GGG-S-775a
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SUPERSEDING
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June 6, 1955

FEDERAL SPECIFICATION

STUD REMOVER AND SETTER

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope.—This specification covers stud removers and setters used for removing or setting threaded and smooth end studs.

1.1.1 *Federal specification coverage.*—This specification covers only the types, designs, sizes, and styles of stud removers and setters generally purchased by the Federal Government, and does not include all types, designs, sizes, and styles which are commercially available.

1.2 Classification.

1.2.1 *Types, designs, sizes, and styles.* — Stud removers and setters shall be of the following types, designs, sizes, and styles, as specified (see 6.1):

Type I.—Collet grip.
  Design A.—Housing with drawbolt.
    Size 1.—Medium.
    Size 2.—Large.
    Size 3.—Extra large.
  Design B.—Housing with shift control.
    Style a.—Short barrel.
      Size 1.—Small.
      Size 2.—Medium.
      Size 3.—Large.
    Style b.—Long barrel.
  Design C.—Housing with drivescrew.
    Style c.—Short nose.
    Style d.—Long nose.
      Size 1.—Small.
      Size 2.—Medium.
      Size 3.—Large.
Type II.—Centered grip.
Type III.—Eccentric grip.
Type IV.—Wedge grip.
  Size 1.—Medium.
  Size 2.—Large.

2. APPLICABLE SPECIFICATIONS, STANDARDS, AND OTHER PUBLICATIONS

2.1 Specifications and standards.—The following specifications and standards, of the issues in effect on date of invitation for bids, form a part of this specification:

Federal Standards:

Fed. Std. No. 102—Preservation, Packaging and Packing Levels.

Fed. Std. No. 123—Marking for Domestic Shipment (Civilian Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications, Standards, and Handbooks and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Admin-

istration Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D. C.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications, Standards, and Handbooks from established distribution points in their agencies.)

Military Specifications:

MIL–C–12968 — Coatings, Phosphate, Protective (for Iron and Steel).

MIL–P–15424—Packaging of Hand Tools for Domestic and Overseas Shipment and Storage.

Military Standards:

MIL–STD–105 — Sampling Procedures and Tables for Inspection by Attributes.

MIL–STD–129—Marking for Shipment and Storage.

MS 15774—Square Drive End Standards, Hand Type (Male and Female) for Use With Square Drive Socket Wrenches and Attachments.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications.—The following document forms a part of this specification. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

National Bureau of Standards Handbook:

H28—Screw Thread Standards for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, 25, D. C.)

3. REQUIREMENTS

3.1 Material.—The stud removers and setters shall be of steel and of such composition and quality which, when properly heat treated, shall produce tools conforming to the requirements hereinafter specified.

3.2 Illustrations.—The illustrations herein are descriptive and not restrictive, and are not intended to preclude the purchase of stud removers and setters otherwise conforming to this specification.

3.3 Finish.

3.3.1 *Surface roughness.*—All external surfaces shall be free from pits, nodules, burrs, cracks, and other detrimental defects. Areas that are both ground and buffed, or otherwise finished by an equivalent method and provided with a coating finish of chromium or nickel plate, shall have a surface roughness equivalent to the finish produced by 180-grit or finer abrasive. Areas not ground and buffed, or otherwise finished by an equivalent method, and provided with a coating finish of chromium or nickel plate shall have a surface finish conforming to good commercial practice. Areas ground, buffed, or otherwise finished by an equivalent method and provided with a coating finish as specified in 3.3.2 other than chromium or nickel plate, shall have a surface roughness equivalent to the finish produced by 80-grit or finer abrasive. Other areas shall have a surface finish conforming to good commercial practice.

3.3.2 *Coatings.*—The coatings shall be adherent, smooth, continuous, and free from pits, blisters, nodules, and any other defects which would interfere with their protective value and serviceability. The minimum thickness of the coating shall be as specified in 3.3.2.3 through 3.3.2.7 on all external surfaces which can be touched by a ball 0.750 inch in diameter.

3.3.2.1 Unless otherwise specified in the contract or order, types I, II, and IV shall have any one of the coatings specified in 3.3.2.3 through 3.3.2.8.

3.3.2.2 Unless otherwise specified in the contract or order, type III shall have either of the coatings specified in 3.3.2.3 and 3.3.2.4, except that the finish specified in 3.3.2.5 through 3.3.2.8, will be acceptable where

chromium and nickel coatings are restricted by Government order.

3.3.2.3 *Chromium plate.* — The coating shall be electrodeposited coating of nickel, followed by chromium, the minimum thickness being 0.0002 inch for nickel and 0.0001 inch for chromium.

3.3.2.4 *Nickel plate.*—The coating shall be electrodeposited coating of nickel, and shall be not less than 0.0002 inch thick.

3.3.2.5 *Cadmium plate.*—The coating shall be electrodeposited coating of cadmium not less than 0.0003 inch thick, and shall be subjected to a chemical or electro-chemical chromating.

3.3.2.6 *Zinc plate.*—The coating shall be electrodeposited coating of zinc not less than 0.0003 inch thick, and shall be subjected to a chemical or electro-chemical chromating.

3.3.2.7 *Hot phosphating.*—The coating shall consist of a heavy chemically produced phosphate coating followed with a coating of oil which contains rust inhibitor.

3.3.2.7.1 *For Army purchases.*—Phosphate coating shall be in accordance with type A of Military Specification MIL–C–12968.

3.3.2.8 *Oxide coating.*—The coating shall consist of a heavy chemically produced oxide coating followed with a coating of oil which contains a rust inhibitor.

3.4 Repair parts.—The successful bidders supplying removers and setters covered by this specification shall make available and furnish repair parts when requested. All parts having the same manufacturer's part number shall be constructed to definite standards, tolerances, and clearances, in order that such parts may be completely interchangeable, and may be replaced or adjusted without requiring modification.

3.5 Screw threads.—The screw threads used with stud removers and setters shall be in conformance with the screw-thread standards of National Bureau of Standards Handbook H28 and supplement thereto.

3.6 Female drive end.—The female drive ends of the stud remover and setter shall be in accordance with Military Standard MS–15774.

3.7 Marking for identification. — Stud removers and setters shall be marked in a plain and permanent manner with the manufacturer's name or with a trademark of such known character that the source of manufacture may be readily determined. Threaded collets shall be marked with the thread size and serrated collets with the fractional-diameter size in order that they may be readily identified without the use of additional tools.

3.8 Type I, collet grip.—Type I stud remover and setter shall be of the collet-grip type provided with either one size or a combination of sizes of the threaded or serrated collets, or both as specified (see 6.1). All stud removers and setters and their components shall be capable of withstanding the applicable minimum torsional loads when tested as specified in 4.5.2.

3.8.1 *Replacement collets.* — When collets are required for use with the type I stud remover and setter, either as individual or replacement sets, the size of the threaded and serrated collets, and the design, size and style, and manufacturer's name or trademark and part number, as applicable, of the stud remover and setter for which they are intended shall be specified (see 6.1 and applicable tables).

3.8.2 *Design A, housing with drawbolt.*—Design A stud remover and setter shall consist essentially of a housing, collet(s), and drawbolt and shall be similar to figure 1.

3.8.2.1 *Housing.*—The housing shall be of the sleeve type with a bore of sufficient depth not to interfere with the collet when fully engaged. The bore at the open end of

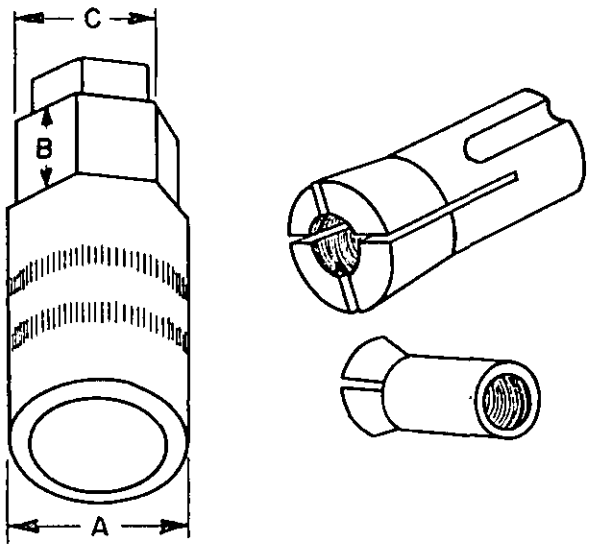

FIGURE 1.—Type I, design A, sizes 1, 2, and 3, collet grip, housing with drawbolt, sizes 1, 2, and 3, medium, large, and extra large.

the housing shall be tapered to correspond with the taper of the collet. The drive end of the housing shall be hexagonal in shape of a standard size having a face hardness not less than 43 nor more than 48 on the Rockwell C scale. A key or pin shall be permanently fastened in the body of the housing to prevent the collet from rotating when draw of collet is being made.

3.8.2.2 *Collet.*—The collet shall be of steel properly heat-treated and tempered to prevent deformation or permanent set when full compressed. The collet shall have not less than 3 nor more than 4 splits to permit proper gripping pressure when compressed on the stud. The collets shall have the outside diameter suitably shaped to fit the bore and taper of the housing. The outside diameter of the collet shall be provided with a keyway or slot of sufficient depth and length to allow the key or pin in the housing to enter freely. The jaw or compression end of the collet shall be internally threaded to conform to the stud range size of housing (see applicable table). The opposite end of the collet shall be internally threaded to accept the thread on the drawbolt without binding or excessive play.

3.8.2.3 *Drawbolt.* — The threads of the drawbolt shall conform to 3.5. Substantial means shall be provided for the drawbolt to rotate freely and be retained in the housing when not engaged with the collet. The body of the drawbolt shall not bind when draw of the collet is being made. The head of the drawbolt shall be hexagon in shape of a size across the flats to engage a standard size wrench.

3.8.2.4 *Size 1, medium; size 2, large; and size 3, extra large.*—Sizes 1, 2, and 3 stud removers and setters and their applicable components shall conform to table I and shall be similar to figure 1.

3.8.3 *Design B, housing with shift control.* — Design B stud remover and setter shall consist of a housing with barrel, right- and left-hand screw assembly, drivehead, shift-control button, collet with collet-pin assembly, and shall be similar to figure 2.

3.8.3.1 *Housing with barrel.*—The bore at the open end of the barrel shall be tapered to correspond with the collet taper. The upper end of the bore shall be threaded to accommodate the right- and left-hand screw assembly. The bore between the threads and taper shall be hexagonal to accommodate the head of the collet. The outside drive end of the barrel shall be hexagonal in shape, with a slot at the top to accommodate the shift control button in the "remover" position. Hardness shall be not less than 38 nor more than 42 on the Rockwell C scale.

3.8.3.2 *Right- and left-hand screw assembly.*

3.8.3.2.1 *Right-hand screw.* — The right-hand screw shall be threaded internally with a left-hand thread to accommodate the left-hand screw and externally with a right-hand thread to permit engagement in the barrel. A keyway shall be provided on the outer portion of the right-hand screw to accommodate the shift-control button. Hardness shall be not less than 36 nor more than 40 on the Rockwell C scale.

TABLE I.—*Type I, design A, sizes 1, 2, and 3, stud remover and setter, collet grip, housing with drawbolt, medium, large, and extra large*

Size	Housing dimensions				Collets		
	A ±1/32	B ±1/64	C Across flats		Stud range of thread sizes		Torsional load Min.
			Min.	Max.			
	Inches	*Inch*	*Inches*	*Inches*	*Inch: NC*	*Inch: NF*	*Inch-Pounds*
1	1 5/8	3/4	1.088	1.125	1/4-20	1/4-28	125
					5/16-18	5/16-24	300
					3/8-16	3/8-24	500
					7/16-14	7/16-20	1100
					1/2-13	1/2-20	1400
					9/16-12	9/16-18	2000
					5/8-11	5/8-18	3000
2	2 1/4	1 1/2	1.690	1.750	3/4-10	3/4-16	5400
					7/8- 9	7/8-14	6000
					1 - 8	1 -14	6000
3	2 3/4	1 3/4	2.175	2.250	1 1/8- 7	1 1/8-12	10,800
					1 1/4- 7	1 1/4-12	10,800
					1 3/8- 6	1 3/8-12	10,800
					1 1/2- 6	1 1/2-12	10,800

3.8.3.2.2 *Left-hand screw.*—The left-hand screw shall be threaded to mate with the left-hand internal threads of the right-hand screw. The top of the left-hand screw shall be a square, dimensioned to fit the square of the drivehead. Hardness shall be not less than 41 nor more than 45 on the Rockwell C scale.

3.8.3.3 *Drivehead.* — The drivehead shall have a square through hole and shall be long enough to allow full entry of the square of the left-hand screw when maximum stud depth adjustment has been made. A set screw shall be provided for attaching the head to the square of the left-hand screw in such a manner as to allow the left-hand screw to increase collet pressure in direct proportion to the setting or removal torque required. A slot shall be at the lower end of the drive head to permit engagement of the shift control button when in "drive" position. Hardness shall be not less than 38 nor more than 42 on the Rockwell C scale.

3.8.3.4 *Drive attachments and handles.*

3.8.3.4.1 *Drive attachment.*—All drive attachments shall be made through the top of the square female drive end in the drivehead. All such openings shall be in accordance with 3.6.

3.8.3.4.2 *Handles.* — Handles shall be provided for each tool. The handles shall be provided with a comfortable and adequate handgrip and shall be capable of providing the necessary torque needed for the applicable tool. The handgrip of the handles shall be either steel or plastic. If plastic handgrips are provided, they shall withstand the test specified in 4.5.3.

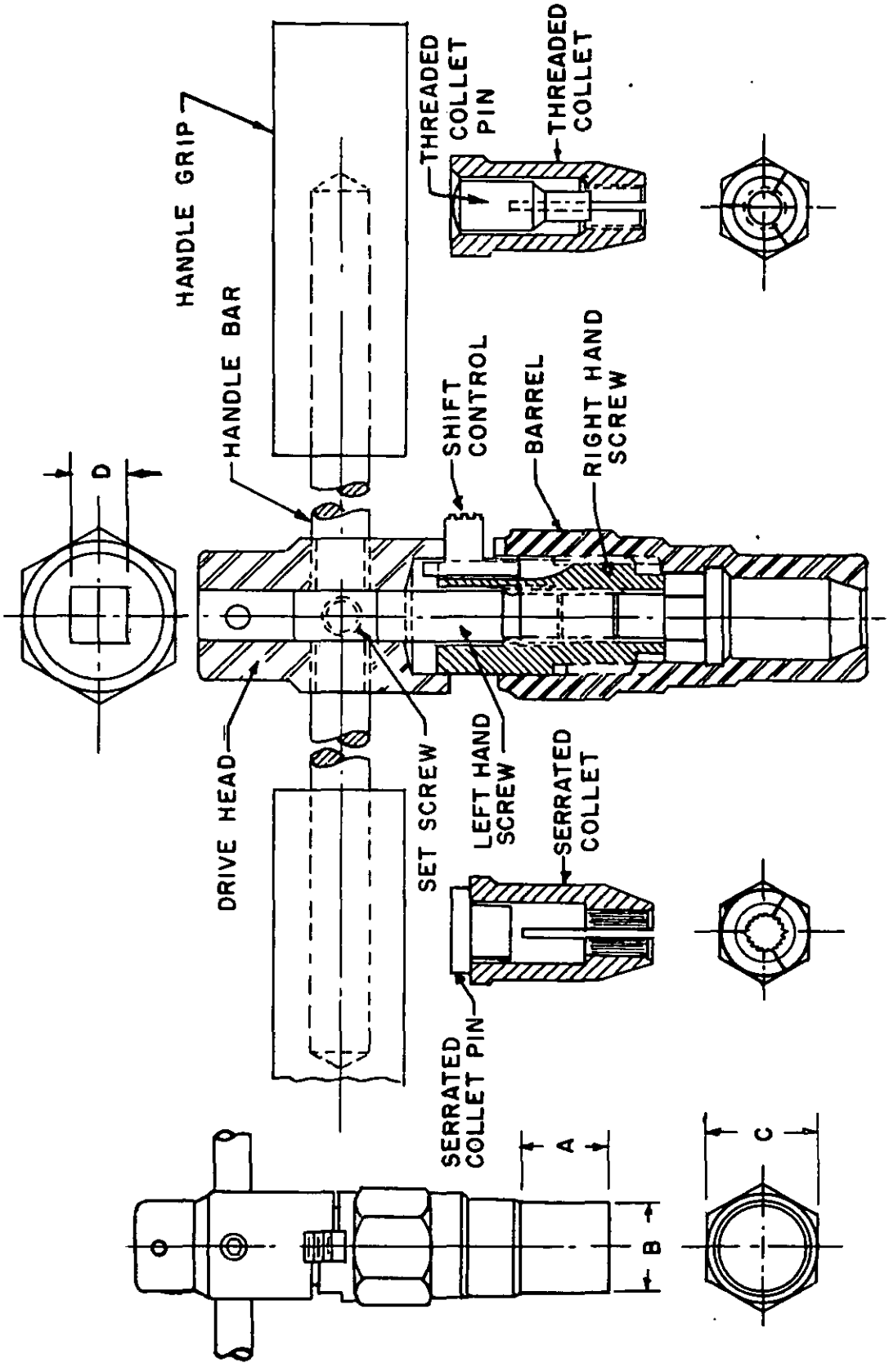

FIGURE 2.—Type I, design B, style a, sizes 1, 2, and 3, collet grip, housing with shift control, short barrel, small, medium and large; and style b, long barrel.

3.8.3.5 *Shift-control button.* — The shift-control button shall be of such size as to permit easy entry into the keyway of the right-hand screw and the slots of the barrel and drivehead. Suitable means shall be supplied to prevent looseness of the shift-control button in its slot. The shift-control button shall have sufficient extension to permit easy operation to move up or down when changing from "drive" to "remove". Hardness shall be not less than 30 nor more than 34 on the Rockwell C scale.

3.8.3.6 *Collet and collet-pin assembly.*

3.8.3.6.1 *Collet.*—The collet shall be of steel having a hardness value of not less than 38 nor more than 42 on the Rockwell C scale. The collet shall have not less than three nor more than four splits to permit proper gripping pressure when compressed on the stud. The collets shall have the outside diameter suitably shaped to engage the bore and taper of the applicable housing. The collet shall be free from the collet pin to the extent that the collet may close sufficiently to insure a complete and positive grip of the collet on the stud. The upper end of the collet shall be hexagonal. The collet shall not extend beyond the face of the barrel when fully compressed on the stud.

3.8.3.6.2 *Collet pin.*—The collet pin shall be a floating type. The hardness of the pin shall be not less than 46 nor more than 50 on the Rockwell C scale.

3.8.3.7 *Style a, short barrel.*

3.8.3.7.1 *Size 1, small; size 2, medium; and size 3, large.*—Sizes 1, 2, and 3 stud removers and setters and their applicable components shall conform to table II and shall be similar to figure 2.

TABLE II.—*Type I, design B, style a, sizes 1, 2, and 3, collet grip, housing with shift control, short barrel, small, medium, and large*

Size	Housing dimensions						Collets			
	A ±1/64	B ±1/64	C Across flats		D		Stud range of thread size		Stud range of serrated sizes	Torsional load Min.
			Min.	Max.	Min.	Max.				
	Inches	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch: NC*	*Inch: NF*	*Inch*	*Inch-Pounds*
1	1 1/16	3/4	0.969	1.000	0.378	0.385	8-32	8-36	--	35
							10-24	10-32	--	50
							1/4-20	1/4-28	1/4	125
							5/16-18	5/16-24	5/16	300
2	1 1/16	1 1/8	1.345	1.375	0.503	0.511	3/8-16	3/8-24	3/8	500
							7/16-14	7/16-20	7/16	1100
							1/2-13	1/2-20	1/2	1400
3	1 5/16	1 1/16	1.9375	2.000	0.753	0.761	9/16-12	9/16-18	9/16	2000
							5/8-11	5/8-18	5/8	3000
							[1] 11/16-11	[1] 11/16-16	11/16	3600
							3/4-10	3/4-16	3/4	4500

[1] NS thread.

3.8.3.8 *Style b, long barrel.*—Style b stud remover and setter and its collet components shall conform to table III, and shall be similar to figure 2.

3.8.4 *Design C, housing with drive screw.*—Design C stud remover and setter shall consist essentially of a housing, drivescrew and collet.

3.8.4.1 *Housing.*—The inside bore at the drive end of the housing shall be tapered to correspond with the tapered portion of the collet. The upper end of the bore shall be threaded to accommodate the external thread of the drivescrew. The outside at the top or upper end of the housing shall be hexagonal in shape and shall have a face hardness of not less than 46 nor more than 50 on the Rockwell C scale.

3.8.4.2 *Drivescrew.*—The drivescrew shall be of steel having a hardness of not less than 58 nor more than 62 on the Rockwell C scale. The threads of the drivescrew shall be in conformance with 3.5. The head of the screw shall be provided with a square female drive (see 3.6).

3.8.4.3 *Collet.*—The collet shall be of steel having a hardness value of not less than 38 nor more than 43 on the Rockwell C scale for the threaded collets and a Rockwell C value of not less than 48 nor more than 52 for the serrated collet. The collet shall have not less than 3 nor more than 4 splits to permit proper gripping pressure when compressed on the stud. The tapered portion of the collet shall correspond with the taper of the inside bore at the open end of the housing. The collet shall not extend beyond the face of the housing barrel when fully drawn and compressed on the stud.

3.8.4.4 *Style c, short nose.*—Style c stud remover and setter housing, internally between the thread and taper shall be provided with a key or pin to prevent collets from rotating when draw of collet is being made. The head and upper end of the collets externally shall be provided with a keyway or slot of sufficient depth and length to allow key or pin in the housing to enter freely. Style c stud remover and setter and its collet components shall conform to table IV and shall be similar to figure 3.

3.8.4.5 *Style d, long nose.*—The style d stud remover and setter housing between the internal thread and taper shall be provided with a female hexagon socket to correspond with the hexagon head of the collet. The fe-

TABLE III.—*Type I, design B, style b, collet grip, housing with shift control, long barrel*

Housing dimensions						Collets			
A ±1/64	B ±1/64	C Across flats		D		Stud range of thread size		Stud range of serrated sizes	Torsional load Min.
		Min.	Max.	Min.	Max.				
Inches	*Inch*	*Inches*	*Inches*	*Inch*	*Inch*	*Inch: NC*	*Inch: NF*	*Inch*	*Inch-Pounds*
2 9/16	1/8	1.345	1.375	0.503	0.511	1/4–20	1/4–28	1/4	125
						5/16–18	5/16–24	5/16	300
						3/8–16	3/8–24	3/8	500

TABLE IV.—*Type I, design C, style c, collet grip, housing with drive screw, short nose*

Housing dimensions									Collets			
A ±1/32	B ±1/64	C Across flats		D		E ±1/8	F +1/32 −1/64	G +1/32 −1/64	Stud range of thread sizes		Stud range of serrated sizes	Torsional load Min.
		Min.	Max.	Min.	Max.							
Inch	*Inches*								*Inch: NC*	*Inch: NF*	*Inch*	*Inch-Pounds*
									1/4-20	1/4-28	1/4	125
									5/16-18	5/16-24	5/16	300
1/2	1 1/8	1.370	1.380	0.503	0.511	4 1/2	1 3/8	1 5/8	3/8-16	3/8-24	3/8	500
									7/16-14	7/16-20	1/16	1100
									1/2-13	1/2-20	1/2	1400

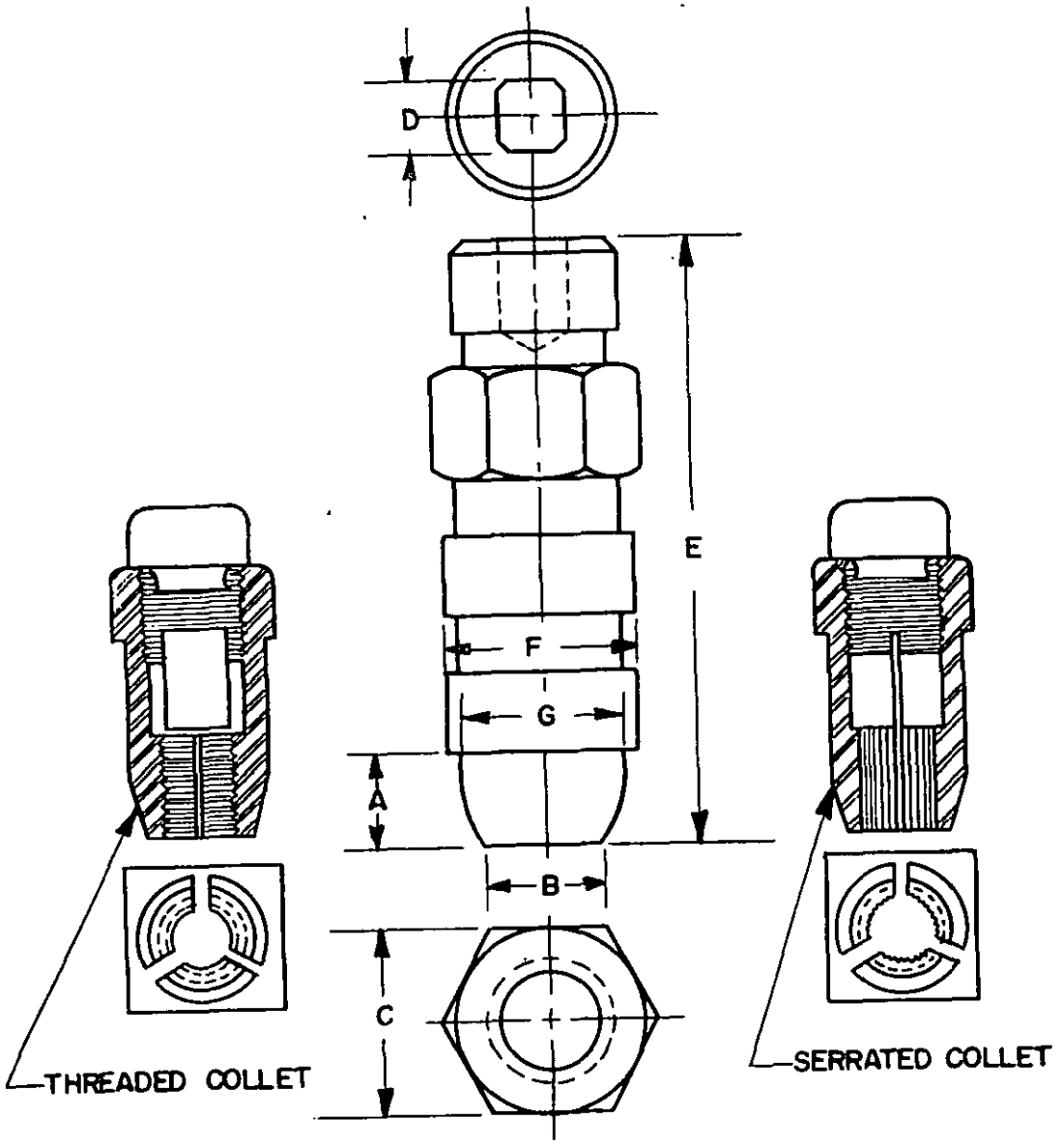

FIGURE 3.—Type I, design C, style c, collet grip, housing with drivescrew, short nose.

male hexagon socket shall be of sufficient depth to prevent the collet from turning or rotating when draw on stud is made.

3.8.4.5.1 *Collet.*—The head or upper end of the collet shall be hexagonal in shape to properly fit the female socket in the housing.

3.8.4.5.2 *Size 1, small; size 2, medium; and size 3, large.*—Sizes 1, 2, and 3 stud removers and setters and their applicable components shall conform to table V, and shall be similar to figure 4.

3.8.4.5.3 *Combination sets.*—Size 1 and size 2 stud remover and setter housings and their collet components may be obtained in a combination set when specified in the contract or order (see 6.1).

3.9 Type II, centered grip.—The stud remover and setter shall be similar to figure 5

TABLE V.—*Type I, design C, style d, sizes 1, 2, and 3, collet grip, housing with drivescrew, long nose, small, medium, and large*

Size	Housing dimensions							Collets			
	A ±1/64	B ±1/64	C Across flats		D		E ±1/64	Stud range of thread sizes		Stud range of serrated sizes	Torsional load Min.
			Min.	Max.	Min.	Max.					
	Inches	*Inches*	*Inches*	*Inches*	*Inch*	*Inch*	*Inches*	*Inch: NC*	*Inch: NF*	*Inch*	*Inch-Pounds*
1	2 1/2	3/4	0.970	1.000	0.378	0.385	5 3/64	8 -32 10 -24 1/4-20 5/16-18	8 -36 10 -32 1/4-28 5/16-24	No. 8 No. 10 1/4 5/16	35 50 125 300
2	2 1/4	1 1/8	1.335	1.375	0.503	0.511	6 1/8	3/8-16 7/16-14 1/2-13	3/8-24 7/16-20 1/2-20	3/8 7/16 1/2	500 1100 1400
3	2 1/4	1 11/16	1.698	1.750	0.753	0.761	6	9/16-12 5/8-11 [1] 11/16-11 3/4-10	9/16-18 5/8-18 [1] 11/16-16 3/4-16	9/16 5/8 11/16 3/4	2000 3000 4000 6300

[1] NS thread.

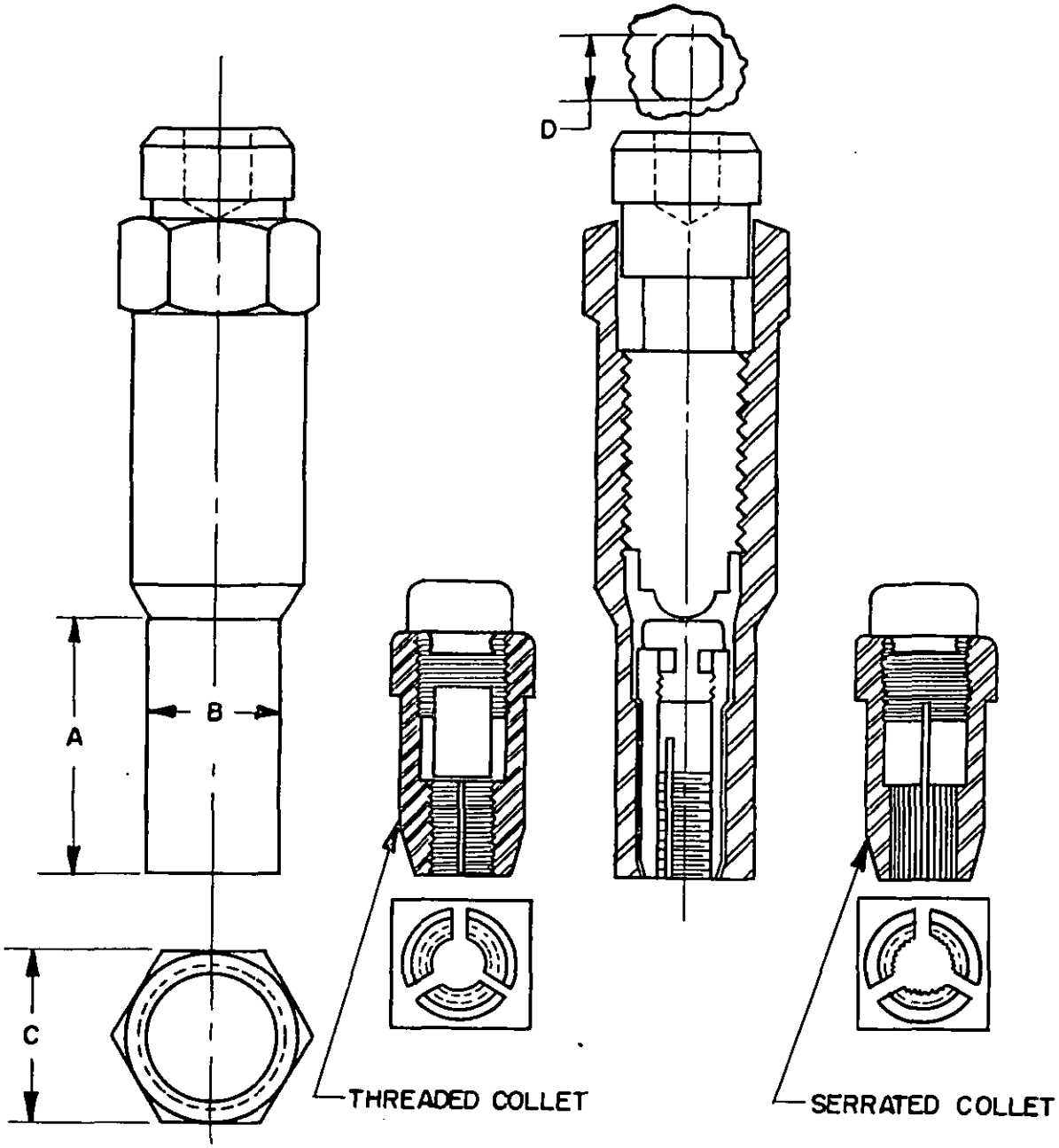

FIGURE 4.—Type I, design C, style d, sizes 1, 2, and 3, collet grip, housing with drivescrew, long nose, small, medium, and large.

and shall consist of housing and jaws, and shall contain a reversible mechanism or equally suitable means for permitting rotation in either direction. The stud remover and setter shall have a stud capacity of ¼ to ½ inch, with a minimum torsion load of 1400 inch-pounds at ½-inch capacity when tested as specified in 4.5.2.

3.9.1 *Housing.*—The housing at the drive end shall be hexagonal in shape with a minimum face length of ⅝ inch and face hardness

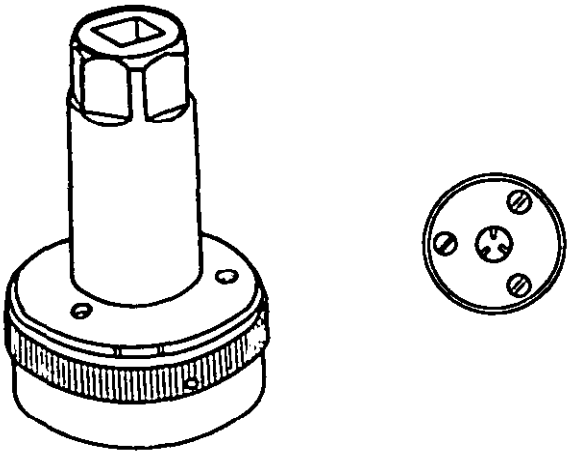

FIGURE 5.—Type II, centered grip.

not less than 43 nor more than 48 on the Rockwell C scale. A ½-inch square female socket may be provided in the hexagon at the drive end (see 3.6).

3.9.2 *Jaws.*—The jaws shall be of steel having grooves or serrations on the jaw engaging surfaces of sufficient depth to assure a positive grip on threaded, smooth, or unthreaded portions of the stud. The jaws shall work freely and shall be properly heat treated to prevent breakage and excessive wear under normal operations of the rated capacity.

3.10 Type III, eccentric grip.—The stud remover and setter shall be similar to figure 6, shall consist of a housing, gripping wheel, and driving shank; with a stud capacity of ¼ to ¾ inch, and shall have a minimum torsion load of 4000 inch-pounds at ¾-inch capacity when tested as specified in 4.5.2.

3.10.1 *Housing.*—The housing shall be provided with one or more stud clearance holes properly located to facilitate the operation of the stud capacity as specified (see 3.10).

3.10.2 *Gripping wheel.*—The gripping wheel shall be of steel having grooves or serrations on the wheel engaging surface of sufficient depth to assure a positive grip on threaded, smooth, or unthreaded portion of the stud. The eccentric gripping action of the wheel shall act in either direction of rotation. The face of the wheel shall be chrome-plated or smoothly ground having a hardness of not less than 50 nor more than 55 on the Rockwell C scale.

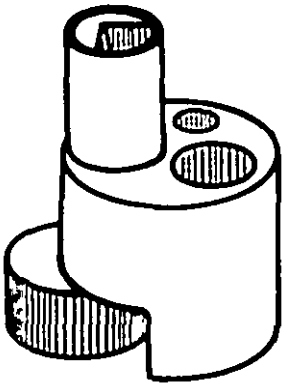

FIGURE 6.—Type III, eccentric grip.

3.10.3 *Driving shank.*—The driving shank at the drive end may be hexagonal in shape or provided with a ½-inch square drive standard female socket, (see 3.6), having a hardness of not less than 43 nor more than 48 on the Rockwell C scale.

3.11 Type IV, wedge grip.—The stud remover and setter shall be similar to figure 7, and shall consist of a body and gripping wedges.

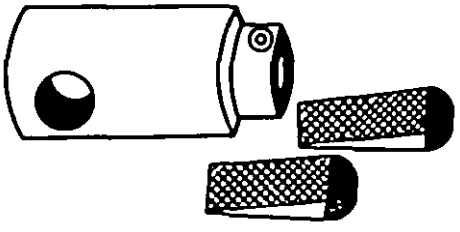

FIGURE 7.—Type IV, sizes 1 and 2, wedge grip, medium and large.

3.11.1 *Body.*—The body shall have a stud clearance hole concentric to the longitudinal axis with a square female socket at the drive end. A spring-tensioned pin or other means shall be provided for holding wedges in the body when not in use. The female socket drive end (see 3.6), shall have a hardness of not less than 43 nor more than 48 on the Rockwell C scale.

3.11.2 *Wedges.*—The wedges shall be tapered on one side only, and shall be similar to figure 7. The tapered surface shall have grooves or serrations of sufficient depth to assure a firm and positive grip on threaded, smooth, or unthreaded portion of the stud. The wedges shall have a hardness of not less than 50 nor more than 55 on the Rockwell C scale.

3.11.3 *Size 1, medium.*—The stud remover and setter shall have a stud capacity of ¼ to ⅝ inch, and shall have a minimum torsion load of 3000 inch-pounds at ⅝ inch capacity when tested as specified in 4.5.2.

3.11.3.1 *Body.*—The body at the drive end shall be similar to figure 6, and shall be provided with a ½-inch square female drive (see 3.6).

3.11.3.2 *Wedges.*—The wedges shall be of sufficient length to assure a positive grip for the range of stud sizes as specified (see 3.11.2).

3.11.4 *Size 2, large.*—The stud remover and setter shall have stud capacity of 9/16 to 1 inch, and shall have a minimum torsion load of 5400 inch-pounds at 1-inch capacity when tested as specified in 4.5.2.

3.11.4.1 *Body.*—The body at the drive end shall be similar to figure 6, and shall be provided with a ¾-inch square female drive (see 3.6).

3.11.4.2 *Wedges.*—The wedges shall be of sufficient length to assure a positive grip for the range of stud sizes as specified (see 3.11.4).

3.12 **Kit or sets.**—When kits or sets of stud removers and setters are required, the components of the kit or set shall be specified (see 6.1), and they shall conform to the requirements of their respective type, design, style, and size covered by this specification. The kit or set shall be furnished in a metal case.

3.12.1 *Metal case.*—The metal case shall contain the necessary hinges, carrying handle and compartments for each component part to facilitate selections and provide a safe and compact method of storage when tools are not in use. The case shall have a protective coating of paint or enamel on both the interior and exterior surfaces. One set of instructions permanently secured to the inside of the cover lid shall be provided with each metal case.

3.13 **Workmanship.** — The workmanship shall be first class in every respect. Surfaces shall be smooth, free from fins or projections. The stud removers and setters shall be free from rust and defects which may affect the appearance, durability, or serviceability.

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 Unless otherwise specified herein, the supplier is responsible for the performance of all inspection requirements prior to submission for Government inspection and acceptance. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order.

4.2 Sampling for lot acceptance inspection.

4.2.1 *Inspection lot.* — All stud removers and setters of the same type, class, design, style, and size offered for delivery at one time shall be considered a lot for purposes of acceptance inspection.

4.2.2 *Sampling for visual and dimensional examination.*—A random sample of stud removers and setters shall be selected from each lot offered for inspection in accordance with Military Standard MIL–STD–105 at Inspection Level III for lots of 40 and under, Inspection Level II for lots of 41 to 300 and Inspection Level I for lots of 301 and over. The Acceptable Quality Level shall be equal to 1.5 percent defective.

4.2.3 *Sampling for lot acceptance tests (except hardness test).*—A random sample of stud removers and setters shall be selected from each lot offered for tests in accordance with Military Standard MIL–STD–105 at Inspection Level L–8. The acceptable quality level shall be 2.5 percent defective. However, the sample size shall be the number associated with the letter in the table and the acceptance number shall be zero until the acceptable quality level permits one or greater. Each of the samples shall be subjected to the tests specified in 4.5.2 and 4.5.3.

4.2.3.1 *Sampling for hardness test.* — A random sample of stud removers and setters shall be selected from each inspection lot in accordance with Military Standard MIL–STD–105 at Inspection Level L–5 for the hardness test specified in 4.5.1.

4.3 Visual and dimensional examination.—Each of the sample stud removers and setters selected in accordance with 4.1.2 shall be visually and dimensionally examined by the inspector to verify compliance with this specification. Any stud remover and setter in the sample containing one or more visual or dimensional defects shall be rejected, and if the number of defective stud removers and setters in any sample exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected.

4.4 Acceptance inspection tests.—Each of the sample stud removers and setters selected in accordance with 4.1.3 shall be subjected to tests specified in 4.5.2 and 4.5.3 (if applicable) to verify compliance with this specification. Any sample stud remover and setter which does not meet the requirements for these characteristics shall be rejected, and if the number of nonconforming stud removers and setters exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected.

4.4.1 *Hardness test.*—Each of the sample stud removers and setters selected in accordance with 4.1.3.1 shall be subjected to the hardness test specified in 4.5.1. If any sample stud setter and remover fails the test, the lot shall be rejected.

4.5 Test procedures.

4.5.1 *Hardness test.*—Each of the sample stud removers and setters selected in accordance with 4.1.3.1 shall be tested to determine conformance to the required Rockwell hardness for the following: All hardness readings shall be made after removing the outer surface to a depth of $\frac{1}{64}$ inch. The readings shall be taken on the Rockwell C scale under a 150-kilogram load.

(*a*) Type I, design A, shall be in conformance with 3.8.2.1 through 3.8.2.4.

(*b*) Type I, design B, shall be in conformance with 3.8.3.1, 3.8.3.2, 3.8.3.3, 3.8.3.5, 3.8.3.6.1 and 3.8.3.6.2.

(*c*) Type I, design C, shall be in conformance with 3.8.4.1 through 3.8.4.3.

(*d*) Type II shall be in conformance with 3.9.1.

(*e*) Type III shall be in conformance with 3.10.2 and 3.10.3.

(*f*) Type IV, sizes 1 and 2 shall be in conformance with 3.11.1 and 3.11.2.

4.5.2 *Torsion test.* — Each of the sample stud removers and setters selected in accordance with 4.2.3 shall be subjected to the torsion load test. Types I, II, III, and IV shall be tested in the following manner. A stud shall be permanently secured in a steel plate, the stud size being determined by the stud remover and setter under test. The stud remover and setter shall be engaged on the

stud and a standard torque wrench or other suitable means shall be utilized to exert a steady pull until the minimum torsion load in inch-pounds is reached or the stud remover and setter or any component fails. Failure is deemed to have occurred when the stud remover and setter or any component breaks or a permanent bend or twist has occurred.

Type I, design A
Sizes 1, 2, and 3 shall conform to 3.8 and table I.

Type I, design B
Style a, sizes 1, 2, and 3 shall conform to 3.8 and table II.
Style b, shall conform to 3.8 and table III.

Type I, design C
Style c, shall conform to 3.8 and table IV.
Style d, sizes 1, 2, and 3 shall conform to 3.8 and table V.

Type II shall conform to 3.9.

Type III shall conform to 3.10

Type IV, size 1 shall conform to 3.11.3.

Type IV, size 2 shall conform to 3.11.4.

4.5.3 *Plastic handgrip test, type I, design B plastic handgrip (at place of manufacture).*

4.5.3.1 *Flammability test.*—The steel handle shall be clamped in a support with the handgrip extended outward in a horizontal position. There shall be clamped in a horizontal position, a 5-inch square piece of 10-mesh Bunsen burner gauze, ¼ inch below the bottom of the handgrip and ½ inch back from the butt end of the handgrip. A Bunsen burner with an efficient flame ½ to ¾ inch in height shall be adjusted so that the flame tip will contact the specimen when placed under the free end of the handgrip. At the end of 30 seconds the flame shall be removed and the sample allowed to burn. The time required for the flame to travel from the butt end to the handle end of the handgrip after removal of the Bunsen burner shall determine the rate of travel of the flame. In case the handgrip does not continue to burn after the first ignition, the Bunsen burner shall be replaced under the free end of the handgrip for a period of 30 seconds immediately following extinction of the flame on the handle grip. If the handgrip does not continue to burn until the flame has reached the handle end of the handgrip after the second ignition, the sample shall be considered self-extinguishing. If the sample continues to burn, the burning rate shall not exceed 2 inches per minute.

4.5.3.2 *Impact test at room temperature.*—Each sample handle shall be held handgrip downward and dropped on a concrete floor from a height of 10 feet. After impact there shall be no breakage, loosening, buckling, spalling, or cracking of the handgrip.

4.5.3.3 *Heat distortion test.*—The handgrip of the sample handle shall be completely immersed in boiling water at 212° Fahrenheit (F.) for a period of 2 minutes. At the end of the period, the handgrip shall be removed from the water and shall show no significant signs of distortion or blistering.

4.6 **Rejected lots.**—Rejected lots may be offered again for inspection provided the contractor has repaired or removed all nonconforming stud removers and setters. The inspector shall again select and examine samples from such resubmitted lots to verify compliance with this specification.

5. PREPARATION FOR DELIVERY

(Civil agencies.—Federal Standard No. 102 should be referred to for definitions and applications of the various levels of packaging protection for supplies and equipment.)

5.1 **Preservation and packaging.**

5.1.1 *Level A.*—Level A preservation and packaging shall be in accordance with level A of Military Specification MIL–P–15424.

5.1.2 *Level C.*—Level C preservation and packaging shall be in accordance with the manufacturer's commercial practice.

5.2 Packing.

5.2.1 *Level A.*—Level A packing shall be in accordance with level A of Military Specification MIL–P–15424.

5.2.2 *Level B.*—Level B packing shall be in accordance with level B of Military Specification MIL–P–15424.

5.2.3 *Level C.*—Stud removers and setters preserved and packaged as specified (see 6.1) shall be packed in a manner to insure carrier acceptance and safe delivery at destination. Containers shall be in accordance with the regulations of carriers as applicable to the mode of transportation.

5.3 Marking.

5.3.1 *Nonmilitary.*—Marking for shipment shall be in accordance with the standard marking of Federal Standard No. 123.

5.3.2 *Military.*—In addition to any special marking required by the contract or order, marking for shipment shall be in accordance with Military Standard MIL–STD–129.

6. NOTES

6.1 Ordering data.—Purchasers should exercise any desired options offered herein, and procurement documents should specify the following:

(*a*) Title, number, and date of this specification.
(*b*) Type, design, and style of stud removers and setters required (see 1.2).
(*c*) Size of stud remover and setter (see 1.2 and applicable table).
(*d*) Size of threaded collet(s) required (see applicable tables).
(*e*) Size of serrated collet(s) required (see applicable tables).
(*f*) When kits or sets are required, specify components of sets (see 3.12).
(*g*) When combination of kits or sets are required (see 3.8.4.4.4).
(*h*) Levels of preservation, packaging, and packing required (see 5.1).

6.1.1 When replacement collets are required, specify the following:

(*a*) Type, design, style and size of replacement collet required.
(*b*) The stud size of replacement collets for each style of stud remover and setter (see 3.10 and applicable tables).
(*c*) Manufacturer's name, or trademark of tool for which collets are required.
(*d*) Quantity required.

6.2 Types, designs, styles, and sizes of stud removers and setters covered in this specification corresponding to those in Federal Specification GGG–S–775 are as follows:

GGG–S–775	*This specification*
Type I—Collet.	Type I.
Class 1—Housing with draw bolt.	Design A.
Design A—Threaded.	Included under design A.
Style 1—Small.	Size 1.
Style 2—Large.	Size 2.
Style 3—Extra large.	Size 3.
Design B—Serrated.	(deleted)
Style 1—Small.	(deleted)

GGG–S–775 (cont.)	*This specification* (cont.)
Class 2—Housing with shift control button.	Design B.
Design A—Threaded.	Included under design B.
Style 1—Small.	Style a, size 1.
Style 2—Large.	Size 2.
Style 3—Extra large.	Size 3.
Design B—Serrated.	Included under design B.
Style 1—Small.	Style a, size 1.
Style 2—Large.	Size 2.
Class 3—Housing with drive screw.	Design C.
Design A—Threaded.	Included under style d
Style 1—Small.	Size 1.
Style 2—Large.	Size 2.
Style 3—Extra large.	Size 3.
Design B—Serrated.	Included under style d
Style 1—Small.	Size 1.
Style 2—Large.	Size 2.
Type II—Three jaw.	Type II.
Type III—Eccentric wheel.	Type III.
Type IV—Wedge.	Type IV.
Style 1—Small.	Size 1.
Style 2—Large.	Size 2.

6.3 Transportation description.—Transportation description applicable to this item is:

Tools, not otherwise indexed by name.
Carload minimum weight 30,000 pounds.

Mechanics' hand tools, not otherwise indexed.
Motor volume minimum weight 30,000 pounds.

MILITARY CUSTODIANS:
Army—Corps of Engineers
Navy—Bureau of Ships
Air Force.

Copies of this specification may be purchased for 15 cents each.