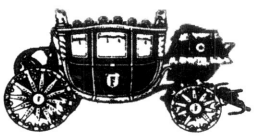
Fisher Body



1969 SERVICE MANUAL

1969 FISHER BODY SERVICE MANUAL

FOR ALL
BODY STYLES

This publication contains the essential removal, installation, adjustment and maintenance procedures for servicing all U.S. and Canadian built 1969 Fisher Body Styles. All information, illustrations, and specifications contained in this publication are based on the latest product information available at the time of publication approval. The right is reserved to make changes at any time without notice.

Arrangement of the material is shown by the table of contents on the right-hand side of this page. Black tabs on the first page of each section can be seen on the edge of the book below section title. A more detailed table of contents precedes each section, and an alphabetical index is included in the back of the manual.

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FISHER BODY DIVISION
PART NO. 8700351

LITHO IN U.S.A.
AUGUST 1968

SECTION 1

GENERAL INFORMATION

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MANUAL DESCRIPTION

INTRODUCTION

This publication contains the essential removal, installation, adjustment and maintenance procedures for servicing all 1969 Fisher Body Styles. This information is current as of time of publication approval.

INDEX

The preceding page contains a "Table of Contents" which lists the section number and subject title of each main body area section. The first page in each main body area section has an index to the subjects included in that section. An alphabetic index covering the entire manual is located in section 18.

PAGE AND FIGURE NUMBERS

All page numbers and figure numbers consist of two sets of digits separated by a dash. The digits preceding the dash identify the main body area section. The digits following the dash represent the consecutive page number or figure number within the particular body area section.

REFERENCE TABS

The first page of each section is marked with a ready-reference black tab corresponding with the table of contents page.

TEXT

Unless otherwise specified, each service procedure covers all body styles. Procedures covering specific styles are identified by the style number, body series number, body type letter or similar designation. A description of these designations is covered in this section under "Model Identification".

ILLUSTRATIONS

Where possible, illustrations are placed in close proximity to the accompanying text and should be used as part of the text.

MODEL IDENTIFICATION CHART

Division	Sales Name	Body Type	Series	Styles
Chevrolet	Chevelle Nomad	A	13200	35-36
	Chevelle "300" Deluxe	A	13400	27-35-36-37-45-46-69-80
	Chevelle Malibu	A	13600	35-36-37-39-45-46-67-69-80
	Chevelle - Concours Estate	A	13800	35-36-45-46
	Biscayne	B	15400	11-36-69
	Bel Air	B	15600	11-36-46-69
	Impala	B	16400	36-37-39-46-47-67-69
	Caprice	B	16600	36-39-46-47
	Camaro	F	12400	37-67
	Chevy Nova	X	11400	27-69
	Corvair "500"	Z	10100	37
	Corvair Monza	Z	10500	37-67
Pontiac	Tempest	A	23300	27-69
	Tempest Custom	A	23500	27-35-36-37-39-67-69
	Tempest LeMans	A	23700	27-37-39-67
	Tempest Safari	A	23900	36
	Tempest GTO	A	24200	37-67
	Catalina	B	25200	36-37-39-46-67-69
	Executive	B	25600	37-39-36-46-69
	Bonneville	B	26200	37-39-46-67-69
	Firebird	F	22300	37-67
	Grand Prix	G	27600	57
Oldsmobile	F-85	A	33200	77
	Cutlass	A	33600	35-36-39-67-69-77-87
	Cutlass Supreme	A	34200	39-69-87
	442	A	34400	67-77-87
	Custom Vista-Cruiser	A	34800	55-56-65-66
	Delta 88	B	35400	37-39-67-69
	Delta Custom 88	B	36400	37-39-69
	Delta Royale 88	B	36600	47
	Ninety Eight	C	38400	39-57-67-69
	Ninety Eight Luxury	C	38600	39-69
	Toronado	E	39400	87
	Toronado Deluxe	E	39600	87
Buick	Special Deluxe	A	43300	27-69
	Special Deluxe	A	43400	35-36-37
	Skylark	A	43500	37-69
	Skylark Custom	A	44400	37-39-67-69
	Sport Wagon	A	44400	56-66
	GS 400	A	44600	37-67
	LeSabre	B	45200	37-39-69
	LeSabre Custom	B	45400	37-39-67-69
	Wildcat	B	46400	37-39-69
	Wildcat Custom	B	46600	37-39-67
	Electra "225"	C	48200	39-57-69
	Electra "225" Custom	C	48400	39-57-67-69
	Riviera	E	49400	87

MODEL IDENTIFICATION CHART (Cont'd.)

Division	Sales Name	Body Type	Series	Styles
Cadillac.	Fleetwood Sixty Special	C	68000	69
	Fleetwood Brougham Sedan	C	68100	69
	Calais	C	68200	47-49
	DeVille	C	68300	47-49-67-69
	Fleetwood Seventy-Five	D	69700	23-33
	Eldorado	E	69300	47
GM of Canada Acadian and Beaumont	Acadian	X	71400	27-69
	Beaumont	A	73200	35-36
	Deluxe	A	73400	27-37-69
	Custom	A	73600	35-36-37-39-67-69
GM of Canada Pontiac	Strato Chief	B	75400	36-37-69
	Laurentian	B	75600	36-37-46-69
	Parisienne	B	76400	36-37-39-46-67-69
	2 + 2	B	76800	37-67
	Grande Parisienne	B	76600	36-37-39-46

MODEL IDENTIFICATION

INTRODUCTION

Due to the variety of body styles available, certain body styles have been grouped in this publication as an aid to identification. These group designations may be used individually or in various combinations. In addition to the model identification chart, an explanation of the principal categories follows:

BODY SERIES NUMBER

The body series number may be used to indicate three possibilities:

Division - first digit and four zeros (ex. 10000 Chevrolet; 20000 Pontiac).

Division and Car Line - first two digits and three zeros (ex. 33000 Oldsmobile F-85; 45000 Buick LeSabre).

Division, Car Line and Style Group - First three digits and two zeros (ex. 25200 Catalina; 25600 Executive).

BODY STYLE IDENTIFICATION

The last two digits of the body series number indicate body style type as follows:

STYLE	DESCRIPTION
11	2-Door - Notch Back - Pillar Sedan
23	4-Door - Limousine with Auxiliary Seat
27	2-Door - Notch Back - Pillar Coupe
33	4-Door - Limousine with Auxiliary Seat and Center Partition Window
35	4-Door - Station - 2 Seat - Single Acting Tailgate
36	4-Door - Station Wagon - 2 Seat - Dual Acting Tailgate
37	2-Door - Notch Back - Hardtop Coupe
39	4-Door - Notch Back - Hardtop (4 Window) Sedan
45	4-Door - Station Wagon - 3 Seat - Single Acting Tailgate
46	4-Door - Station Wagon - 3 Seat - Dual Acting Tailgate
47	2-Door - Notch Back - Hardtop Coupe
49	4-Door - Notch Back - Hardtop (4 Window) Sedan
55	4-Door - Station Wagon - 2 Seat - Single Acting Tailgate
56	4-Door - Station Wagon - 2 Seat - Dual Acting Tailgate
57	2-Door - Notch Back - Hardtop Coupe
65	4-Door - Station Wagon - 3 Seat - Single Acting Tailgate
66	4-Door - Station Wagon - 3 Seat - Dual Acting Tailgate
67	2-Door - Convertible Coupe
69	4-Door - Notch Back - Pillar (4 Window) Sedan
77	2-Door - Plain Back Pillar Coupe
87	2-Door - Plain Back - Hardtop Coupe
80	2-Door - Pick-Up Delivery

BODY STYLE NAME

Body style names are used for group classification

as follows (style numbers suffix shown in brackets):

Closed Style
- Two-door sedan (11)
- Two-door coupe (27,77)
- Four-door sedan (69)
- Limousine (23,33)

Hardtop
- Sport coupe hardtop (37, 47, 57, 87)
- Sedan hardtop (39, 49)

Station Wagon
- Station wagon two seat (35-36, less skylight; 55-56 with skylight)
- Station wagon three seat (45-46 less skylight; 65-66 with skylight)

Convertible Coupe (67)

Sedan Delivery (80)

BODY NUMBER PLATE

The body number plate identifies the model year, car division, series, style, body assembly plant, body number, trim combination, paint code and date build code (Figs. 1-1 and 1-2). On Corvair styles the body number plate is attached to the left side of the motor compartment cross rail. On Cadillac "C & D" styles, the plate is located on the left upper portion of the horizontal surface of the shroud. On all other cars, the plate is located on the left upper portion of the vertical surface of the shroud.

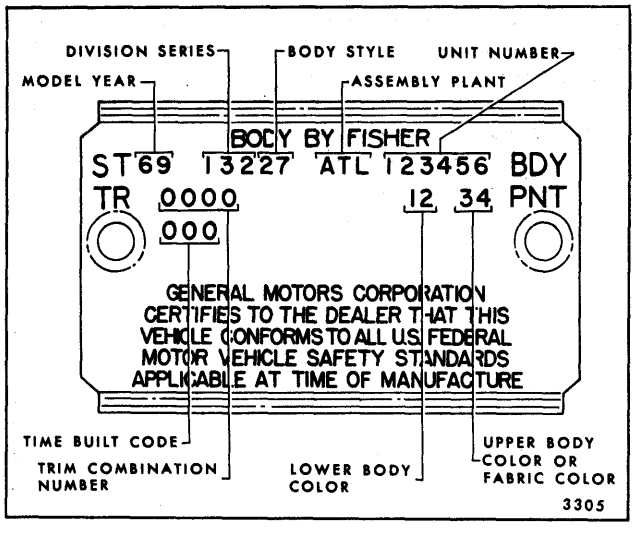

Fig. 1-1—Body Number Plate - U.S. Models

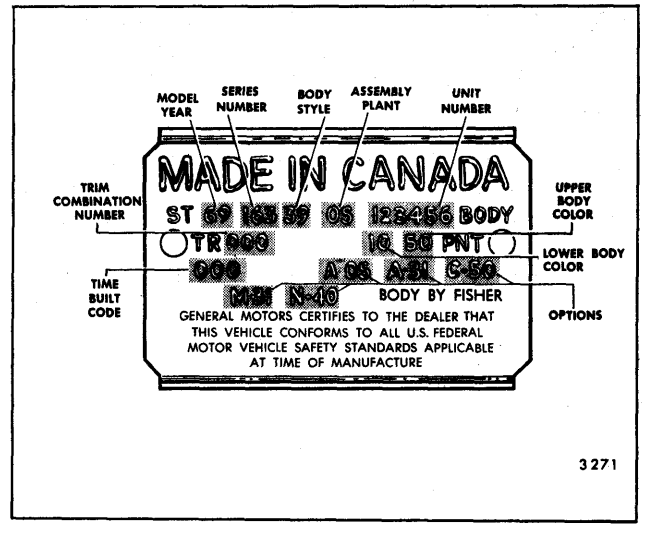

Fig. 1-2—Body Number Plate - Canadian Models

VEHICLE IDENTIFICATION NUMBER

The Vehicle Identification Number (serial number) is located on the left horizontal surface of the instrument panel which is visible from outside the car. Figure 1-3 shows a typical installation.

Fig. 1-3—Typical Vehicle Identification Number

LOCK CYLINDER CODING

FIVE BITTING LEVEL LOCK CYLINDER AND KEY

All 1969 style cars are equipped with new lock cylinders and keys. The keyway has been revised so that prior model keys will not enter current model lock cylinders.

Two non-interchangeable keyways are used on 1969 model cars. One keyway, known as type "E", is used in all ignition, front door and station wagon tail gate lock cylinders. Type "E" keys will have a square head and be marked similar to keys used for 1968 styles, except that a capital letter "E" will be located on the shank just below the coining on the head, in place of capital letter "C". In addition, a code number within the series 0J00 to 9J99, or 0K00 to 9K99 will be stamped on the knock-out portion on the keyhead. This number identifies the lock combination and is used when ordering or making new keys.

The second keyway, known as type "H", is used in the instrument panel compartment, console compartment, rear compartment, front compartment and station wagon rear floor compartment lock cylinders. Type "H" keys will have oval heads and will be similar to keys used for 1968 styles, except that a capital letter "H" will be stamped on the shank just below the coining on the head, in place of capital letter "D". In addition, a code number within the series 0L00 to 9L99, or 0M00 to 9M99 will be stamped on the knock-out portion of the key head. This number identifies the lock combination and is used when ordering or making new keys.

Key code numbers are stamped on the "knockout" plug in the key head and on the lock cylinder housing (to facilitate replacement or duplication of key). After the code number has been recorded by the owner, the plugs should be knocked out of the key head. From these numbers, the lock combination can be determined by use of a code list (available to owners of key cutting equipment from equipment suppliers). If key code numbers are not available from records or from the "knock-out" plug, lock combination (tumbler numbers and position arrangement) can be determined by laying the key on the diagram in Figure 1-4.

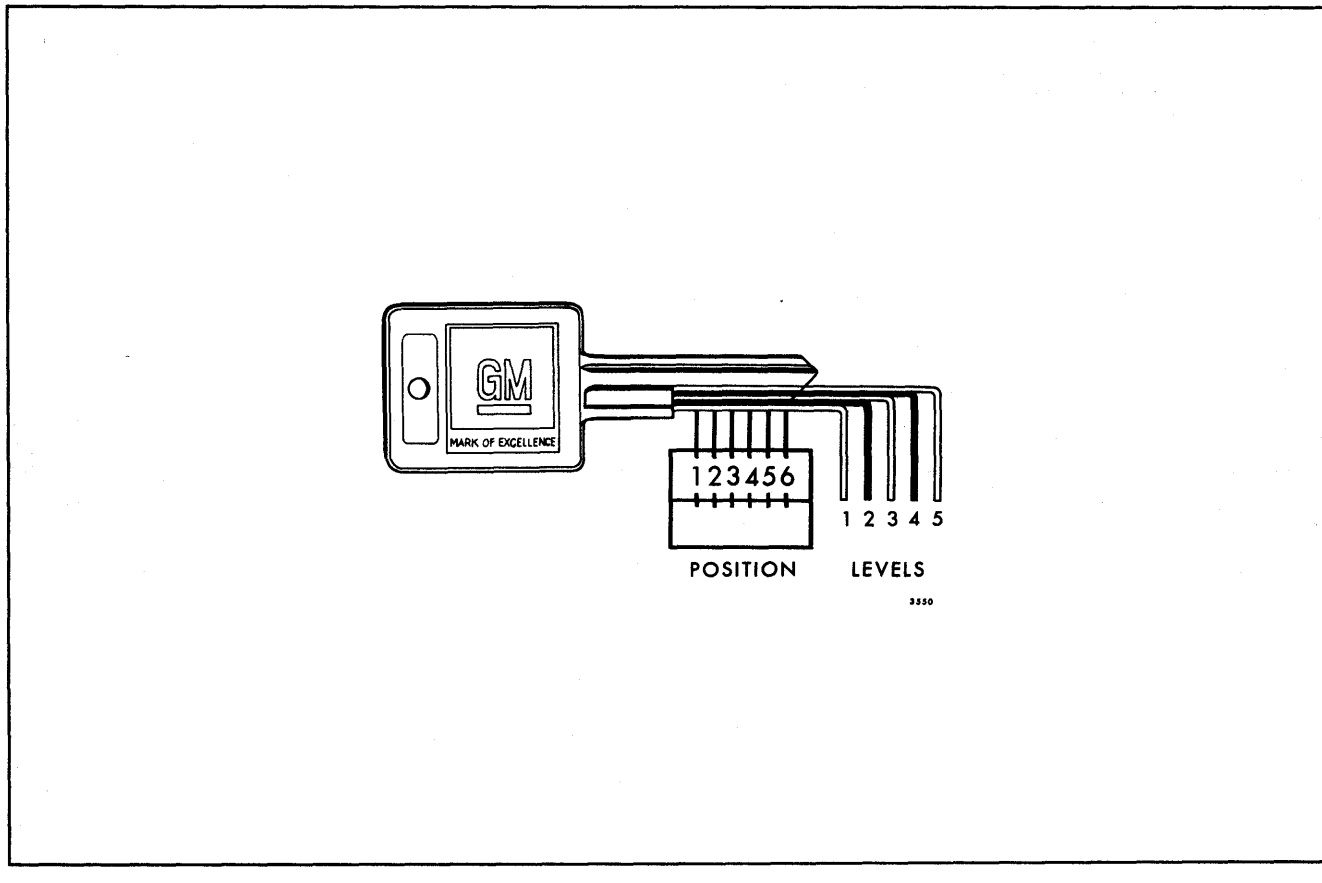

Fig. 1-4—Key Code Diagram

CUTTING KEYS

After the special code has been determined, either from the code list or the Key Code Diagram (Figure 1-4) cut a blank key to the proper level for each of the six tumbler positions, and check the key in the lock cylinder. The new key should agree with the combination opposite the code number in the code list.

REPLACEMENT LOCK CYLINDERS

New lock cylinders are available from the servicing Parts Warehouse with the new lock cylinder locking bar staked in place. Tumblers are also available and must be assembled into the cylinder according to the procedure outlined below.

ASSEMBLY AND CODING LOCK CYLINDERS—

ALL LOCK CYLINDERS EXCEPT GLOVE AND CONSOLE COMPARTMENTS

Tumblers for all locks except the glove and console compartments are shaped exactly alike, with the exception of the position of a notch on one side. As the key is inserted in the lock cylinder, the tumblers are raised to the correct height so that the notches on each tumbler are on the same level. When the notches on all six tumblers line up, the locking bar is pushed into the notches by two small springs, allowing the cylinder to turn in its bore. Five types of tumblers are used to make all the various lock tumbler combinations and each is coded according to a number, 1 through 5, stamped on its side.

1. Determine lock cylinder tumbler numbers and tumbler arrangement by use of a numerical key code lock cylinder code list. Code lists are made available to owners of key cutting equipment by equipment suppliers.

   NOTE: To determine which tumblers should be installed in what position for a given key, when a code list is not available, proceed as follows:

   a. Lay the key on the Key Code Diagram (Figure 1-4) with the key outlined by the diagram as accurately as possible.

   b. Starting at the head of the key blade, determine and record the lowest level (tumbler number) that is visible in position #1 and subsequent position numbers 2 through 6. After tumbler numbers and arrangement have been determined, assemble as follows:

2. Starting at the open end (head) of the cylinder, insert the tumblers in their proper slots in the order called for by the code, as shown in Figure 1-5.

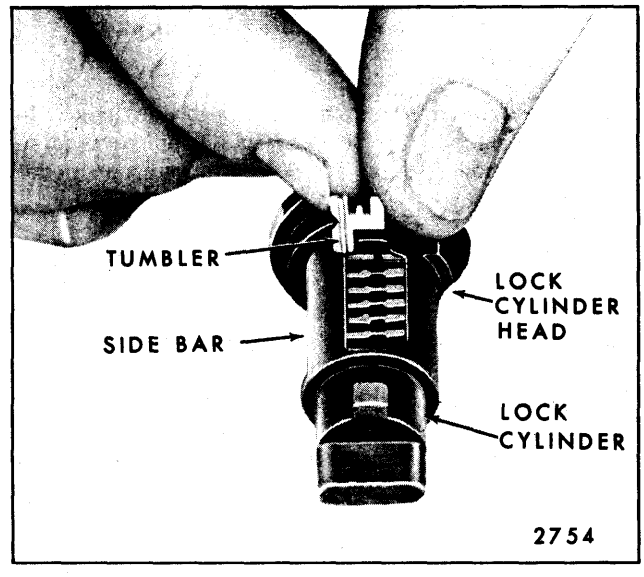

Fig. 1-5—Installing Tumblers

3. Pull out side bar with fingers so that tumblers will drop completely into place (Fig. 1-5). Insert one tumbler spring in the space provided above each tumbler.

   NOTE: If the springs become tangled, do not pull them apart - unscrew them.

4. Insert the spring retainer so that the two end prongs slide into the slots at either end of the cylinder. Press the retainer down. (See Figure 1-6).

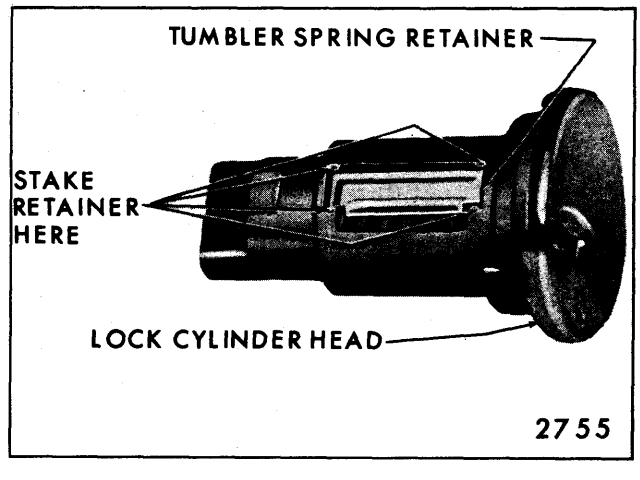

Fig. 1-6—Installing Spring Retainer

5. To determine if tumblers have been properly installed, insert key into lock cylinder. If tumblers are installed properly the side bar will drop down. If bar does not drop down,

remove the key, spring retainer, springs and tumblers and reassemble correctly.

NOTE: If the tumblers have not been assembled correctly, they can be removed from the cylinder by holding cylinder with the tumbler slots down, pulling the side bar out with the fingers and jarring the cylinder to shake the tumblers out. This procedure is necessary because once the tumblers have been pressed down into the cylinder they are held in their slots by the side bar.

6. If, after checking, it is found that the lock cylinder is assembled properly, remove key and secure cylinder in a vise with spring retainer exposed.

   NOTE: Use leather or wood at each vise jaw to prevent damage to the cylinder.

7. Using a suitable staking tool, stake the spring retainer securely in place by staking the cylinder metal over the retainer at each end. Refer to Figure 1-6.

ASSEMBLING AND CODING GLOVE AND CONSOLE COMPARTMENT LOCK CYLINDERS

Only one type of tumbler is used to make the various lock tumbler combinations for glove and console compartment locks. Tumblers for these two lock cylinders are pre-assembled in the service replacement lock cylinder and require that a correctly coded key be inserted in the cylinder before and during cylinder coding.

As the key is inserted in the coded lock cylinder, each tumbler is depressed so that no part of any tumbler is exposed above the level of the lock cylinder thereby allowing the cylinder to turn in its bore.

NOTE: These two lock assemblies are equipped with four or five tumblers rather than six as used in other locks. Tumblers are used in positions 3-4-5-6 or 2-3-4-5-6 only. Tumblers which correspond to positions 1 and/or 2 on the key are not used. The non-brass, black "tumbler" that is closest to the head of the four tumbler lock cylinder is a locking device and must NOT be removed or filed. See Figure 1-7.

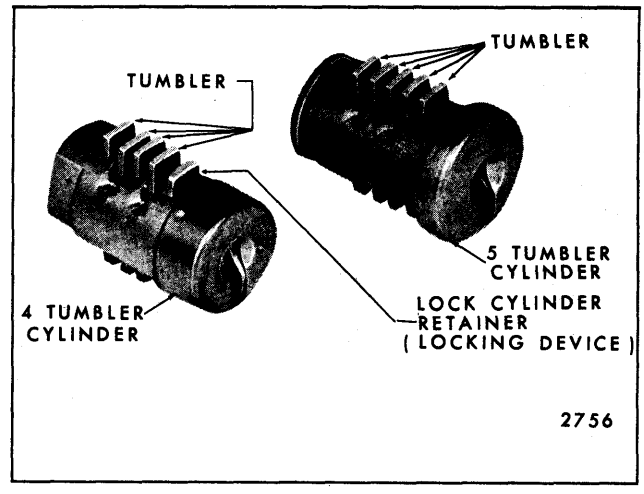

Fig. 1-7—Glove Compartment Lock Cylinder

1. Insert properly coded key in cylinder.

2. Place cylinder in a vise, bottom side up, using leather or wood at each vise jaw to prevent damage to the cylinder.

3. File tumblers down so that no part of any tumbler extends above the lock cylinder.

   NOTE: Do not file any part of the non-brass, black "tumbler" (retainer) on four tumbler lock cylinders. This is a locking bar and should not be altered.

4. Reverse lock cylinder position in vise and repeat step #3 for top of tumblers. See Figure 1-8.

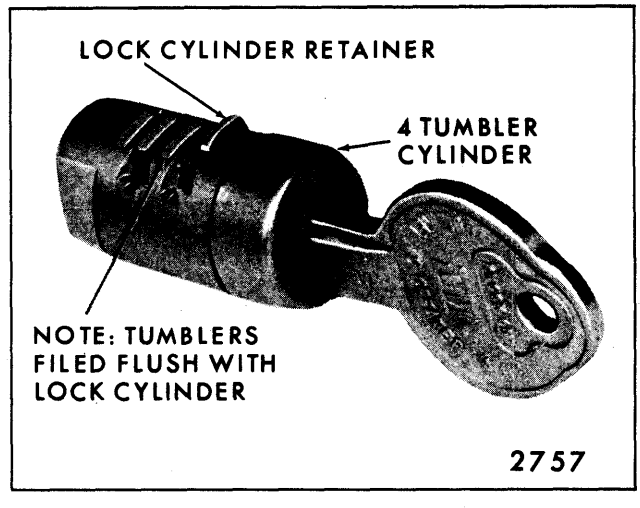

Fig. 1-8—Coded Glove Compartment Cylinder

GLASS POLISHING

REMOVAL OF MINOR SCRATCHES AND ABRASIONS—

Description

Minor glass scratches and abrasions can be effectively removed or substantially reduced by utilizing the procedure and precautions presented in this section. The phases of glass polishing discussed in this section include the equipment required, the recommended procedure and the precautions necessary.

There are two basic types of automotive glass: (1) laminated safety plate (all windshield and skylight glass) and (2) solid tempered safety plate (all side windows and back glass, except skylight).

A major concern in glass polishing is preventing double vision from developing in areas that will distort driver's vision. For this reason, less polishing can be done on the windshield in the driver's line of vision than in other areas. Distortion is most likely to result when attempting to remove deep scratches.

Glass polishing is an operation that must be performed with reasonable care.

The equipment and procedures recommended here were developed using cerium oxide compound (Glass-Nu or equivalent). Follow the manufacturer's directions if other materials are used.

The following equipment is recommended for glass polishing:

1. A low speed (600-1300 RPM) rotary polisher (Skil Model #570 or equivalent).
2. A wool felt rotary-type polishing pad, approximately three inches in diameter and two inches thick.
3. Powdered cerium oxide (Glass-Nu or equivalent) mixed with water as the abrasive compound.
4. A wide mouth container to hold the polish.

Glass Polishing Procedure

1. Mix at least three heaping tablespoons of cerium oxide (Glass-Nu or equivalent) with sufficient water to obtain a creamy consistency.

   NOTE: If a larger proportion of cerium oxide (Glass-Nu or equivalent) is used, the compound cakes on the felt pad faster. If a small proportion is used the polishing time required will increase.

2. Agitate the mixture occasionally to maintain a creamy consistency. The powdered cerium oxide is insoluable in water and tends to separate.

3. Draw a circle around the scratches on the inside of the windshield with a marking crayon or equivalent. Draw other lines directly behind scratches to serve as guides in locating the scratch during polishing (Fig. 1-9).

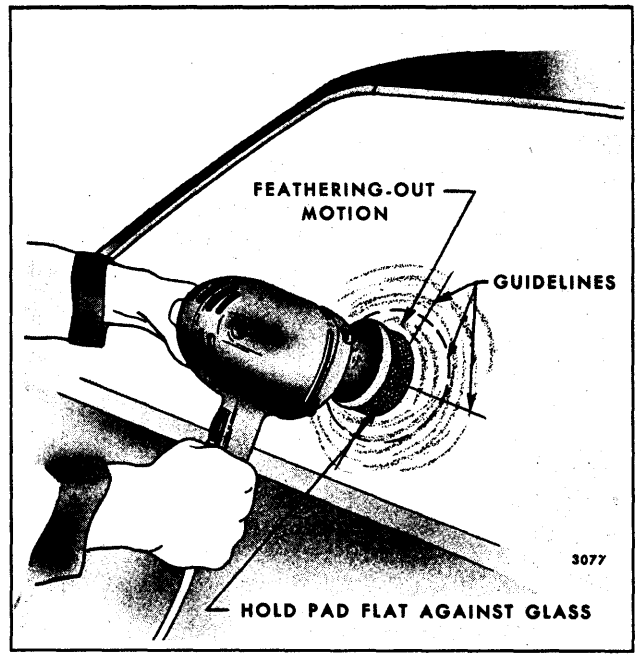

Fig. 1-9—Minor Glass Scratch Removal

4. Use masking paper where needed to catch drippings or spattered polish.

5. Dip the felt pad attached to the polisher into the mixture several times to insure that the pad is well saturated.

   NOTE: Never submerge or allow the pad to stay in the mixture as it may loosen the bond between the pad and the metal plate.

6. Using moderate, but steady, pressure, hold the pad flat against the scratched area of the glass, and with a feathering-out motion, polish the affected area as shown in Figure 1-9.

   NOTE: Avoid excessive pressure which does not speed-up the operation and may cause overheating of the glass.

7. Cover a sufficient area around the scratch with a feathering-out motion as shown in Figure 1-9, to eliminate any possibility of a "bulls-eye".

   NOTE: Never hold the tool in one spot or operate the tool on the glass any longer than 30 to 45 seconds at a time. If the glass becomes hot to touch, let it air cool before proceeding further. Cooling with cold water may crack the heated glass.

8. Dip the pad into the mixture about every fifteen seconds to insure that the wheel and the glass are always wet during the polishing operation. A dry pad causes excessive heat to develop.

9. After removing the scratch or abrasion, wipe the body clean of any polish.

10. Clean the polishing pad.

    NOTE: Care should be taken during polishing and storage to keep the pad free of foreign material such as dirt, metal filings, etc.

WOOD GRAIN TRANSFER (Station Wagon Styles)

DESCRIPTION AND GENERAL INFORMATION

Two types of vinyl wood grain transfers are used on 1969 model station wagons. Both types incorporate a pressure sensitive adhesive. In addition, both transfers are designed with the same Burgundy Walnut wood grain pattern, the same colors, and the same 50° or semi-gloss finish. One transfer is of all-vinyl construction. The other transfer is a heavier gauge material and is also of vinyl construction, but is top coated with a clear acrylic containing a flattening agent. Due to the difference in construction, the two types of transfers are not to be inter-mixed on the same car.

Both types of transfers are available through the service parts department. When placing orders for transfers, carefully observe "Division", "Model Year" and "body style" identification to determine the correct part number.

The following general information and procedures apply to both types of transfers.

For quality installation of service replacement transfers, the temperature of the transfer, the panel surface and the work room should be between 65°F. and 90°F. Transfers should not be replaced in temperatures below 65°F.

Prepare a supply of wetting solution, as called out in the procedure, by adding 1/4 ounce of detergent ("Joy", "Vel", or equivalent) to one gallon of clean water.

Use of a wetting solution, as specified, insures a better bond between the transfer and the painted surface. Deviating from specifications, such as using too much detergent or using a soap solution, is detrimental to the bond of the transfer.

Transfer replacement involving collision damage, or damage to the underlying acrylic paint finish requires that the metal repair and/or refinish operations be carried to completion before a transfer is installed.

The purpose of squeegeeing with a proper tool, using progressive, overlapping strokes and working from the center outwardly, is to drive out all the water and air. At the same time, proper squeegeeing provides the required pressure per square inch for proper bonding of pressure sensitive adhesive to painted surfaces.

Scuff-sanding an acrylic finish before transfer installation with #360 or #400 sandpaper promotes better adhesion, and removes dirt nibs and high spots.

The following equipment and materials are necessary in making a quality transfer installation. Equivalent products can be used.

1. Liquid detergent: "Joy", "Vel" or equivalent
2. Wax and Silicone Remover: "Prep-Sol", "Pre-Kleano", or "Acryli Clean"
3. 3-M Vinyl Trim Adhesive or equivalent; brush or spray-can
4. Squeegee: 3" to 5" wide; plastic or hard rubber
5. Water bucket and sponge
6. Sandpaper, #360 or #400, Wet-or-Dry Type
7. Infra-red heat bulb and extension cord
8. Clean wiping rags or paper towels
9. Sharp knife
10. Scissors
11. Fine pin or needle

Removal

1. Wash and clean repair surfaces and adjacent panels and openings as required.

2. Remove transfer finishing moldings, handles, side marker lamps, and/or other transfer overlapping parts.

3. Remove affected transfer by starting at one edge and by peeling transfer as sheet from surface. Application of heat to affected transfer at point of removal aids removal operation.

   CAUTION: Avoid using pointed or sharp instruments during transfer removal as they may damage paint finish.

Installation

1. Scuff-sand acrylic painted surface with #360 or #400 sandpaper by dry sanding. Freshly painted surfaces must be thoroughly dry. Residual solvents in fresh paint may lead to subsequent blistering problems.

2. Clean acrylic painted surface with wax and silicone remover, such as: Prep-Sol; Pre-Kleano; Acryli-Clean; or equivalent. Wipe surface dry with clean cloth. Use compressed air to blow away loose dirt from area of repair.

3. Apply vinyl trim adhesive to door hem flanges and to rear body lock pillar facing that will be covered by transfer.

4. Peel paper backing from transfer and lay transfer, face down, on clean table.

5. Using clean sponge, apply ample wetting solution to transfer adhesive and to repair panel surface.

6. Align upper edge and ends of transfer with panel surface and press down lightly across top.

7. Squeegee outboard from middle to edges of transfer removing all air bubbles and wetting solution to assure bonding of film to painted surface. On large transfers, the following sequence of operations will simplify transfer installation.

   a. Squeegee a short, 4 to 6 inch, horizontal section of transfer at center of panel. Lift right or left side of transfer, position it straight and close to panel, and squeegee toward lifted edge. Avoid stretching transfer at lifted end. Squeegee progressively from middle with firm, overlapping strokes.

   b. Lift upper area of transfer (up to bonded area of step "a" above) and, working upward from bonded section at middle, squeegee transfer into place.

   c. Lift lower area of transfer (up to bonded area) and, working downward from bonded section at middle, squeege transfer into place.

      CAUTION: If a wrinkle is trapped during squeegeeing operations, carefully lift the affected transfer section. Align the affected section to the surface and progressively squeegee it into place. Do not lift the transfer if only a few tiny bubbles are trapped.

   d. Secure opposite half of transfer to surface as described in steps "a", "b" and "c", above.

8. Notch out peak or curved edges of transfer where necessary. In some cases it may be necessary to trim off excess material at edges.

9. Heat inboard side of door hem flanges (or body lock pillar facing, etc.) and edges of transfer film (to approximately 90°F.).

10. Fold ends of transfer over door hem flanges (or over corners at panel ends) and press to secure edges of transfer to panel surfaces. Avoid undue pulling or stretching at ends as tearing could result.

11. Apply heat to transfer at door handle holes, side marker lamps and other depressions. Press transfer uniformly into depressions to obtain formed bond.

12. Carefully cut out transfer at side marker lamps, door handle holes, and other openings in panel.

13. Inspect transfer installation from critical angle using adequate light reflection to detect any irregularities that may have developed during installation. Remove all air or moisture bubbles by piercing each at an acute angle with a fine pin or needle and by pressing the bubble down.

14. Install previously removed parts and clean up car as required.

PAINT CONDITIONS

INTRODUCTION

Painters should be able to recognize paint conditions that occur on acrylics in order to be able to repair the conditions properly and thereby produce quality work. Understanding the cause and severity of a given condition is an aid to the painter in determining the best repair procedure. Many of the paint conditions that may be encountered are described and illustrated alphabetically in the following:

BLISTERING

Blistering is the bubbling or raising of the paint surface. When dry and rubbed or sanded, blisters may give a pitted appearance down to the undercoat or even to the bare metal.

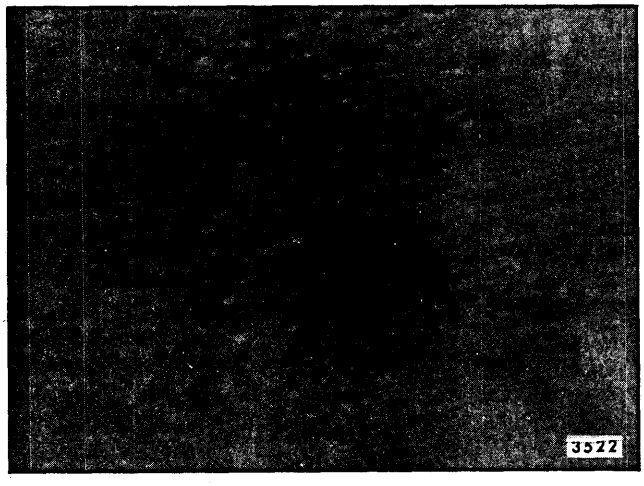

Fig. 1-10—Blistering

Cause: This condition is usually caused by moisture becoming trapped between metal and undercoat or between undercoat and color coat, expanding and forming small or large rounded blisters.

Correction: In minor cases the blister may be sanded out, resurfaced, sanded, and refinished. In severe cases however, the finish must be removed down to the metal before refinishing.

BLUSHING

A milky or dull mist formation on the surface.

Cause: Blushing is caused by precipitation of the acrylic finish, due to condensation of moisture on the applied wet acrylic film. Rainy or humid weather at refinishing time is the usual cause of this condition.

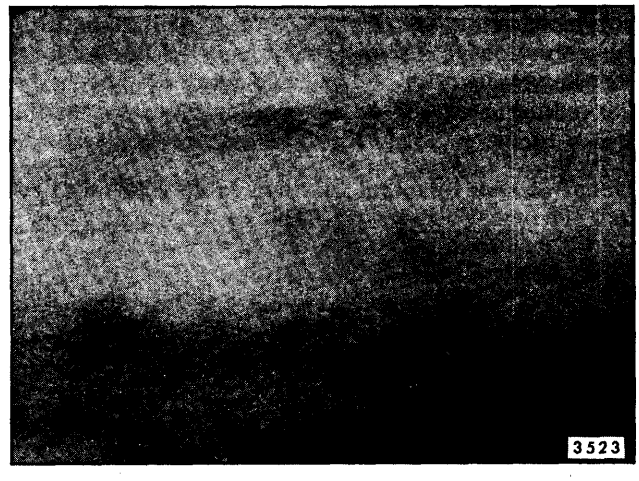

Fig. 1-11—Blushing

Correction: In most cases, spraying a coat of high grade thinner with 10% to 20% retarder immediately over affected area will dissolve the blushed acrylic and restore normal appearance of the finish. If blushed color dries, add retarder to reduced material and color coat as required.

BULL'S-EYE

Fig. 1-12—Bull's-Eye

A spotted, ringed, outline or low area in the color coat. It often gives the illusion of a different color, depending upon the peculiarities of light and shadows in the area. Primer might show.

Cause: A bull's-eye is the result of undercoat shrinkage; incomplete spot repair; or poor technique.

Correction: In minor cases, sand with No. 600 sandpaper and polish. In extreme cases, sand and featheredge the area correctly, build up the paint surface with undercoat, then color coat as required.

LINE—CHECKING

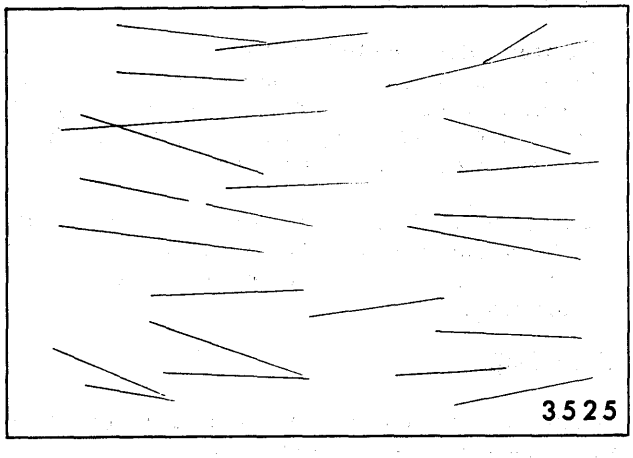

Fig. 1-13—Line-Checking

This appears as a series of straight lines of various configurations. Depending on the thickness of the color and the severity of the condition, the checking lines may be quite short or as long as 18 inches.

Cause: This may be due to excessively thick color coats; or application of new color over old color which checked before and was not removed completely.

Correction: Remove the checked color coat in the affected area to the undercoat and recolor coat as required. Original undercoats are not affected by line-checking.

CHEMICAL DISCOLORATION

This is a condition that can occur on solid or metallic colors and is evidenced by contrasting color spots appearing mostly on flat or horizontal surfaces. On red metallics, the spots are darker red; on blue metallics, the spots are darker blue; etc. On solid colors, the discoloration spots may be of any color depending upon specific conditions.

Fig. 1-14—Chemical Discoloration

Cause: On metallic colors the condition apparently is caused by fall-out or moisture in the form of rain water containing acid or alkaline materials which attack the aluminum flake. On solid colors, specific pigments may be affected by specific materials from fall-out.

Correction: In mild cases, rub out and polish. In severe cases, sand to remove the condition and color coat as required. The best prevention against this condition is to keep the paint finish clean and polished.

CRAZING

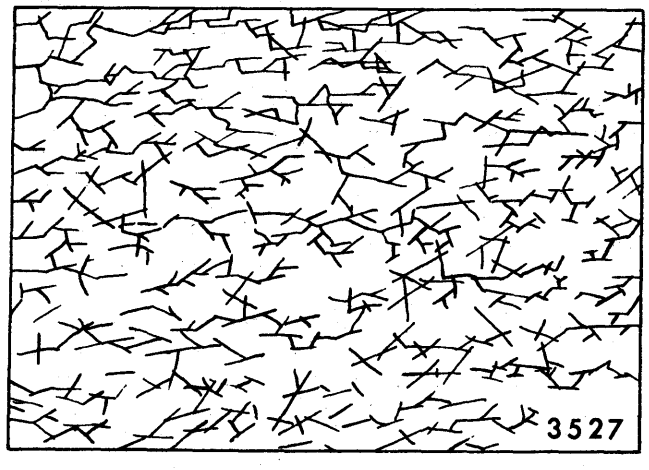

Fig. 1-15—Crazing

Crazing usually appears as a fine spider-web type of cracking in the color coat. The cracks may vary from very fine (requiring a magnifying glass) to relatively coarse.

The crack lines connect to one another. Crazing occurs immediately after repairs are attempted.

Cause: Crazing occurs when excessive stresses, which occasionally may be set up in an acrylic color film during the time it cures, are suddenly released.

Prevention: Before repairs are attempted, test color to be repaired as follows: (1) Apply a drop of thinner to color in a most inconspicuous spot; (2) Allow thinner to evaporate and inspect color within thinner ring for crazing. A lack of crazing indicates that the color can be color coated or blended into normally. The appearance of crazing within the thinner ring indicates that the color must be removed down to the undercoat before repairs. Original factory undercoats are not affected by the crazing condition.

Correction: If a panel surface to be repaired already has the crazing condition, remove the complete affected color coat down to the factory undercoat and color coat as required.

DIRT IN PAINT

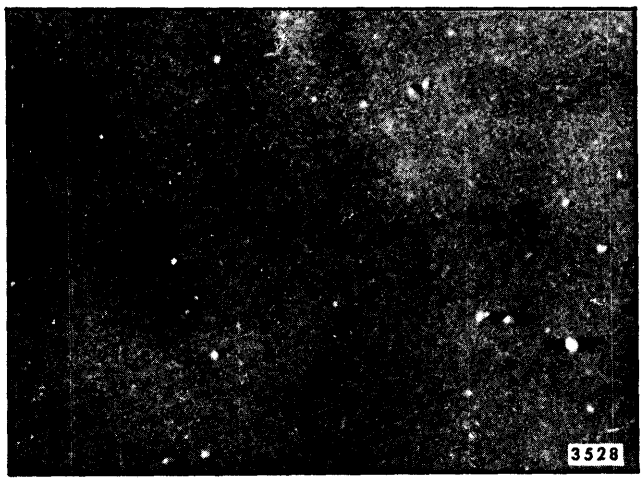

Fig. 1-16—Dirt in Paint

Surfaces with this condition have an uneven grittiness from lint, dirt, or sand-like particles.

Cause: Particles flying about and settling on wet paint film are the usual cause of this condition. In addition, surface edges and crevices that are not properly cleaned, blown out, or tacked off immediately before spraying will usually promote a dirt condition.

Correction: Rub or polish out with rubbing compound; or, in extreme cases, wet sand with No. 500 or No. 600 paper and rub out and polish.

DRY SPRAY

This can easily be distinguished by a certain uniform, fine grittiness and dullness: It is usually in a linear pattern or a pattern of spray gun travel.

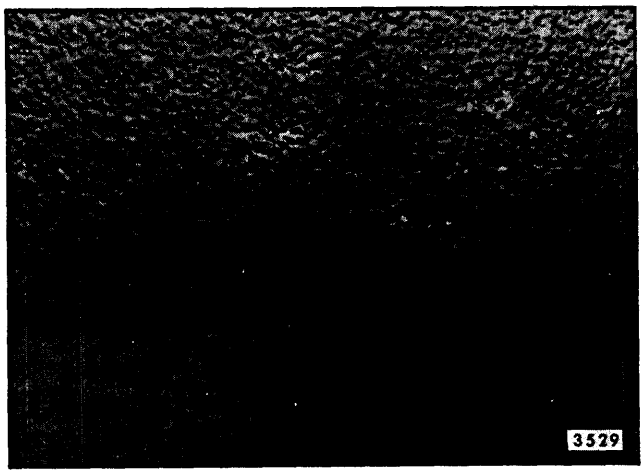

Fig. 1-17—Dry Spray

Cause: The condition is usually caused by holding the spray gun on an angle or too far from the surface. Insufficient thinner, excessive air pressure, dirty spray gun, or spraying in a draft can also cause dry spray conditions.

Correction: Minor cases of dry spray can usually be polished out. Major cases of dry spray must be sanded out and, if necessary, the surface color coated.

ETCHING

Etching is a very severe form of water spotting in which the entire paint surface within the periphery of each spot is etched or eaten away. The condition may appear as small or large water spotted areas and usually appears on the flat or horizontal surfaces. Etching penetrates much more deeply into the finish than water spotting.

Cause: The condition may be caused by bird droppings, insects, etc., in which case a strong chemical deposit is allowed to react with the finish for a prolonged period of time.

Correction: If the condition is "mild", sand to remove the condition and color coat as required. If the condition is "severe", sand to remove the condition; apply undercoats and color coats as required. The best prevention against this condition is to keep the paint surface clean and polished.

FISH-EYES

The appearance of small, crater-like openings in the finish after it has been applied.

Cause: Application of color coats over a surface contaminated with silicones.

Prevention:

1. Clean surface with wax and silicone removing agent such as Prep-Sol, Pre-Kleano, Acryli-Clean or equivalent.
2. Sand surface as required.
3. Re-clean surface with silicone removing agent.
4. Proceed with color coat application.
5. If above prevention steps are not successful and fish-eyes appear upon application of first coat, add "Fish-Eye Eliminator", "Fish-Eye

Preventor", or equivalent to reduced color and continue color coating immediately.

Correction: To repair a paint surface with the dried fish-eye condition, sand the surface smooth and color coat as required incorporating the above prevention steps.

MOTTLING

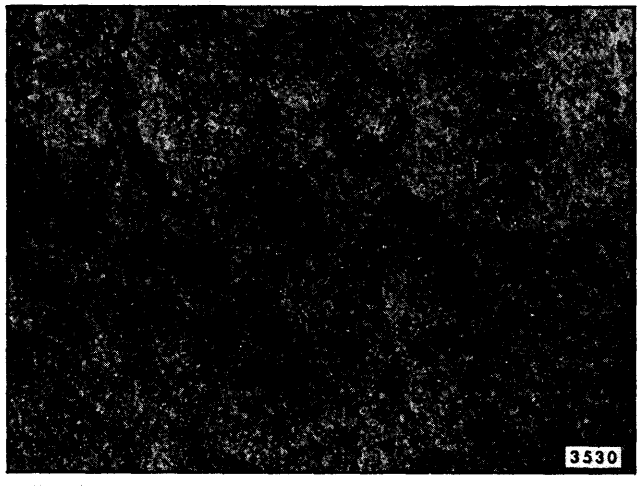

Fig. 1-18—Mottling

Mottling is a paint condition which appears as dark, shaded, or off-color spots and streaks in the paint finish. It is especially evident in metallic paints. A moderate amount of mottling is to be expected in metallic finishes.

Cause: Most colors are made from a combination of different pigments and metallic flakes which have varying densities and particle sizes, giving them a natural tendency to separate and float into groups when the film is in a liquid state. Under normal conditions, this tendency is small in magnitude and cannot be seen by the naked eye.

Certain conditions aggravate this to a point where the separation of the pigments and metallic flakes become visible, due to use of thinner which dries too slowly, allowing the pigment particles to migrate; or applying the color on a cold surface or in a cold room; or applying too heavy color coat.

Correction: In minor cases, no correction is required. In severe cases, clean and re-spray with color coat.

OFF-COLOR

The color is off-shade or does not match.

Cause: The main cause of off-color conditions is not keeping the color coat thoroughly mixed. Wrong thinner mixtures, air pressures, spraying distance, film thickness, or spraying too wet or dry will also affect the color match, especially with metallic colors. The use of compounds too soon or burning the color coat by hard wheel polishing will also affect the color's appearance. Old, waxed or polished areas will often appear different in color than areas with new color.

Correction: Sand only if necessary. Color coat with proper technique to nearest natural break line.

EXCESSIVE ORANGE PEEL

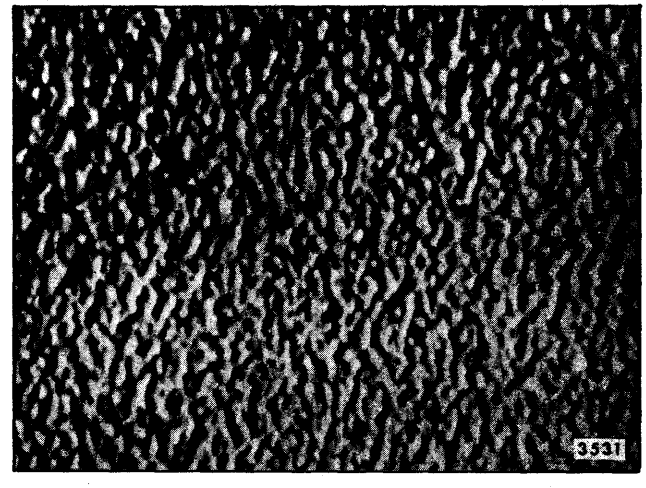

Fig. 1-19—Excessive Orange Peel

Orange peel is a natural occurrence in refinishing in which the resultant finish has uneven formations on the surface similar to that of an orange. A certain amount of orange peel occurs in normal refinishing and is acceptable.

Cause: Excessive orange peel is actually a defect of flow or leveling. Some of the causes are: using wrong type or a poor grade of thinner, using too high an air pressure, improper adjustment of spray gun, holding gun too far from surface or too close to surface, abnormal shop or metal temperatures, spraying in a draft, and coats applied too dry.

Correction: If condition is slight, no remedy is necessary. If condition is excessive, clean, compound, and polish affected area.

OVERSPRAY

The appearance of a rough or dull paint finish, similar to dry spray.

Cause: Overspray is caused by the settling of semi-dry paint particles on an adjacent finished surface during spraying operations.

Correction: If the condition involves the same

color, compound and polish the affected area. If the condition involves two colors, but is slight, compounding and polishing the affected area may eliminate the condition. If the condition is severe, sand and color coat as required.

PIN-HOLING

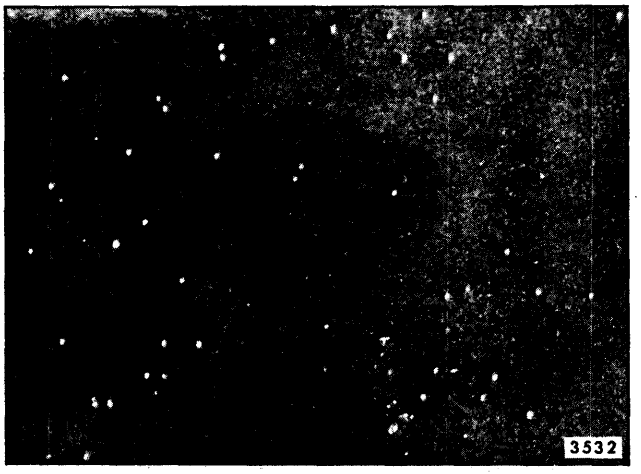

Fig. 1-20—Pinholing

Pin-holing is a series of tiny, fine holes or pits that give the surface a spotty, dull, or off-shade appearance.

Cause: This condition is usually caused by solvent or air trapped in the paint film, plus heat.

Correction: Sand down the surface until it is smooth, and then color coat as required.

RUST SPOTS

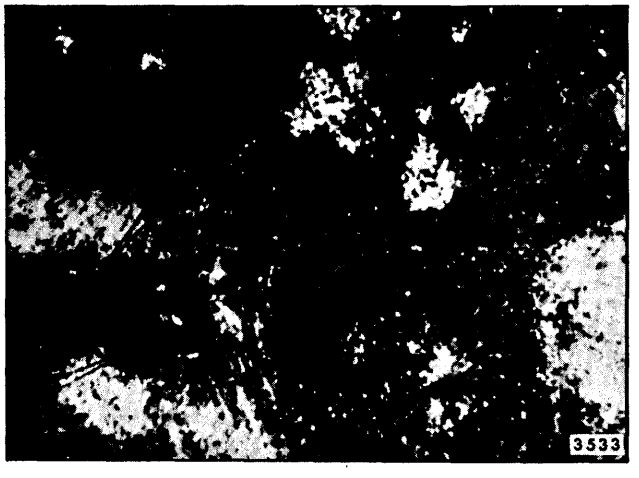

Fig. 1-21—Rust Spots

Rust spots are usually accentuated by a rust colored ring that forms at the affected area. Rusting beneath the film is usually made apparent by a raised section of film or a blister. After the film or blister has broken, the rust begins to work back under the edges of the film. Since many primers are similar to rust in color, careful examination is necessary to identify the minor rust conditions accurately.

Cause: Moisture and chemicals attack the metal through either visible or microscopic breaks in the paint film, which usually result in blistering and peeling. Another cause is painting a metal surface containing rust that was not completely removed, or painting over metal touched by bare hands or chemical deposits from sanding water.

Correction: In minor cases, where the paint is not blistered, wash panel and clean rust stain off with body polish or a mild rubbing compound, hand-applied, then protect the finish with application of wax.

In severe cases the paint should be removed down to metal before cleaning the stains, so that no spots will be overlooked. Sand metal thoroughly to remove all traces of rust, treat surface with metal conditioner, dry and prime the areas as soon as possible to prevent the start of new rust formations. Refinish according to usual methods.

SAND OR FILE MARKS

Fig. 1-22—Sand or File Marks

The surface is grained or scratched.

Cause: File or disc marks were left in the metal, or the grit of the sandpaper used to sand the undercoat was too coarse.

Correction: Minor sand marks or scratches on the color coat may be lightly sanded and polished. In severe cases, sand and refinish as required.

SAND SCRATCH SWELLING

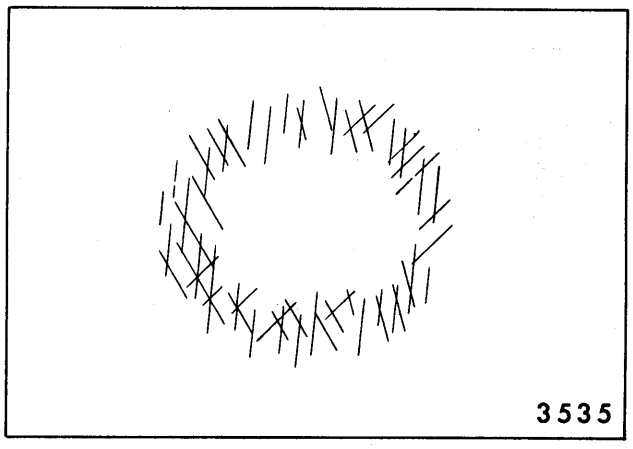

Fig. 1-23—Sand Scratch Swelling

Sand scratch swelling appears as exaggerated sandpaper scratches and occurs mostly after spot repairs or panel refinishing are done over sanded original acrylic finishes. The condition is most apparent on dark colors.

Cause: The condition is caused by sanding acrylic surfaces with coarse sandpaper preparatory to color coating. The thinner of fresh color coats swells the scratches to an enlarged size.

Prevention: Do not sand acrylics unless required. When sanding with coarse sandpaper is required, follow with extra-fine (No. 500 or No. 600) sandpaper. Then remove sand scratches by rubbing; or apply an approved sealer according to label directions before color coating.

Correction: Remove minor sand scratches by rubbing and polishing. In certain instances, water sanding with No. 500 or No. 600 sandpaper may be necessary before final rubbing and polishing. Remove severe sand scratches by employing steps outlined in "Prevention", above, and then color coat as required.

SWEAT OUT OR BLOOM

Usually characterized by a dull appearance along with some sand scratches.

Cause: Due to film shrinkage because of evaporation.

Correction: Polishing is usually sufficient to bring the gloss to an acceptable level. In severe cases where some film shrinkage has occurred that results in a slight wrinkled or orange peel appearance, sanding with No. 600 sandpaper and polishing may be required.

THIN PAINT

Severe thin paint conditions are easily identified by the undercoat showing through the top surface, or by light bright areas in the finish.

Cause: The usual cause of a thin paint condition is excessive rubbing or polishing that removes the paint film. This is usually due to improper use of power polishing equipment, or not enough color coat application.

Correction: For panels, this paint condition can be corrected by cleaning the affected areas and color coating the surface. If edges are thin, touch up with brush as required.

WATER SPOTTING

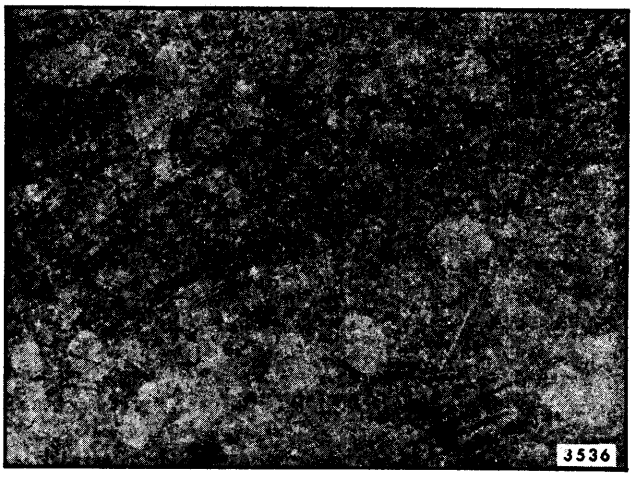

Fig. 1-24—Water Spotting

The condition is evidenced by tiny or small rings which surround each spot from which water has evaporated. These rings appear to be etched into the paint finish and cannot be removed by normal washing or polishing.

Cause: The condition is caused by the evaporation of droplets of water from an acrylic finish, particularly at temperatures over 150°F. The condition becomes more severe as the chemical content of the water and the temperature are increased. A chemical reaction is believed caused by the evaporating water and the paint finish, resulting in the ring.

Correction: Rub out and then polish as required. Use GM Acrylic Finish Conditioner, or equivalent.

WHEEL BURN

A dark, often rough, smear on a panel surface.

Cause: Holding the polisher too long in one spot.

Correction: Rub out with cloth treated with paint finish cleaning solvent and hand polish. In severe cases, water sand with No. 600 sandpaper, and then rub out and polish.

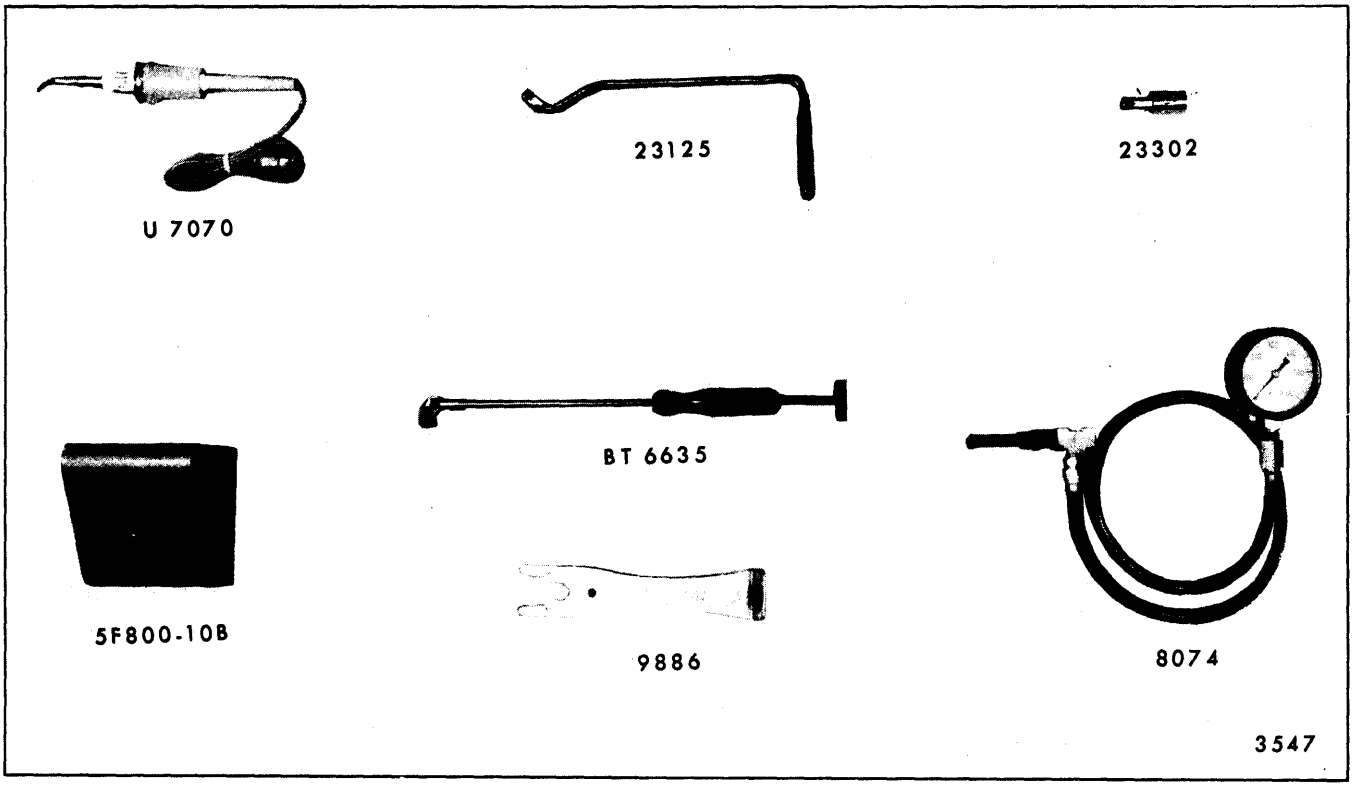

Fig. 1-25—Special Body Service Tools

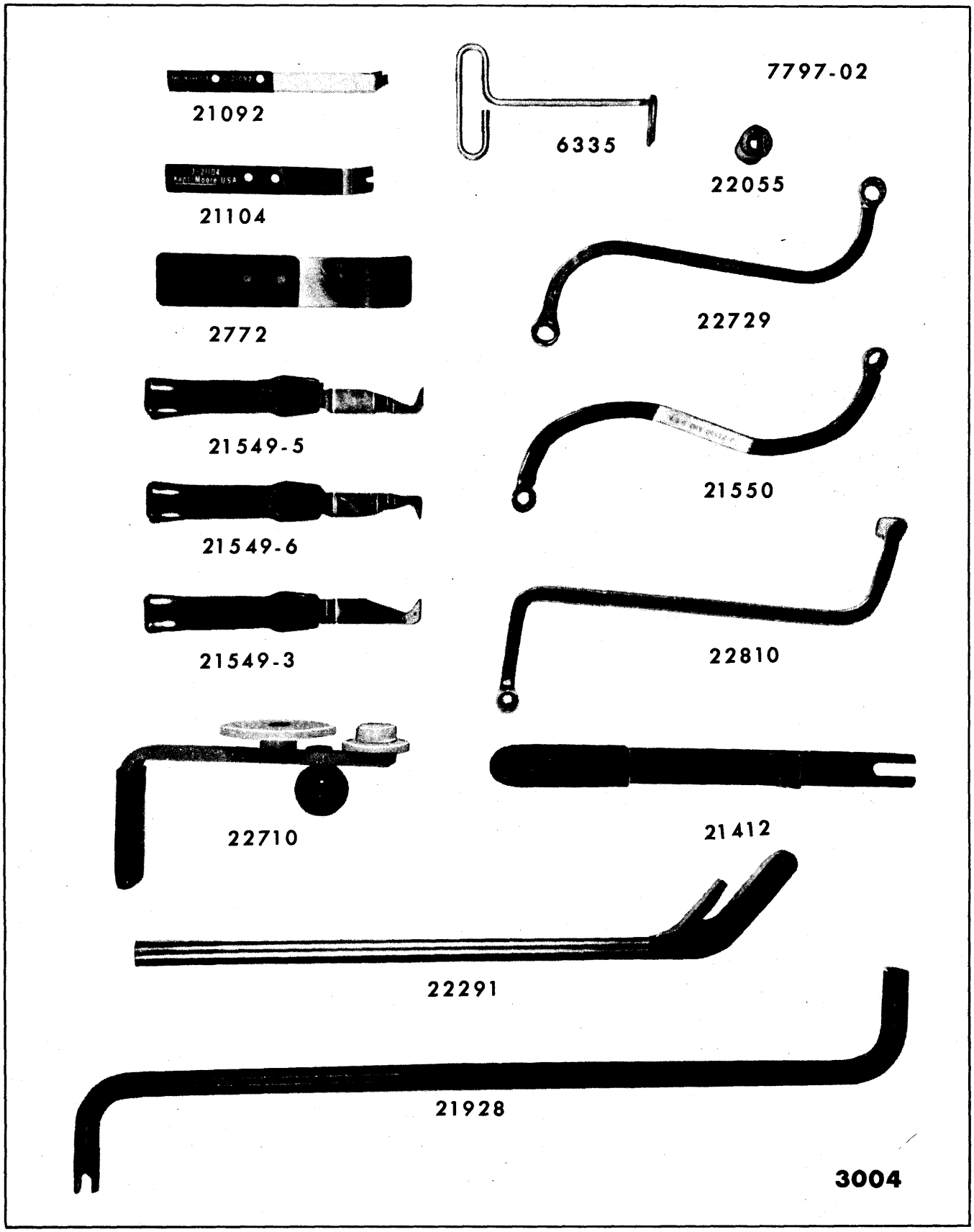

Fig. 1-26—Special Body Service Tools