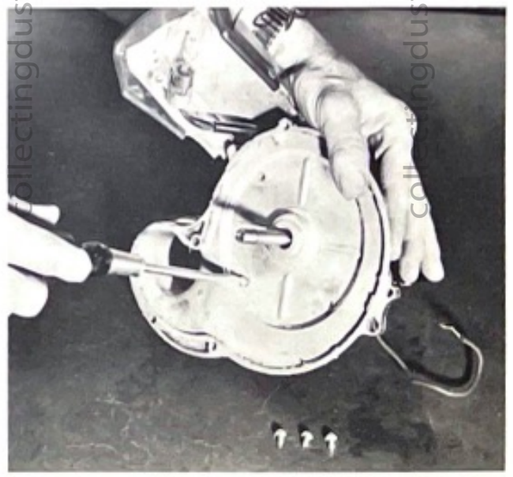


Figure 1-56. Installing front bearing plate screws

Figure 1-57. Installing seal O-ring on fan housing

outward, on the commutator end of the armature shaft, using a hammer and discarded fan pulley to drive it into place as shown in figure 1-23.

e. Position the assembled armature and rear bearing into the motor housing through the field so that the rear bearing seats in the bore against the grease-retaining washer; make sure that there will be no interference between the armature and field leads.

f. Position the felt washer (72, fig. 1-3) in the front bearing plate (71); install the thrust washer (73) with the bent tabs against the felt washer. After cleaning and repacking with special high consistency grease, position the front bearing (74) on the front bearing plate so the open side is toward the thrust washer; press the front bearing firmly into place as shown in figure 1-24. In models where used, or if the bearing is not a tight fit in the bearing plate, install a corrugated strip (52, fig. 1-3) so that the notch engages with slot in bearing well of bearing plate before installing the front bearing.

g. Position the assembled front bearing plate and bearing over the armature shaft and align with the holes of the motor housing casting; secure with the four screws (54, fig. 1-3) as shown in figure 1-56.

h. Install the commutator brushes as directed in paragraph 1-17a(5) and (6) or 1-17b(5) through (7).

i. Insert a fan locking pin (T104) or an ice pick through the ventilating hole of the motor housing and through the hole of the armature shaft to hold the armature from turning (see figure 1-14); turn the fan and pulley (55, fig. 1-3) in a counterclockwise direction until secure on the armature shaft.

j. Assemble the fan housing as follows:

(1) Position the nozzle lock (68) and spring (67) on the fan housing (69); secure with the screw (66). Rivet over the inside end of the screw to prevent it from loosening in the fan housing.

(2) Clean out the groove of the fan housing. Use a good grade of rubber cement to secure the seal O-ring (60) in the groove as shown in figure 1-57.

(3) Position the spring (59, fig. 1-3) in the hole of the ratchet lock (58). Hold the ratchet lock and spring in the slot at the side of the fan housing with the teeth outward; position the front wheel bracket shaft (63) to engage the teeth of the ratchet lock and the slot at the bottom of the fan housing. Secure with the two clamps (64) and screws (65).

k. Carefully scrape any old cement from the sealing surfaces of the fan housing and the motor housing casting. Apply the special fan housing sealer cement (A134856), which we can supply, to the rim of the fan housing as shown in figure 1-58. Position the fan housing on the motor housing so that the alignment pins enter the holes; secure with the four screws (46, fig. 1-3) installed from the rear, and the one screw (57), installed from the front, which is below the headlight cap.

l. Install the safety switch as directed in paragraph 1-15c.

m. Position the housing shell section (22) on the assembled motor housing and fan housing; secure with the three screws (23) (see figure 1-37).

n. Align the foot switch button (32, fig. 1-3) with the opening in the housing shell and the foot switch and push into place.

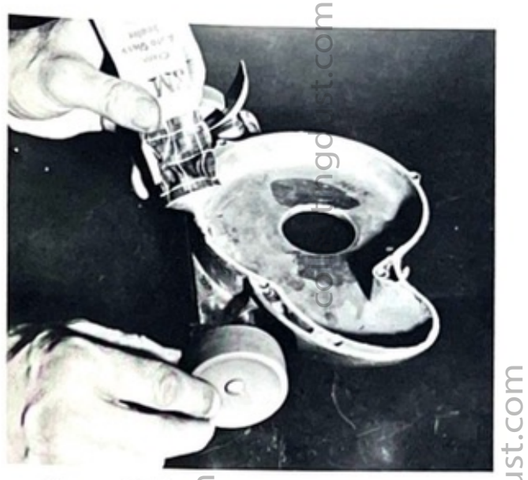


Figure 1-58. Applying sealer cement to rim of fan housing

o. Check the motor unit for proper operation as directed in paragraph 1-2.

1-22. HANDLE SPRING REPLACEMENT (Models 516 through)*

a. Disassembly.

(1) Remove the housing shell as directed in paragraph 1-19a.

(2) If the spring is not broken, it is first necessary to relieve the tension from the handle spring. Remove the spring bushing clip (12, fig. 1-3). Engage the pin of the spring tool (SP123) with one of the slots on the outer surface of the spring bushing (13) as shown in figure 1-59. Hold tension on the spring tool and pry the bushing to the side far enough to allow the spring yoke (8, fig. 1-3) to be disengaged from the spring bushing; turn the spring tool to relieve the tension.

(3) Remove the screw (9) from the spring bushing as shown in figure 1-60 and remove the spring clip (10, fig. 1-3) from the spring shaft.

(4) Pull the spring bushing, spring yoke,

* For current models.

Figure 1-59. Using handle spring tool (SP123)

fiber washer (7), spring shaft (11), and handle spring (14) from the housing shell (1).

(5) Remove the screw (17) and the spring spreader (16) from the housing shell.

(6) If the bushings (6 or 18) are damaged or excessively worn, press them from the housing shell. Be sure that the housing shell is properly supported to prevent cracking or breaking it.

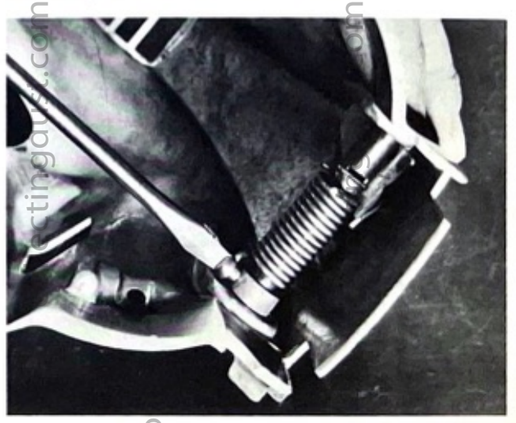


Figure 1-60. Removing screw from spring bushing

(7) If any of the handle lock parts require replacement, the handle lock should be disassembled at this time as directed in paragraph 1-23.

b. Inspect the parts for cracks, distortion, or excessive wear. Replace all unserviceable parts.

c. Reassembly.

(1) Position the spring spreader (16) in the housing shell (1); secure with the screw (17).

(2) If the bushings (6 and 18) were removed, press new bushings into place so that they are flush with the outside edge of the housing shell.

(3) Slide the spring shaft (11) into the spring shaft bushing (13) as shown in figure 1-61 so that the screw holes are aligned one over the other.

(4) Position the spring yoke (8, fig. 1-3) and fiber washer (7) on the assembled spring shaft and bushing as shown in figure 1-62.

(5) Position the handle spring (14, fig. 1-3) in the housing shell so that it is aligned with the spring shaft bore and the straight end is on the side toward the small bushing; insert the spring shaft and assembled parts through the large bushing and through the spring.

(6) Check that the screw holes of bushing and spring shaft are still in alignment; install

Figure 1-61. Installing bushing on spring shaft

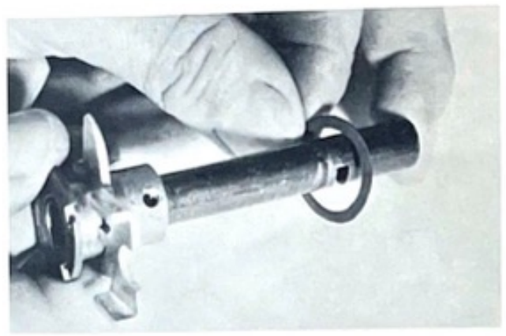


Figure 1-62. Installing yoke and washer on spring shaft

the shouldered screw (9) (see figure 1-60). Hook the looped end of the handle spring on the shouldered screw.

(7) Engage the pin of the spring tool (SP123) with one of the slots on the outer surface of the bushing as shown in figure 1-59. Rotate the bushing until the lip of the spring yoke can be engaged in the second or third slot of the bushing. This is determined by the amount of tension desired. Push the bushing all the way in and lock in place by installing the spring bushing clip (12, fig. 1-3) inside the housing shell.

(8) Install the spring clip (10) on the spring shaft so that the flat side of the clip is in the slot of the spring shaft.

(9) Install the housing shell and foot switch button as directed in paragraph 1-21m and n.

1-23. HANDLE LOCK REPLACEMENT (Models 516 through)*

a. Models 516 through 518.

(1) Disassemble the handle spring as directed in paragraph 1-22a.

(2) Use long-nose pliers to pull the retainer pin (3, fig. 1-3) from the handle lock button (2) as shown in figure 1-63; remove the handle lock button.

* For current models.

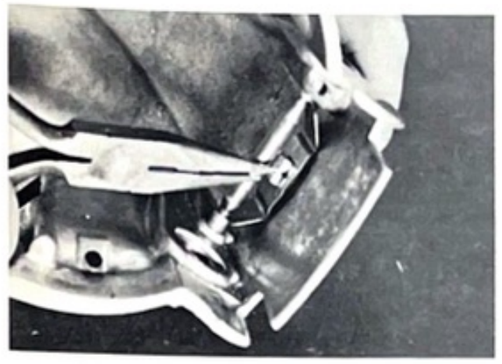


Figure 1-63. Removing handle lock button pin

(3) Remove the lock button spring (15, fig. 1-3) and slide the lock shaft (4) out of the housing shell.

(4) Replace any broken or defective parts.

(5) Slide the lock shaft (4) into the housing shell so that the end with the greater length from the recess to the end is toward the side of the housing shell which has the opening for the foot switch.

(6) Position the lock button spring (15) so that the ends engage the recesses of the lock shaft and the hole is aligned with the opening for the handle lock button.

(7) Insert the handle lock button (2) through the housing shell and lock button spring; press down on the spring with a screw driver and insert the retaining pin (3) through the handle lock button.

(8) Check that the lock shaft moves without excessive binding and that it extends out on the side toward the switch button hole.

(9) Reassemble the handle spring as directed in paragraph 1-22c.

b. Models 519 through ( )*

(1) Remove the housing shell and foot switch button as directed in paragraph 1-19a.

* For current models.

(2) Remove the handle lock spring (4, fig. 1-4) by inserting a screwdriver under the handle spring and pulling the handle lock spring out.

(3) Move the handle lock button (1) to align with the hole and remove it from the housing shell (3); slide the handle lock shaft (2) from the hole of the housing shell.

(4) Replace any broken or defective parts.

(5) Insert the handle lock shaft (2) into the hole of the housing shell so that the flat end is toward the opening for the foot switch button and the small hole in the shaft is toward the opening for the handle lock button.

(6) Install the handle lock button (1) through the top of the housing shell so that the pin engages the hole of the handle lock shaft. With the dimpled depressions toward the housing shell as shown in fig. 1-64, slide the handle lock spring (4, fig. 1-4) through the lock button to retain it.

(7) Check that the handle lock shaft moves without excessive binding and that it extends out of the housing shell on the side toward the foot switch button hole.

(8) Install the housing shell and foot switch button as directed in paragraph 1-21m and n.

Figure 1-64. Installing handle lock spring

SECTION 2
NOZZLE GROUP

INDEX

2-1. ILLUSTRATED PARTS LIST

The exploded view illustrations and the indexed legends which follow provide identification of the nozzle group parts and give the proper relationships of associated parts as an aid to repairing the nozzle assemblies.

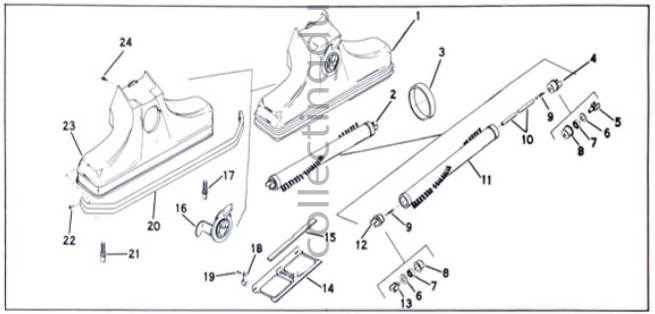


Figure 2-1. Nozzle Group (Model 505/512)

Index No.	Part No.	Part Name	Quantity
2-1-1	B1400S	Nozzle Complete,Less Brush	1
	B1400G	Nozzle Complete w/Brush and Belt	1
-2	B1482S	Floor Brush Complete	1
-3	B1590	Belt	1
-4	B1521S	Brush End Complete, Large	1
-5	B1521	Brush Yoke (Large)	1
-6	B1524	Brush Bearing Felt Washer	2
-7	B1522	Brush Bearing	2
-8	B1523	Brush Bearing Cup	2
-9	B1501	Brush Shaft Groove Pin	2
-10	B1500	Brush Shaft	1
-11	B1482	Floor Brush Shell Only	1
-12	B1520S	Brush End Complete, Small	1
-13	B1520	Brush Yoke (Small)	1
-14	B1420S	Rug Plate (Includes 2 of item 15)	1
-15	B1422	Rug Plate Felt Strip	2
-16	B144356S	Belt Lifter	1
-17	B1461S	Brush Adjusting Screw (Large)	1
-18	B1423	Rug Plate Hinge	2
-19	B1864	Rug Plate Hinge Rivet	2
-20	B1401	Nozzle Bumper (Replace with B1404)	1
-21	B1463S	Brush Adjusting Screw (Small)	1
-22	B1402	Rivet (Replace with B1405 and B1408)	2
-23		Nozzle Casting	1
-24	B1430	Belt Lifter Stop Screw	1

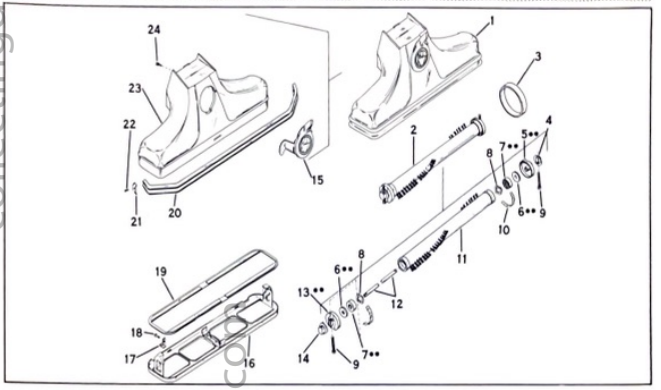
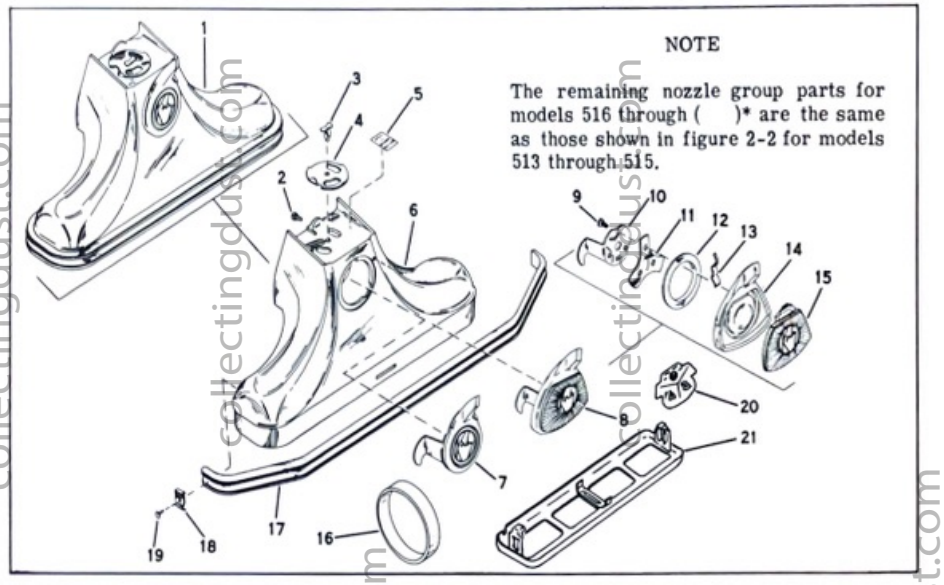


Figure 2-2. Nozzle Group (Models 513 through 515)

Index No.	Part No.	Part Name	Quantity
2-2-1	B1403S	Nozzle Complete Less Brush	1
	B1403G	Nozzle Complete w/Brush and Belt	1
-2	B1551S	Floor Brush Complete ( )*	1
-3	B1590	Belt	1
-4	B1539	Brush End Plastic Cap (Small) ( )*	1
-5	**	Brush End (Small)	1
-6	**	Brush Bearing Felt Washer	1
-7	**	Brush Bearing	1
-8	B1534	Brush Bearing Wave Washer ( )*	2
-9	B1543	Brush Adjusting Screw 1 inch (Model 513 only)	2
	B1541	Brush Adjusting Screw 1-3/8 inch (Models 514/)*	2
-10	B1533	Brush Bearing Corrugated Strip ( )*	2
-11	B1551	Floor Brush Shell Only ( )*	1
-12	**	Brush Shaft	1
-13	**	Brush End (Large)	1
-14	B1540	Brush End Plastic Cap (Large) ( )*	1
-15	B144356S	Belt Lifter	1
-16	B1526S	Rug Plate (Includes item 19)	1
-17	B1547	Rug Plate Hinge ( )*	2
-18	B1545	Rug Plate Hinge Rivet ( )*	2
-19	B1548	Rug Plate Plastic Gasket ( )*	1
-20	B1404	Nozzle Bumper Red Plastic ( )*	1
-21	B1405	Nozzle Bumper End Clamp ( )*	2
-22	B1408	Nozzle Bumper End Rivet ( )*	2
-23		Nozzle Casting	1
-24	B1430	Belt Lifter Stop Screw	1

( )* For current models.
** These parts are not available for service.



NOTE

The remaining nozzle group parts for models 516 through ( )* are the same as those shown in figure 2-2 for models 513 through 515.

Figure 2-3. Nozzle Group (Models 516 through)*

Index No.	Part No.	Part Name	Quantity	Models
2-3-1	B159556S	Nozzle Complete Less Brush	1	516/519
	B159556G	Nozzle Complete w/Brush & Belt	1	516/519
	B159560S	Nozzle Complete Less Brush	1	560/( )*
	B159560G	Nozzle Complete w/Brush & Belt	1	560/( )*
-2	B1430	Belt Lifter Stop Screw	1	505/519
	B143060	Belt Lifter Stop Screw	1	560/( )*
-3	B143256	Air Adjusting Plate Fastener	1	516/( )*
-4	B143156	Air Adjusting Plate	1	516/( )*
-5	B143356	Air Adjusting Label	1	516/( )*
-6		Nozzle Casting	1	
-7	B144356S	Belt Lifter	1	505/519
-8	B144360S	Belt Lifter Complete	1	560/( )*
-9	B134157	Belt Lifter Screw	3	560/( )*
-10	B144260	Belt Lifter Cap Hook	1	560/( )*
-11	B144160	Belt Lifter Cap Spring	1	560/( )*
-12	B145460	Belt Lifter Cap Bearing	1	560/( )*
-13	B145560	Belt Lifter Cap Insert Clip	1	560/( )*
-14	B144060	Belt Lifter Cap Casting	1	560/( )*
-15	B145260	Belt Lifter Cap Plastic Insert	1	560/( )*
-16	B159056	Belt	1	516/( )*
-17	B1404	Nozzle Bumper	1	513/( )*
-18	B1405	Nozzle Bumper End Clamp	2	513/( )*
-19	B1408	Rivet	2	513/( )*
-20	B144960	Belt Lifter Cap Label	1	560/( )*
-21	B154456S	Rug Plate With Plastic Gasket	1	560/( )*

( )* For current models

SERVICE INSTRUCTIONS

2-2. NOZZLE AND BRUSH ADJUSTMENTS

a. Inspect nozzle and adjust as follows:

(1) Inspect the nozzle to be sure that the two lugs that fit over the nozzle attaching shaft are not broken or badly distorted. These lugs cannot be repaired; if defective, the nozzle must be replaced.

(2) Install the nozzle on the motor unit and lock in place with the nozzle lock.

(3) With nozzle in position, test for loose fit by placing one hand at each end as shown in figure 2-4; check if the nozzle can be rocked back and forth. If the nozzle can be moved, it will allow air to leak. Tap the casting at a point above the notch with a small blunt chisel as shown in figure 2-5 to tighten.

(4) With the nozzle installed as in (2) above, set the unit on a flat surface; push down on both ends of the nozzle to determine if it lies flat on the surface along its entire length. If one side is higher, remove the nozzle and tap the opposite side of the nozzle casting as shown in figure 2-5 to level it.

Figure 2-4. Checking nozzle for looseness

Figure 2-5. Tap casting as indicated to tighten or level

b. Brush adjustment (Models 505 through 512)

(1) Make sure that the large brush adjusting screw (17, fig. 2-1) is correctly installed in the end of the nozzle toward the foot switch of the motor housing.

NOTE

If the brush is incorrectly installed the belt will ride on the bristles and damage the brush.

(2) Place a straightedge across the nozzle opening as shown in figure 2-6 and press it down firmly against the nozzle casting to determine how far the bristles of the brush protrude. The proper setting is for the bristles to protrude 1/16 inch below the mouth of the nozzle.

(3) Turn the adjusting screws counterclockwise to raise the brush or clockwise to lower

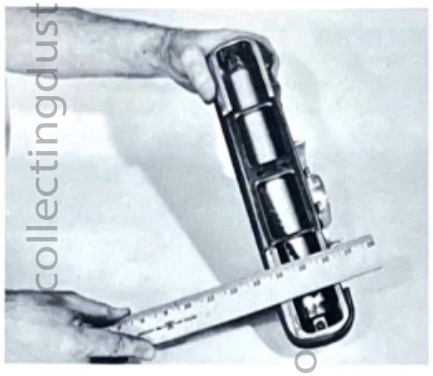


Figure 2-6. Checking nozzle brush protrusion

the brush. Check and adjust at each end of the nozzle to secure the proper adjustment. A new brush should be installed when the bristles are worn too short to make further adjustment practical.

c. Brush adjustment (Models 513 through).*

(1) Place a straightedge across the nozzle opening to determine the protrusion of the brush bristles as shown in figure 2-6. The proper setting is for the bristles to protrude 1/16 inch below the mouth of the nozzle.

(2) Turn the adjusting screws clockwise to raise the brush or counterclockwise to lower the brush. Check and adjust the brush at each end of the nozzle to secure the proper adjustment. A new brush should be installed when the old one is worn too short to make adjustment practical.

2-3. BRUSH REPLACEMENT

a. Brush replacement (Model 505 through 512)

(1) Pull on the rug plate (14, fig. 2-1) to unfasten the clip that secures it at the front of the nozzle (23); turn the rug plate out of the way.

* For current models

(2) Pull the brush assembly (2) from the rubber bushings of the adjusting screws (17 and 21) and remove from the nozzle. Remove the belt (3) from the brush.

(3) Support the end of the brush with a spacer that has a larger inside diameter than the outside diameter of the bearing cup (11). Drive the brush shaft groove pin (9) through the brush yoke (5 or 13) at the opposite end of the brush, using a small diameter punch; remove the assembled brush end, shaft, and groove pins from the brush shell (11). Pry the remaining brush end from the brush shell. Examine the parts; if all are serviceable, install on the new brush shell as directed in steps (5) and (6) below.

(4) If the brush yokes or brush bearings (7) are damaged, remove the yoke, brush bearing, and felt washer (6) from the bearing cups (8) and replace the defective parts or replace with a complete brush end.

(5) Install the large brush end on the end of the brush shell that has the group with six tufts of bristles. Install a grooved pin (9) on each end of the brush shaft (10).

(6) Position the assembled brush shaft, and pins, so that it aligns with the hole of the large brush yoke on the brush shell. Align the yoke of the small brush end with the yoke of the large brush end and the brush shell; press the parts together. Check that the brush rotates on the shaft without binding.

(7) If the brush adjusting screws (17 and 21) are damaged, remove them from the nozzle casting (23).

(8) If the adjusting screws will not turn freely in the casting, use a 1/4 inch-28 thread tap (available at your local hardware store) to clean the threads of the casting.

(9) Install the large brush adjusting screw (17) into the hole of the nozzle casting that is on the foot switch side when the nozzle is installed on the motor unit and the small brush adjusting screw (21) into the hole on the opposite side.

(10) Position the belt (3) over the brush and align the brush with the adjusting screws;

push firmly into place. Close the rug plate and adjust the brush as directed in paragraph 2-2b.

b. Brush replacement (Models 513 through).*

(1) Pull the front edge of the rug plate (16, fig. 2-2) to open. Pry the ends of the rug plate open far enough to remove the brush assembly (2, fig. 6); remove the brush assembly and belt (3).

(2) Remove the adjustment screw (9) from each of the brush ends (5 and 13). Remove the small plastic cap (4) and large plastic cap (14). Pull the assembled brush end, felt washer (6), and bearing (7) from one end of the shaft (12); pull the shaft and remaining brush end from the brush shell (11). Remove the two wave washers (8) and corrugated strips (10) from the brush shell.

(3) Inspect the parts for damage or the bearing for improper operation. If the bearings or ends are damaged, replace the complete brush. If the bearings are good, repack with grease.

(4) Position a corrugated strip (10) and wave washer (8) on each end of the new brush shell (11). Install the assembled small brush end (5), felt washer (6), and bearing (7) on the end of the brush shell that has the group with six tufts of bristles.

(5) Install the large plastic cap (14) on the assembled large brush end (13), felt washer (6) and bearing (7). Push the brush shaft (12) into the large brush end so that the holes are aligned and install the adjustment screw (9).

NOTE

The adjustment screws used on model 513 are one inch in length; on models 514 through ( )* they are 1-3/8 inches in length.

(6) Install the assembled large brush end and brush shaft through the brush shell and turn the shaft to obtain the proper alignment with the small brush end already installed. Position the small plastic cap (4) over the brush end and secure the parts with the remaining adjustment screw installed from the same side as the one in the large brush end. It may be necessary to hold pressure against the parts to overcome the tension of the bearing wave washers and obtain proper engagement of the threads.

(7) Position the belt (3) over the assembled brush. Align the brush with the proper ends of the rug plate and so the heads of the screws are downward; pry the ends of the rug plate open far enough to install the brush. Close the brush plate and adjust the brush as directed in paragraph 2-2c.

2-4. BELT LIFTER REPLACEMENT

a. Remove the belt lifter stop screw (2, fig. 2-3) through the hole at the back of the nozzle as shown in figure 2-7.

b. Rotate the belt lifter (7 or 8, fig. 2-3) to align the flanges with the slots of the nozzle casting (6); remove the belt lifter.

c. Disassemble the Model 560/( )* belt lifter by removing the three screws (9); remove the hook (10), spring (11), and bearing (12). Pull the clip (13) from the cap casting (14) and push out the plastic insert (15). Reassemble in the reverse order, taking care that the flanged side of the bearing is toward

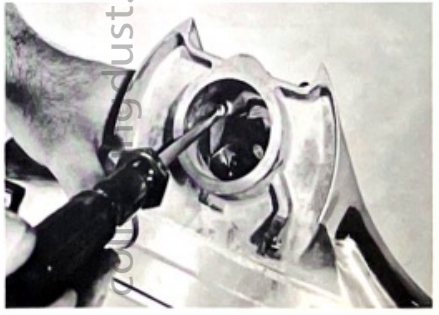


Figure 2-7. Removing belt lifter stop screw

* For current models.

the cap casting, the narrow flange of the spring is upward, and the hook is pointing downward. Reinstall the insert clip, using a belt lifter tool (page xii).

d. Engage one edge of the belt lifter, align the flanges with the slots, and push into place.

e. Turn the belt lifter to the side so that the hole for the stop screw (2) is clear; install the stop screw from the rear of the nozzle.

2-5. RUG PLATE REPLACEMENT

a. Rug plate replacement (Models 505/512).

(1) Remove the nozzle from the motor unit; remove the brush from the nozzle as directed in paragraph 2-3a(1) and (2).

(2) Pry up the two rug plate hinges (18, fig. 2-1) just far enough to slide the rug plate (14) off; remove the rug plate. If the hinges are cracked or loose, drill out the rivets (19) and remove the hinges.

(3) If damaged, remove the two felt strips (15) from the rug plate; cement two new felt strips in place on the rug plate.

(4) Install the rug plate on the hinges and bend the hinges back into place; secure against the nozzle casting. If the hinges were removed, hook the new hinges (18) through the rug plate and nozzle casting; secure each with a rivet (19) installed with the head outside the casting.

(5) Install the brush as directed in paragraph 2-3a(10).

b. Rug plate replacement (Models 513/).*

(1) Remove the nozzle from the motor unit; remove the brush from the rug plate as directed in paragraph 2-3b(1).

(2) Bend the two hinges (17, fig. 2-2) open far enough to remove the rug plate (16).

(3) If the hinges are cracked, broken, or loose, drill out the rivets (18) and remove the hinges. Position the new hinges and rivet securely with the heads of the rivets on the outside of the nozzle casting (23).

(4) Align the plastic gasket (19) with the rug plate and cement securely in place.

(5) Engage the rug plate with the two hinges on the nozzle casting; bend the ends of the hinges down even with the edge of the casting to retain the rug plate.

(6) Install the brush on the rug plate as directed in paragraph 2-3b(7).

2-6. BELT LIFTER REPAIR (560). Replace the belt lifter insert clip with a tool you can make yourself from an old screwdriver. Grind it to shape as in fig. 2-8 and use as in fig. 2-9.

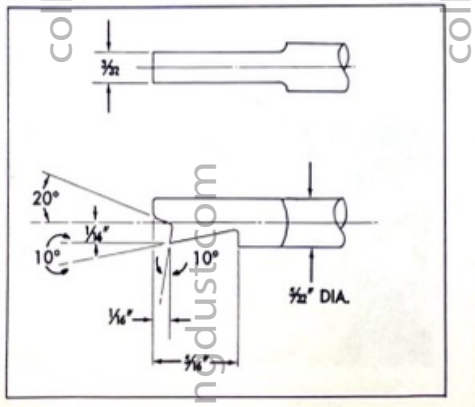


Figure 2-8. Belt lifter tool dimensions

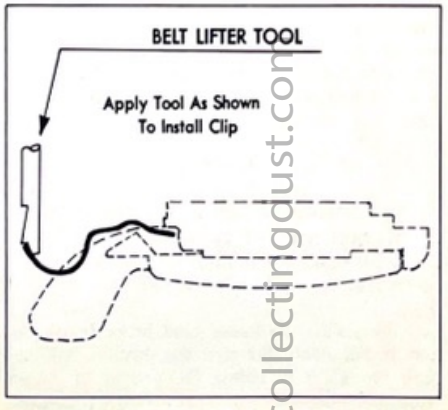


Figure 2-9. Belt lifter tool in use

* For current models.

SECTION 3
HANDLE GROUP

INDEX

*For current models.

3-1. ILLUSTRATED PARTS LIST

The exploded view illustration and the indexed legend which follows provides identification of the handle group parts and give the proper relationships of associated parts as an aid to repairing the handle assemblies.

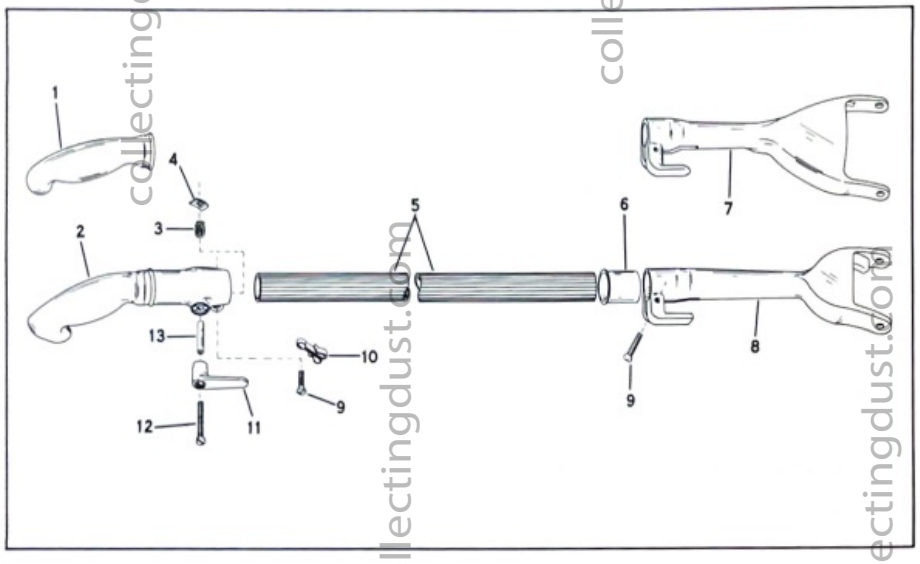


Figure 3-1. Handle Group, exploded view

Index No.	Part No.	Part Name	Quantity	Models
3-1-1	D1712	Grip, Plastic Only	1	505/513
-2		Handle Grip	1	
	D1727S	Handle Grip Complete	1	505/( )*
-3	D1706	Cord Swivel Hook Spring	1	513/( )*
-4	D1708	Cord Swivel Hook Nut	1	513/( )*
-5	D170058	Handle Tube	1	505/( )*
-6	D172159	Handle Tube Insulator Cup (Replaces D1721 and D1722)	1	505/( )*
-7	D1725S	Handle Fork	1	505/515
-8	D172556S	Handle Fork	1	516/( )*
-9	D1714	Handle Sleeve or Fork Screw	2	505/( )*
-10	D171357	Bag Loop Hook	1	505/( )*
-11	D1717	Cord Swivel Hook	1	513/( )*
-12	D1709	Cord Swivel Hook Screw	1	513/( )*
-13	D1707	Cord Swivel Hook Tube	1	513/( )*
	D1795G	Handle Complete	1	505/515
	D179556G	Handle Complete	1	516/( )*

( )* For current models

SERVICE INSTRUCTIONS

3-2. HANDLE GRIP COVERING REPLACEMENT (Models 505 through 513)

a. Remove the worn grip covering by slicing longitudinally with a sharp knife.

b. Apply a small amount of rubber cement to the end of the grip casting; quickly slide the new handle grip plastic (1, fig. 3-1) into position.

NOTE

If this operation is not performed quickly, the grip may stick part way on so that it can not be installed fully nor easily removed.

3-3. CORD SWIVEL HOOK REPAIR OR REPLACEMENT (Model 513 through).*

a. Loosen the screw (9) that secures the handle grip assembly to the handle tube (5); slide the grip assembly from the end of the handle tube.

b. Use a long nose pliers to hold the swivel hook nut (4) and remove the screw (12) as shown in figure 3-2; remove the cord swivel hook (11, fig. 3-1), nut (4), spring (3), and tube (13).

c. Inspect the parts for cracks or damage; replace unserviceable parts.

d. Position the screw (12) and tube (13) on the cord swivel hook (11). Insert the screw part way into the handle grip (2) and position the spring (3) over the end of the screw; use a long nose pliers to hold the nut (4) inside the handle grip aligned with the screw, and secure the parts.

Figure 3-2. Removing cord swivel hook

e. Install the handle grip assembly on the tube (5) and secure by tightening the screw (9).

3-4. HANDLE FORK REPLACEMENT

a. Loosen the screw (9, fig. 3-1) that secures the handle fork (7 or 8) to the tube (5); remove the handle fork and handle tube insulator cup (6).

b. Install the handle tube insulator cup (6) on the handle tube (5); position the handle fork (7 or 8) so that the cord hook is aligned with the cord swivel hook of the handle grip (2).

NOTE

The proper installation of the handle tube insulator cup is important as it is provided to protect the user from electrical shocks resulting from a grounded motor.

c. Taking care that the insulator cup is not dislodged, slide the handle fork on the handle tube; secure by tightening the screw (9).

* For current models.

SECTION 4
EMTOR GROUP

INDEX

4-1. ILLUSTRATED PARTS LIST

The exploded view illustrations and the indexed legends which follow provide identification of the emtor and bag group parts and give the proper relationships of associated parts as an aid to repairing the emtor assemblies.

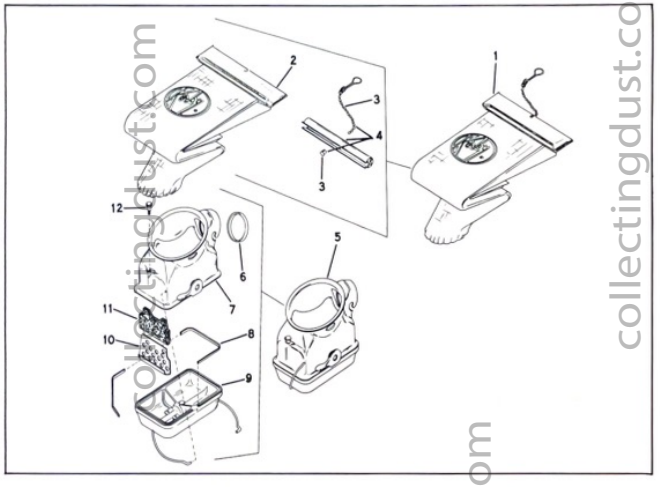


Figure 4-1. Emtor Group, exploded view (Models 505/515)

Index No.	Part No.	Part Name	Quantity	Models
4-1-1	E190058S	Bag Complete	1	505/( )*
-2	E190058	Bag Cloth	1	505/( )*
-3	E1913	Bag Chain and Loop Only	1	505/( )*
-4	E1912S	Bag Clamp w/Chain and Loop	1	505/( )*
-5	E1799G	Emtor Complete,Less Bag	1	505/515
-6	E1880	Emtor Round Rubber Gasket	1	505/515
-7	E1799S	Emtor Upper Casting	1	505/515
-8	E1861	Emtor Bottom Felt Gasket	1	505/( )*
-9	E1860S	Emtor Bottom Plastic Complete	1	505/( )*
-10	E1820	Emtor Sweet Air Felt Screen	1	505/( )*
-11	E182159	Emtor Sweet Air Felt	1	505/( )*
-12	E1823	Emtor Thumb Screw	1	505/( )*

( )* For current models

NOTE

The remaining emtor group parts for Model 516 through ( )* are the same as those shown in figure 4-1 for models 505 through 515.

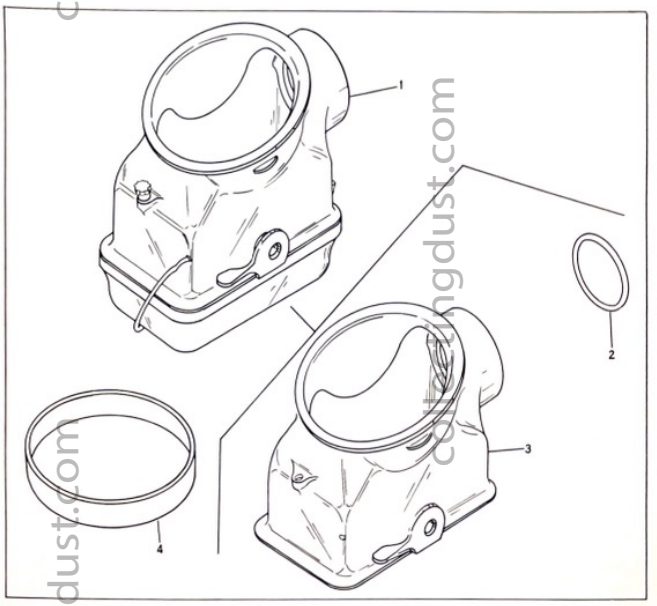


Figure 4-2. Emtor Group Parts (Model 516/)*

Index No.	Part No.	Part Name	Quantity	Models
4-2-1	E189556G	Emtor Complete,Less Bag	1	516/( )*
-2	E188056	Emtor Round Rubber Gasket	1	516/( )*
-3	E180056S	Emtor Upper Casting	1	516/( )*
-4	E1916	Bag Plastic Guard	1	505/( )*

( )* For current models

SERVICE INSTRUCTIONS

4-2. BAG REPLACEMENT

a. Remove the emtor from the motor unit.

b. Hold the emtor securely and start one edge of the bag elastic over the emtor flange and remove the bag from the emtor upper casting (7, fig. 4-1).

c. Roll the top edge of the bag flap over the bag clamp (4).

d. Slide the assembled bag clamp and chain from the bag.

e. To replace the chain and loop (3), press the chain end through the clamp and disengage the chain from the chain end. To install the chain and loop, put the chain through the top of the clamp (4); engage the chain with the chain end and pull the chain end securely into the hole of the clamp.

f. Make sure that the bag is folded so center folds meet; slide the assembled bag clamp and chain on the bag (2).

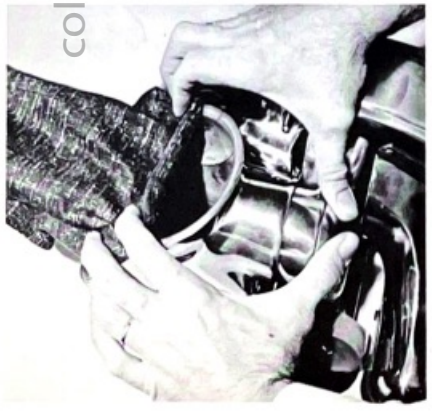


Figure 4-3. Installing bag on sani emtor

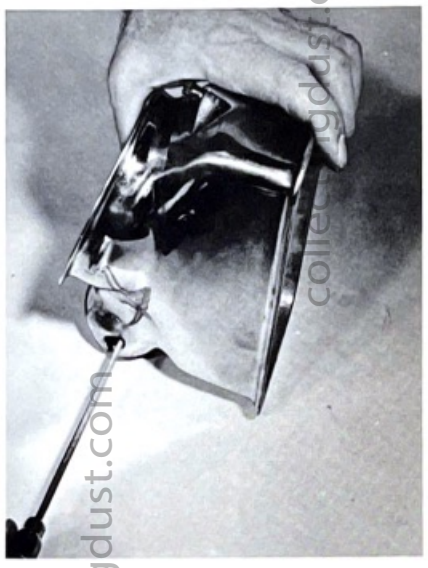


Figure 4-4. Deepening notches of emtor casting

g. Insert the chain through the slit and fold the flap over the bag clamp.

h. Rest the emtor against the edge of workbench, using the body as a support to allow the use of both hands. Stretch the bag over the emtor flange as shown in figure 4-3.

4-3. SANI EMTOR REPAIR

a. Emtor bottom plastic tray replacement.

(1) Release the tray clamp; disengage the ends of the tray support from the emtor upper casting and remove the bottom plastic tray (7, fig. 4-1).

(2) If only the felt gasket (8) is worn, pull it from the groove of the plastic tray (9). Clean the groove and cement a new felt gasket in place.

(3) Position the bottom plastic tray so that the side with the small offset is toward the clamp on the emtor upper casting; engage the two ends of the support into the holes of the upper casting.

b. Repair of loose emtor (Models 505 through 515).

(1) Remove the emtor gasket (6, fig. 4-1) from the upper casting (7).

(2) If the ears of the casting are worn, deepen the notches with a small round file as shown in figure 4-4.

(3) Use rubber cement to secure a new emtor gasket in the opening of the upper casting.

(4) Check if the emtor will now hold securely on the motor unit. If emtor is still too loose, it must be replaced.

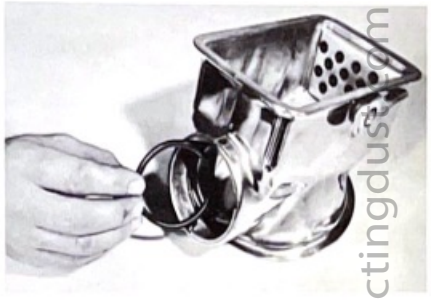


Figure 4-5. Installing gasket in sani emtor

c. Emtor gasket replacement (Models 516 through).*

(1) Remove the emtor gasket (3, fig. 4-2) from the emtor upper casting (3).

(2) Cement the new gasket in the emtor sleeve as shown in figure 4-5.

* For current models.

SECTION 5
CORD GROUP PARTS

INDEX

NOTE
The illustration and indexed legend which follow provide identification of the cord group parts.

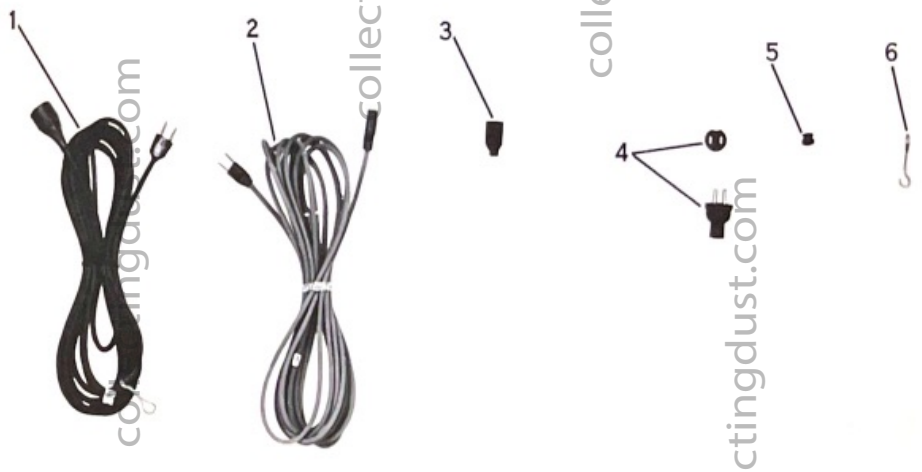


Figure 5-1. Cord Group Parts

Index No.	Part No.	Part Name	Models
5-1-1	F1920S	Cord Set	505/515
-2	F192059S	Cord Set	516/( )*
-3	F1925	Cord Connector, Flat	505/( )*
-4	F1923	Attachment Male Plug	505/( )*
-5	F1922	Cord Rubber Grommet	505/( )*
-6	F1921	Cord Wire Loop	505/( )*

( )* For current models

SERVICE INSTRUCTIONS

5-1. CORD. Failure of the unit to operate can be caused by interruption of the circuit in the cord between the wall outlet and the motor unit.

a. Inspect the cord for cuts, defective insulation, damaged or loose plug or connector.

b. If the plug or connector is damaged or burned, remove the old part from the cord, clean the leads, and install a new plug or connector.

c. Check the cord for breaks by connecting to a test lamp (see page xi) and wall outlet and flexing it as shown in figure 5-2 along its entire length.

Figure 5-2. Checking cord for breaks

d. If the insulation of the cord is damaged or if there is a break in the cord wires, the entire cord should be replaced.

SECTION 6
ATTACHMENT GROUP PARTS

NOTE
The illustration and indexed legend which follow provide identification of the attachment group parts.

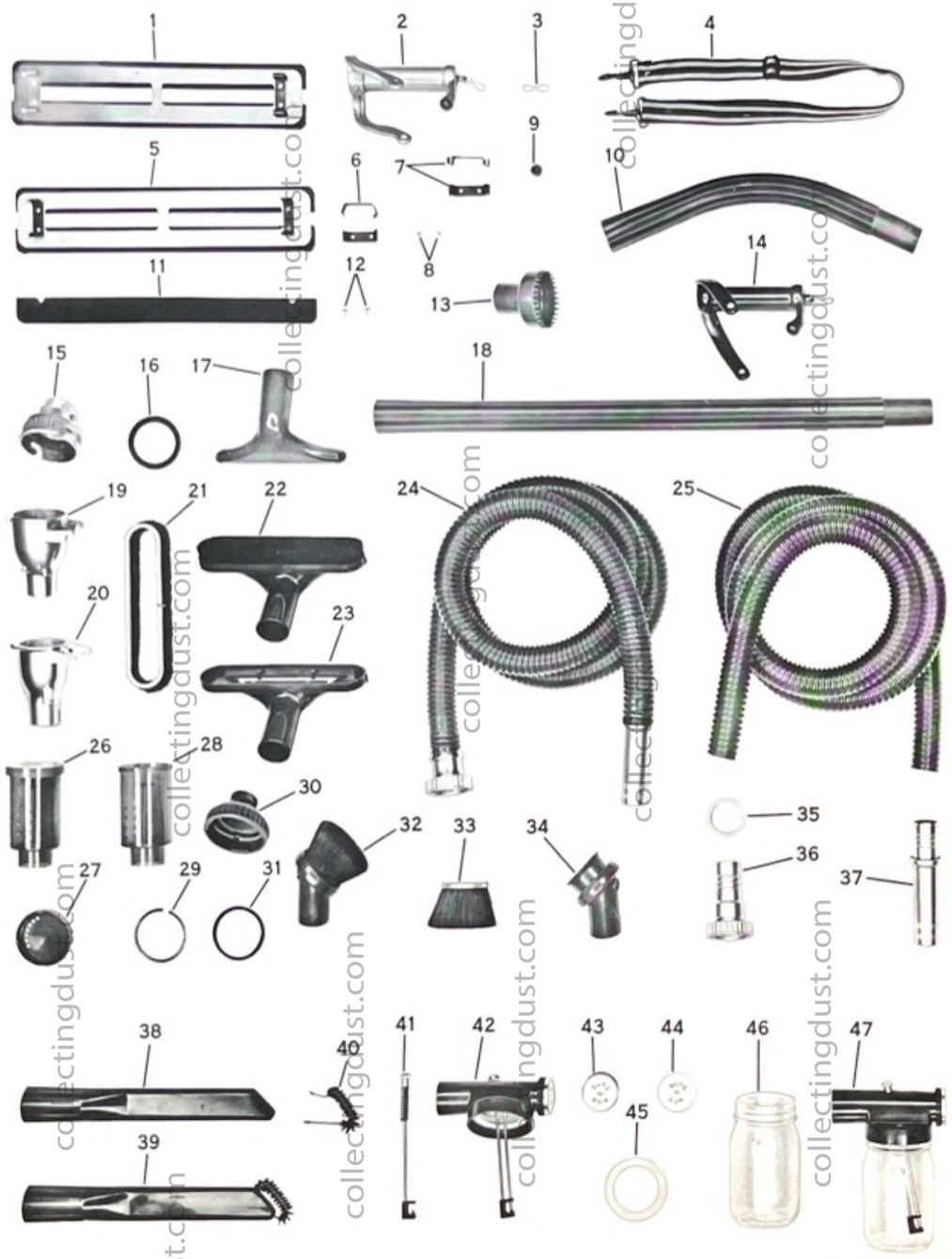


Figure 6-1. Attachment group parts

Index No.	Part No.	Part Name	Quantity	Models
6-1-1	G206056S	Floor Duster Pad Complete	1	513/( )*
-2	G2000S	Lifter Grip	1	505/515
-3	G2002	Lifter Grip 'S' Hook	1	505/( )*
-4	G2020	Shoulder Strap	1	505/( )*
-5	G206052S	Floor Duster Pad Complete	1	505/512
-6	G2061	Floor Duster Pad Clip	2	505/512
-7	G2063	Floor Duster Pad Clip	2	513/( )*
-8	G2062	Floor Duster Pad Clip Rivet	4	505/( )*
-9	G2001	Lifter Grip Pad	1	505/( )*
-10	G2250	Extension Tube, Curved, Red	1	505/( )*
-11	G2083	Floor Duster Pad Felt Strip	2	505/( )*
-12	G2084	Floor Duster Pad Felt Rivet	4	505/( )*
-13	G2141	Massage Cup Red	1	505/( )*
-14	G200056S	Lifter Grip	1	516/( )*
-15	G2120S	Blower Connection	1	505/515
-16	G1880	Blower Connection Gasket	1	505/515
-17	G2160	Utility Air Nozzle, Red	1	505/( )*
-18	G2240	Extension Tube, Straight, Red	1	505/( )*
-19	G2100	Suction Connection	1	505/515
-20	G210056	Suction Connection	1	516/( )*
-21	G2181	Upholstery Brush Strip	1	505/( )*
-22	G2180S	Upholstery Brush Complete	1	505/( )*
-23	G2180	Upholstery Brush Back, Red	1	505/( )*
-24	G223656S	Hose Complete	1	505/( )*
-25	G223056	Hose, Less Couplings	1	505/( )*
-26	G2220S	Crystalator Complete	1	505/( )*
-27	G2221	Crystalator Body Cover	1	505/( )*
-28	G2220	Crystalator Body	1	505/( )*
-29	G2222	Crystalator Cap Wave Washer	1	505/( )*
-30	G212059S	Blower Connection	1	516/( )*
-31	G188056	Blower Connection Gasket	1	516/( )*
-32	G2182S	Duster Brush Complete, Red	1	505/( )*
-33	G2201	Duster Brush Bristle Ring	1	505/( )*
-34	G2182	Duster Brush Back, Red	1	505/( )*
-35	G223456	Hose Locking Nut Ferrule	1	505/( )*
-36	G223256S	Hose Locking Nut Assembly	1	505/( )*
-37	G223356	Hose Tube Swivel Assembly	1	505/( )*
-38	G226057	Radiator Tool w/o Brush	1	505/( )*
-39	G226057S	Radiator Tool with Brush	1	505/( )*
-40	G226157	Radiator Tool Brush	1	505/( )*
-41	G2512S	Spray Gun Valve Stem	1	505/( )*
-42	G2500S	Spray Gun Top w/Sudser	1	505/( )*
-43	G2520S	Suds 'O' Gun	1	505/( )*
-44	G2522	Suds 'O' Gun Cloth Screen	1	505/( )*
-45	G2508	Spray Gun Gasket	1	505/( )*
-46	G2510	Spray Gun Jar	1	505/( )*
-47	G2500G	Spray Gun Complete	1	505/( )*

( )* For current models

SECTION 7
POWER POLISHER GROUP

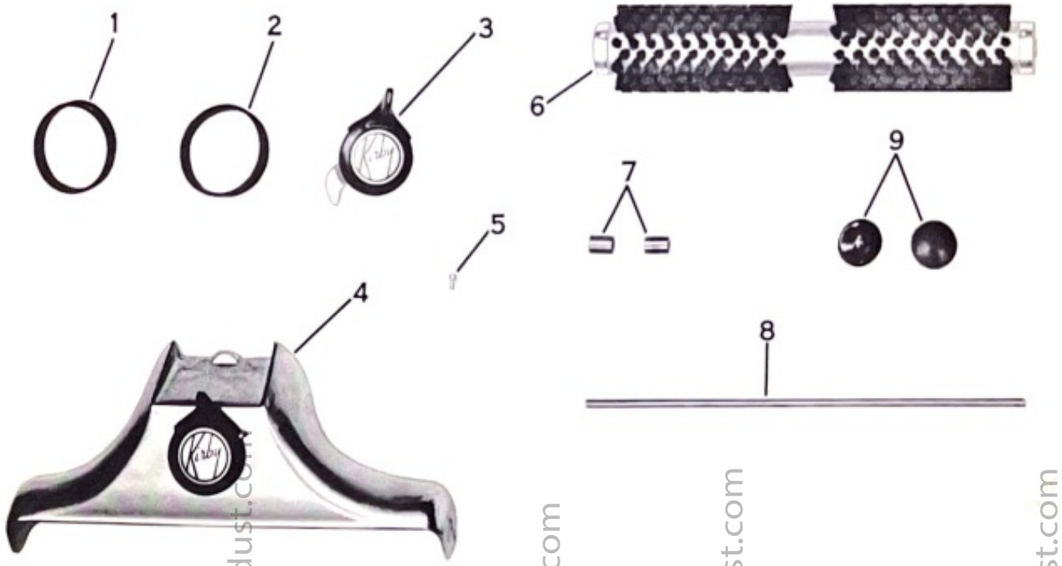


Figure 7-1. Polisher Group Parts

Index No.	Part No.	Part Name	Quantity	Models
7-1-1	H1590	Polisher Belt	1	505/515
-2	H3012	Polisher Belt	1	516/( )*
-3	H144356S	Polisher Beltlifter	1	505/( )*
-4	H300056S	Polisher Complete Less Brush	1	516/( )*
-5	H1430	Polisher Beltlifter Screw	1	505/( )*
-6	H3009	Polisher Brush	1	505/( )*
-7	H3011	Polisher Brush Bearings	1	505/( )*
-8	H3020	Polisher Brush Shaft	1	505/( )*
-9	H302156S	Polisher Bumper w/Screw,Red	2	505/( )*

( )* For current models

SECTION 8
HANDI-BUTLER GROUP

NOTE
The illustration and indexed legend which follow provide identification of the handi-butler group parts.

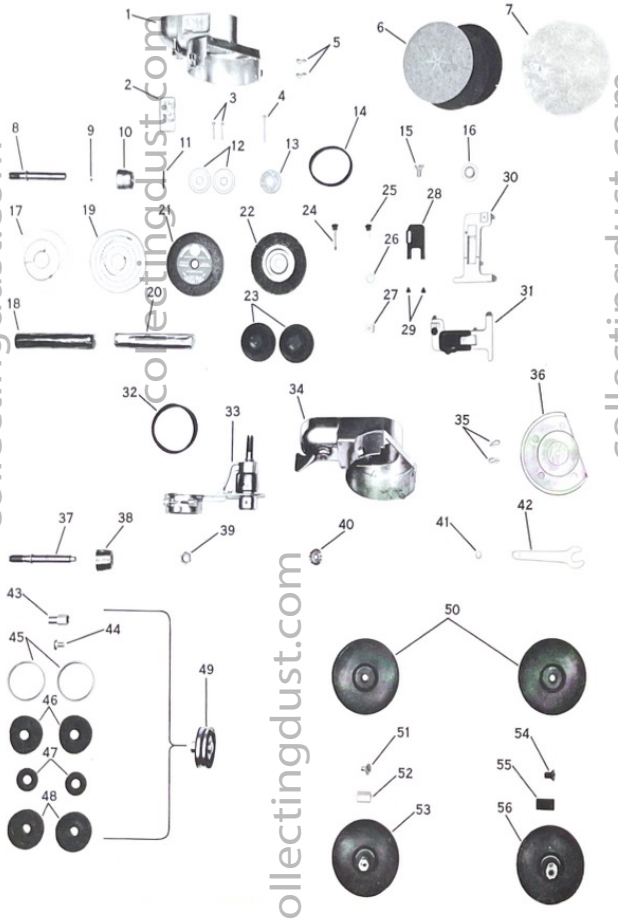


Figure 8-1. Handi-Butler, Exploded View

Index No.	Part No.	Part Name	Quantity	Models
8-1-1	K4040S	HB Body Casting	1	505/518
-2	K4060	HB Name Plate	1	505/518
-3	K4080	HB Assembly Screw, 1 inch	2	505/( )*
-4	K4081	HB Assembly Screw, 1-3/8 inch	1	505/518
-5	K4093	HB Wheel Guard Cover Clip	2	505/518
-6	K412656	HB Sand Paper, Set of 3	-	505/( )*
-7	K4140	HB Lambswool Pad	-	505/( )*
-8	K4020S	HB Jack Shaft Spindle	1	505/518
-9	K4026	HB Thrust Bearing Ball		505/518
-10	K4024	HB Jack Shaft Pulley	1	505/518
-11	K4027	HB Pulley Lock Pin	1	505/( )*
-12	K4022	HB Jack Shaft Wheel Washer	2	505/( )*
-13	K4023	HB Knurled Nut	1	505/518
-14	K1590	HB Belt	1	505/518
-15	K412556	HB Sanding Clamp Screw	1	505/518
-16	K412356	HB Sanding Clamp Washer	1	505/( )*
-17	K4200	HB Flannel Buff, Soft	-	505/( )*
-18	K4240	HB Polishing Stick - Coarse	-	505/( )*
-19	K4220	HB Sewed Sheeting Buff, Hard	-	505/( )*
-20	K4260	HB Polishing Stick - Fine	-	505/( )*
-21	K4160	HB Grinding Wheel	-	505/( )*
-22	K4180	HB Wire Wheel	-	505/( )*
-23	K428058	HB Wheel Cup Stand	2	505/( )*
-24	K4154	HB K. S. Adjusting Screw		513/518
-25	K4155	HB K. S. Clamp Screw		513/518
-26	K4157	HB K. S. Felt Washer	-	513/518
-27	K4156	HB K. S. Clamp Screw Nut		513/518
-28	K4151S	HB K. S. Adjusting Slide	1	513/518
-29	K4152	HB K. S. Carbon Inserts	2	513/518
-30	K4150	HB K. S. Aluminum Plate	1	513/518
-31	K4148S	HB Knife Sharpener Complete	1	513/518
-32	K405058	HB Belt	1	518A/( )*
-33	K400058S	HB Frame Casting	1	518A/( )*
-34	K404058S	HB Body Casting	1	518A/518A
	K404059S	HB Body Casting	1	519/( )*
-35	K409358	HB Wheel Guard Cover Clip	2	518A/( )*
-36	K409258	HB Wheel Guard Cover	1	518A/518A
	K409259	HB Wheel Guard Cover	1	519/( )*
-37	K402058S	HB Jack Shaft Spindle	1	518A/( )*
-38	K402458	HB Jack Shaft Pulley	1	518A/( )*
-39	K413558	HB Nut, LH	1	518A/( )*
-40	K402558	HB Jack Shaft End Cover	1	518A/( )*

( )* For current models

Index No.	Part No.	Part Name	Quantity	Models
8-1-41	K416158	HB Nylon Spindle Bushing	1	518A/518A
-42	K419058	HB Wrench	1	518A/( )*
-43	K413458	HB K. S. Extension Hub	1	518A/( )*
-44	K413658	HB K. S. Assembly Screw	1	518A/( )*
-45	K413258	HB K. S. Abrasive Steel Ring	2	518A/( )*
-46	K413358	HB K. S. Abrasive Disk	2	518A/( )*
-47	K413158	HB K. S. Flat Steel Washer	2	518A/( )*
-48	K413058	HB K. S. Rubber Wheel	2	518A/( )*
-49	K413058G	HB Knife Sharpener Complete	1	518A/( )*
-50	K412058	HB Rubber Disk Only		518A/( )*
-51	K412558	HB Sanding Clamp Screw,LH	1	518A/( )*
-52	K412158	HB Jack Shaft Adapter,LH	1	505/( )*
-53	K412158G	HB Rubber Disk Assembly,LH	1	505/( )*
-54	K412958	HB Adapter Screw,RH	1	518A/( )*
-55	K412858	HB Flex Shaft Adapter,RH	1	518A/518A
	K412860	HB Flex Shaft Adapter,RH	1	519/( )*
-56	K412058S	HB Rubber Disk Assembly,RH	1	518A/518A
	K412060S	HB Rubber Disk Assembly,RH	1	519/( )*

( )* For current models

SECTION 9
FLEXIBLE SHAFT GROUP

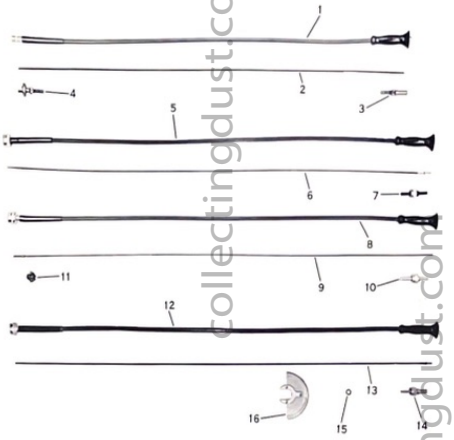


Figure 9-1. Flexible Shaft Group Parts

Index No.	Part No.	Part Name	Quantity	Models
9-1-1	M4173	Flex Shaft Casing w/Handle	1	513/518
-2	M4174	Flex Shaft Inner Core	1	513/518
-3	M4175	Flex Shaft Spindle	1	513/518
-4	M4176	Flex Shaft Motor Coupling	1	513/518
-5	M417958	Flex Shaft Casing - Plain Cup	1	518A/A
-6	M417758	Flex Shaft Core - Plain Cup	1	518A/A
-7	M417858	Flex Shaft Spindle - Dark	1	518A/A
-8	M417658	Flex Shaft Casing - Indent Cup	1	518A/A
-9	M417458	Flex Shaft Core - Indent Cup	1	518A/A
-10	M417558	Flex Shaft Spindle - Bright	1	518A/A
-11	M416958	Flex Shaft Finger Spring		518A/A
-12	M417660	Flex Shaft Casing	1	519/( )*
-13	M417460	Flex Shaft Core	1	519/( )*
-14	M417560	Flex Shaft Spindle,1/2 inch	1	519/( )*
-15	M418160	Flex Shaft Nut,1/2 inch,RH	1	519/( )*
-16	M416560S	Flex Shaft Guard Shroud	1	519/( )*

( )* For current models

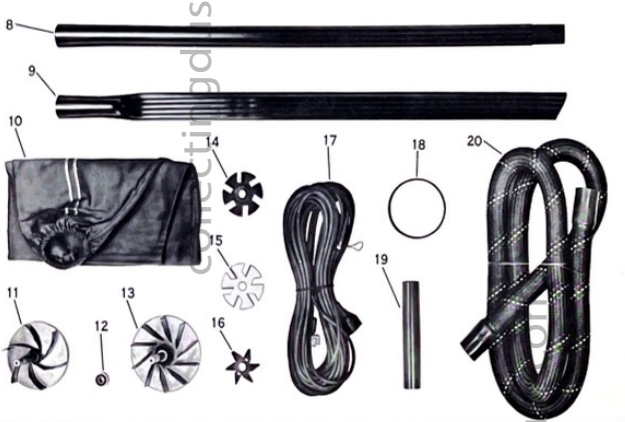
SECTION 10
SURFACE NOZZLE GROUP, SPECIAL AND OBSOLETE PARTS, AND TOOLS

NOTE

The illustration and indexed legend which follow provide identification of the surface nozzle group parts, special and obsolete parts, and tools.

Surface Nozzle

Special And Obsolete Parts



Tools

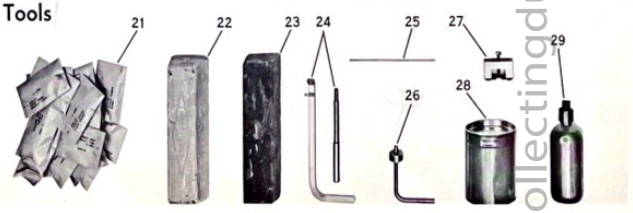


Figure 10-1. Surface nozzle group, special and obsolete parts, and tools

Index No.	Part No.	Part Name	Quantity	Models
10-1-1	N219758S	Surface Nozzle Complete w/o Elbow	1	518/( )*
-2	N227557S	Surface Nozzle Elbow Only	1	517/( )*
-3	N219557	Surface Nozzle Spring	2	517/517
-4	N219457	Surface Nozzle Screw	2	517/517
-5	N219058	Surface Nozzle Body Less Brush	1	518/( )*
-6	N219658S	Surface Nozzle Brush	1	518/( )*
-7	N219657S	Surface Nozzle Brush	1	517/517
-8	S2245	Long Straight Extension Tube,36 inch	1	
-9	S2265	Long Radiator Tool,36 inch	1	
-10	S1905	Bag Cloth	1	2C
-11	S1187	Fan and Pulley	1	2C
-12	S1161	Front Bearing	1	2C
-13	S1188	Fan and Pulley	1	3C
-14	S1148	Armature Vent Fan,W	1	
-15	S1147	Armature Vent Fan,E	1	
-16	S1146	Armature Vent Fan,WL	1	
-17	S1926	50 Foot Cord	1	
-18	S3030	Polisher Belt (Large)	1	505/505
-19	S2249	Plastic 6 inch Tube	1	2C
-20	S2229	Hose	1	2C
-21	SP128	Small Screw Assortment	1	
-22	T101	White Diamond Polishing Compound	-	
-23	T102	Tripoli Polishing Compound	-	
-24	SP124	515 or Earlier Spring Tools	-	
-25	T104	Fan Locking Pin	-	
-26	SP123	516 or Newer Spring Tool ( )*	-	
-27	SP125	Rear Bearing Puller	-	
-28	T105	One Pound Can Bearing Grease	-	
-29	T106	Bottle Plastic Cement	-	
	T103	Whiting or Dusting Powder	-	

( )* For current models