HINGE PINS

This lower hinge pin does not use any shims and is not adjustable. Item A is only used on the 475 IIIA machines. See figure 1.

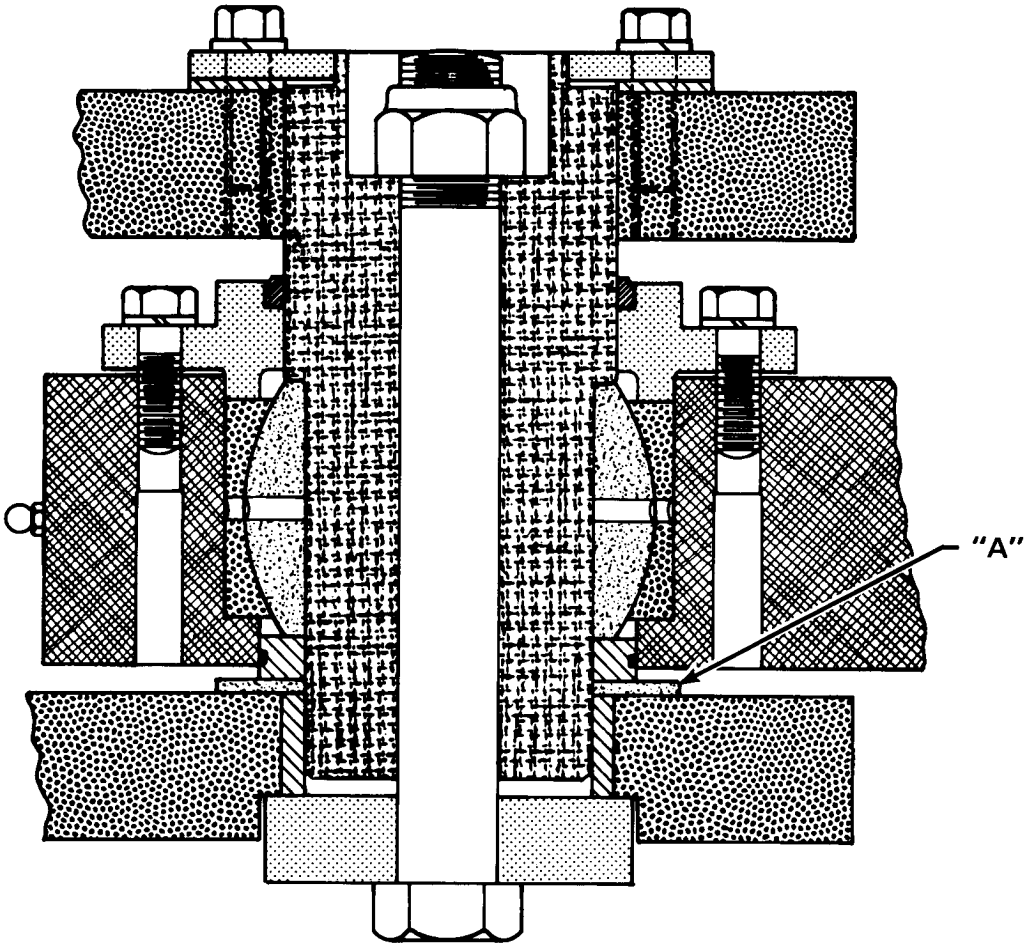


FIGURE 1

Check and Adjust Lower Hinge Pin Bushing:

The lower hinge pin bushing is constructed in a manner which allows for a clearance adjustment between the inner and outer race. By removing shims under the bushing retaining cap, the clearance between the inner and outer race can be adjusted to compensate for wear.

There are two types of adjustable lower hinge pin arrangements in use. Use procedure "A" for adjustment of lower hinge pins with doughnut shaped cover plate and one piece shims. Follow procedure "B" for adjustment of lower hinge pins without doughnut shaped cover plate and split shims.

Check Bushing Adjustment. See Figures 2 & 3.

Park machine on a level surface, attach safety links and lower bucket.

Check center bolt to be certain that it is tightened to specified torque.

Check lower hinge pin bushing by alternately applying down pressure and raising boom at idle. Look for movement or change in distance between front and rear frame plates at center pivot. If any movement is detected, adjust bushing as follows.

1. Using a dial indicator measure the amount of "play" between front and rear frame plates at lower pivot and record measurement.
2. Remove doughnut shaped plate from center pivot, then remove cap.
3. Remove shims equal, or as close as possible, to above measurement to produce a .000 to .010 end play.
4. Reinstall cap and tighten bolts to specified torque.
5. Reinstall doughnut shaped plate and tighten mounting bolts. Retighten center bolt to specified torque.

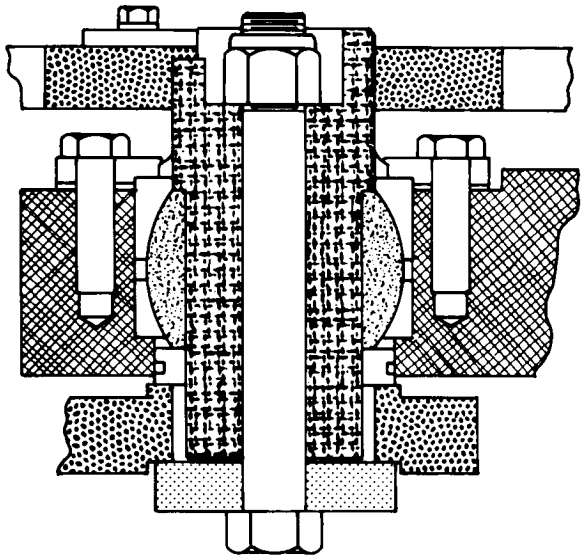


FIGURE 2

Procedure "B". See Figure 3.

1. Using a dial indicator measure the amount of "play" between front and rear frame plates at lower pivot and record measurement.
2. Loosen cap bolts to gain access to shims.
3. Remove shims equal, or as close as possible, to above measurement to produce a .000 to .010 end play.
4. Retighten cap bolts to specified torque. Refer to Bolt Torque Chart in rear of manual.
5. Retighten center bolt to specified torque.

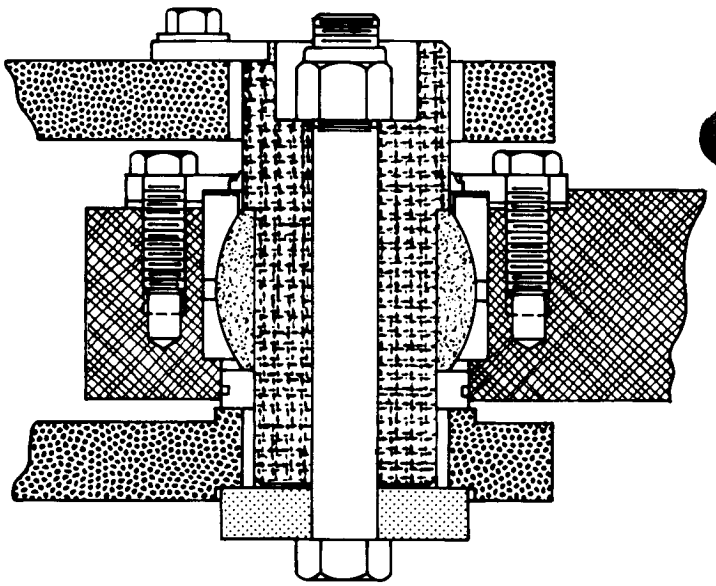


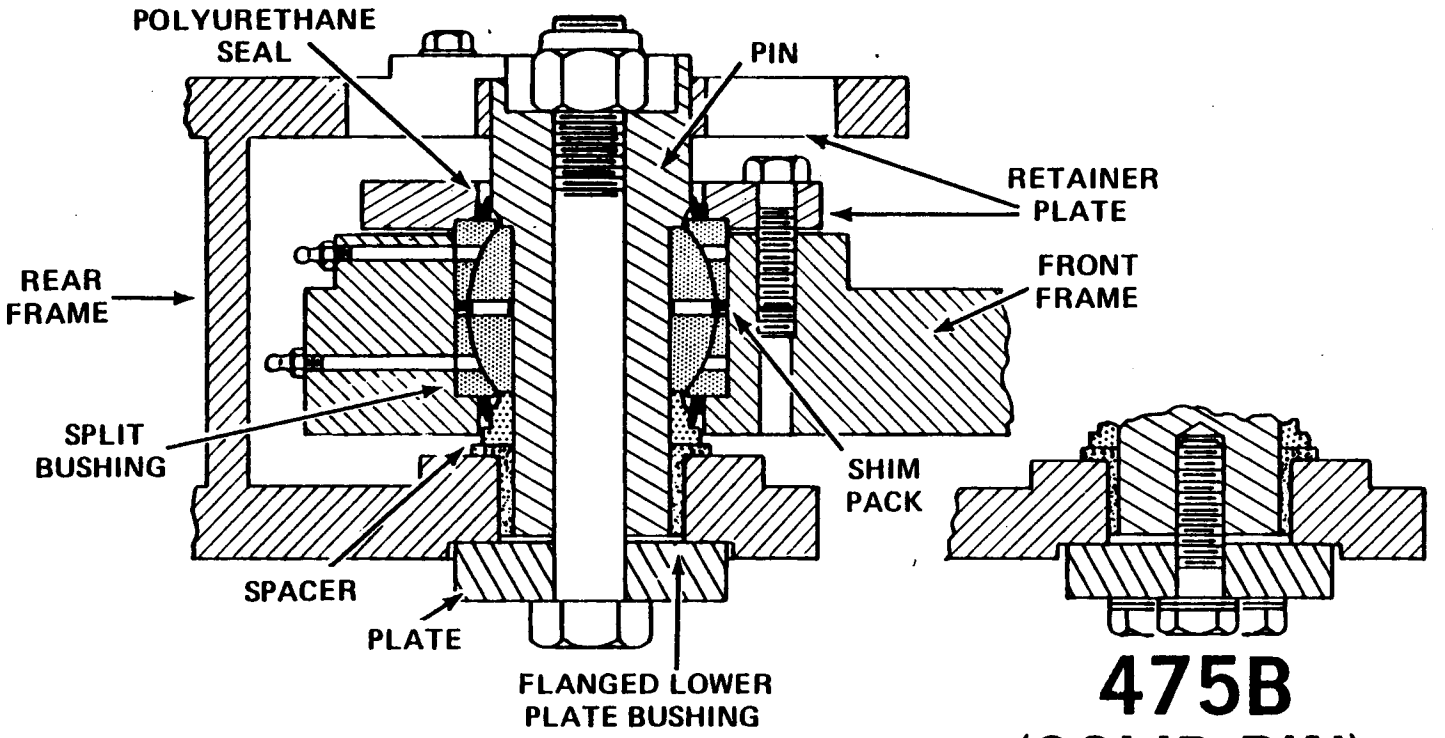
FIGURE 3

ARTICULATED HINGE PINS

MACHINE	DONUT	ADJUSTABLE WITH SHIMS	BOLT SIZE	TORQUE FT. LBS.
45 B	NO	NONE	3/4 - 16	320
55 IIIA	NO	YES AS REQ.	1 - 14	800
75 IIIA	NO	NONE	1 - 14	800
75 B	NO	*YES AS REQ.	1 - 14	800
75 B S/N 443A-101 & After S/N 447A-101 & After	YES	YES AS REQ.	1-1/8 - 12	1100
85 IIIA	NO	YES AS REQ.	1-1/4 - 12	1500
125 B	YES	*YES AS REQ.	1-1/4 - 12	1500
125 IIIA	YES	YES AS REQ.	1-1/4 - 12	1500
175 IIIA	YES	YES AS REQ.	1-1/4 - 12	1500
175 B	YES	YES AS REQ.	1-1/4 - 12	1500
175 B S/N 427C-101 & After S/N 438C-101 & After	YES	*YES AS REQ.	1-1/4 - 12	1500
275 IIIA	NO	NONE	1-1/2 - 12	2000
275 B	NO	*YES AS REQ.	1-1/2 - 12	2000
475 IIIA	YES	NONE	1-3/4-8	2500
475 B	YES	YES AS REQ.	1-1/8 - 12	1160
675 B	YES	YES AS REQ.	1-3/8 - 12	2000
280 IIIA	NO	NONE	1-1/2 - 12	2000
380 IIIA	YES	NONE	1-3/4 - 8	2500

*Shims in center of bearing.

DOUBLE STEEP ANGLE BEARING
(THRU BOLT)



	55B	75B	125B	175B	275B	475B
CURRENT		●	●			●
NEXT LOT				●	●	

TS-14957

CLARK Service gram

24 July 1974

MICHIGAN SG-335D
Group Ref. No. 500

(This bulletin supersedes and replaces SG-335C, dated 6 Sept. 72. REASON: Updated to satisfy latest boom & bucket system spacer requirements).

SUBJECT: Boom Bucket and Bellcrank Spacer Installation
Applicable to all Series IIIA and B Tractor Shovels

Boom, bucket and bellcrank spacers are available to be used as required on subject model machines. These spacers are designed to fill gaps which may be present in the boom and bucket system, thereby protecting the bushing from the entrance of dirt and other foreign material.

Spacers may be installed in subject machines, if desired, by using those listed in the following table, according to individual machine application and installing them in a manner similar to that illustrated in sample case (Figure 1) below.

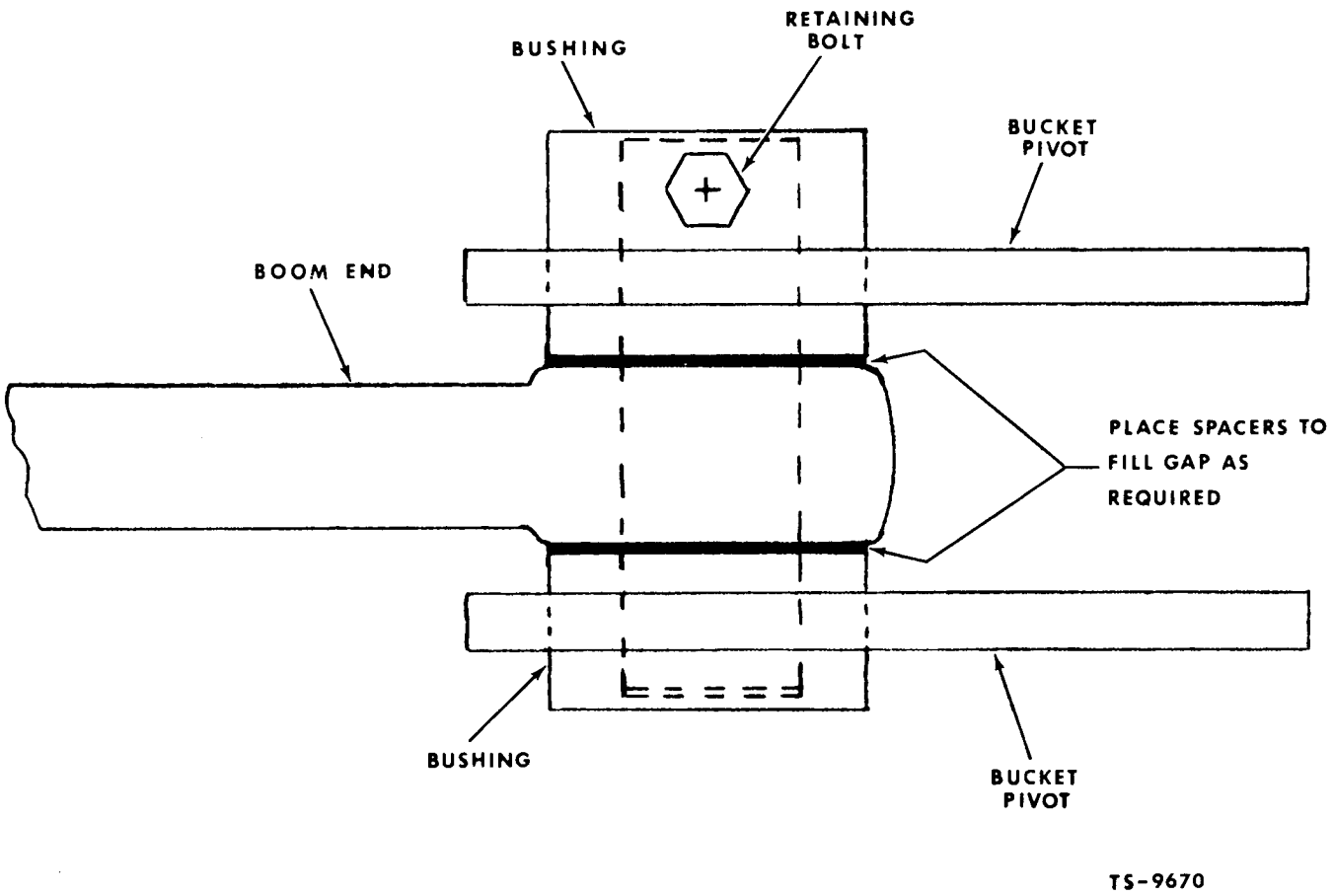


Figure 1 Typical Spacer Installation

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Model	Part No.	Thickness	I. D.	O. D.	Application
55-III A	1547964	.1345 in.	2.32	5.00	Boom to Frame
55-III A	1513236	.1345 in.	2.08	3.80	Bucket Cylinder to Frame
55-III A	1540169	.1046 in.	2.56	5.00	Boom to Bellcrank
55-III A	1547962	.1345 in.	1.76	3.76	Boom to Bucket
55-III A	1516945	.1046 in.	1.60	4.00	Pushrod to Bucket
75-III A	1547891	.1345 in.	2.58	4.76	Boom to Frame
75-III A	1547964	.1345 in.	2.32	5.00	Boom to Bucket
75B	1547964	.1345 in.	2.32	5.00	Boom to Frame
75B	1513236	.1345 in.	2.08	3.80	Bucket Cylinder to Frame
75B	1540169	.1046 in.	2.56	5.00	Boom to Bellcrank
75B	1547962	.1345 in.	1.76	3.76	Boom to Bucket
75B	1516945	.1046 in.	1.60	4.00	Pushrod to Bucket
85-III A	1540168	.1345 in.	2.56	5.00	Boom to Frame
85-III A	1516947	.1345 in.	2.10	4.50	Bucket Cylinder to Frame
85-III A	1541450	.1875 in.	3.12	7.00	Boom to Bellcrank
85-III A	1547963	.1345 in.	2.08	5.00	Boom to Bucket
85-III A	1516944	.1046 in.	1.90	4.50	Pushrod to Bucket
125-III A	1516946	.2500 in.	2.60	6.00	Boom to Frame
125-III A	1516941	.1046 in.	2.60	6.00	Boom to Frame
125-III A	1540169	.1046 in.	2.56	5.00	Bucket Cylinder to Frame
125-III A	1540169	.1046 in.	2.56	5.00	Boom to Bucket
125-III A	1540169	.1046 in.	2.56	5.00	Pushrod to Bucket
175-III A	1516946	.2500 in.	2.60	6.00	Boom to Frame
175-III A	1516941	.1046 in.	2.60	6.00	Boom to Frame
175-III A	1540169	.1046 in.	2.56	5.00	Bucket Cylinder to Frame
175-III A	1540169	.1046 in.	2.56	5.00	Boom to Bucket
175-III A	1540169	.1046 in.	2.56	5.00	Pushrod to Bucket
175B	1516939	.1046 in.	3.10	5.00	Boom to Frame
175B	1540169	.1046 in.	2.56	5.00	Bucket Cylinder to Frame
175B	1516940	.1046 in.	3.10	6.00	Boom to Bellcrank
175B	1516939	.1046 in.	3.10	5.00	Boom to Bucket
175B	1540169	.1046 in.	2.56	5.00	Pushrod to Bucket
275-III A	1541396	.1046 in.	3.07	5.50	Boom to Frame and Bucket
275-III A	1541397	.1345 in.	3.07	5.50	Boom to Frame and Bucket
275B	1516938	.1046 in.	3.60	7.00	Boom to Frame
275B	1516939	.1046 in.	3.10	5.00	Bucket Cylinder to Frame
275B	1516938	.1046 in.	3.60	7.00	Boom to Bellcrank
275B	1516939	.1046 in.	3.10	5.00	Boom to Bucket
275B	1540169	.1046 in.	2.56	5.00	Pushrod to Bucket
275B (425C)	2508719	.1046 in.	3.56	5.00	Boom & Pushrod to Bucket
475-III A & B	1546695	.1046 in.	5.08	9.00	Boom to Frame
475-III A & B	1546696	.2500 in.	5.08	9.00	Boom to Frame
475-III A & B	1516943	.1345 in.	4.10	9.00	Bucket Cylinder to Frame
475-III A & B	1516942	.1046 in.	4.10	9.00	Bucket Cylinder to Frame
475-III A & B	1547917	.1345 in.	4.06	7.50	Boom to Bucket
475-III A & B	1547917	.1345 in.	4.06	7.50	Pushrod to Bucket

C/N 17169, 35670, 35972
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SG-335D

CLARK Service gram

April 30, 1971

MICHIGAN SG-378

Group Ref. No. 900

SUBJECT: Front to Rear Frame Center Hinge Pin Bolt & Nut
All Models of Articulated MICHIGAN Tractor Shovels & Dozers

The front and rear frames of all articulated tractor shovels and dozers are joined together by precision made heavy duty, induction hardened, steel hinge pins fit in self aligning spherical bushings, providing maximum strength and dependability for all loads and stresses encountered during operation. See Figure 1 herein for typical center pivot construction.

During the initial hours of operation, the working motions of the machine tend to cause hinge pin components to seat themselves in place do to normal "break-in action." Under certain conditions, this action can cause a slight lessening of tension between the lower hinge pin bolt and nut. It is therefore recommended that after the first eight (8) hours or work shift of operation the lower hinge pin bolt and nut be checked for tightness. Subsequent checks for tightness should be made every 500 hours of operation. Refer to applicable Operators Manual of machine model involved for torque specifications on center hinge pin bolt and nut.

Little or no maintenance is required in this area, other than the above, except for periodic lubrication. These hinge pins are to be lubricated after every eight (8) hours of operation, through grease fittings provided, with a lithium base multi-purpose grease, Grade 2 for temperatures of 0°F. and above and Grade 0 for below 0°F. Lack of proper and periodic lubrication can and will cause excessive wear, improper operation and failure of components involved.

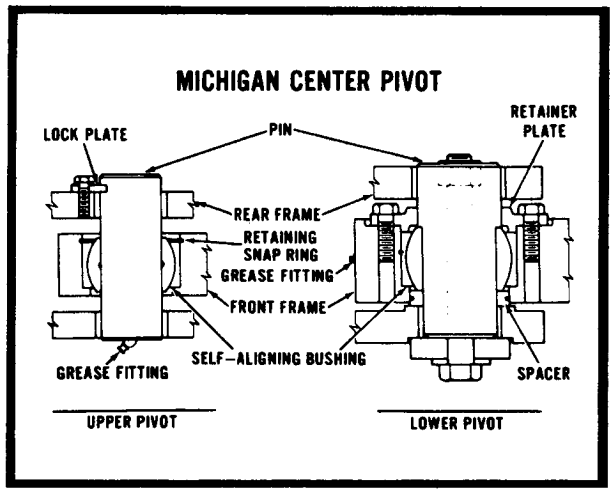

Figure 1.

CLARK Service gram

27 June 1973

MICHIGAN SG - 445A
Group Ref. No. 1900

(This bulletin supersedes and replaces SG - 445A, dated 9 August 1972.
REASON: Revised to include 55-IIIA, 75B, 125-IIIA & 280-IIIA.)

SUBJECT: Cockpit Reinforcing Gussets
Model 55-IIIA, 75B, 85-IIIA, 125-IIIA, 175B,
275B, 280-IIIA, & 475-IIIA

An improvement change has been introduced on subject model machines featuring the addition of a stabilizing gusset to the right rear corner of the cockpit for the purpose of increased cockpit ridgidity. Due to the fact that this was a running change without change in cockpit part number, serial break information of effective point of change is not available.

This improvement may be added to machines in the field on which subject gusset is not present by fabricating said gusset from .30" (7,6) thick SAE 1020 HRS stock according to dimensions given in Figure 1 and installing same as illustrated in Figure 2.

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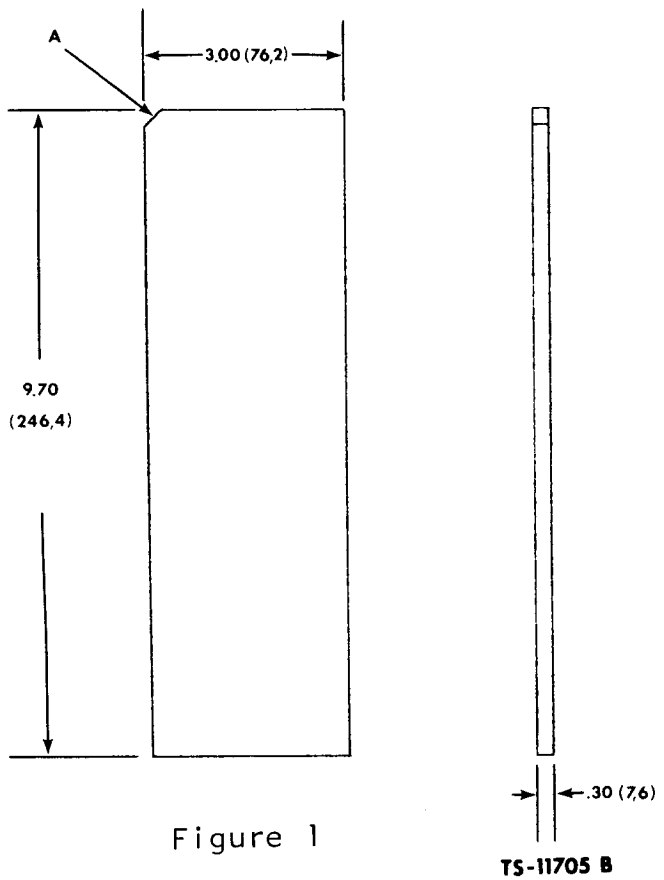

Figure 1

A. .30" (7,6) x 45° Chamfer

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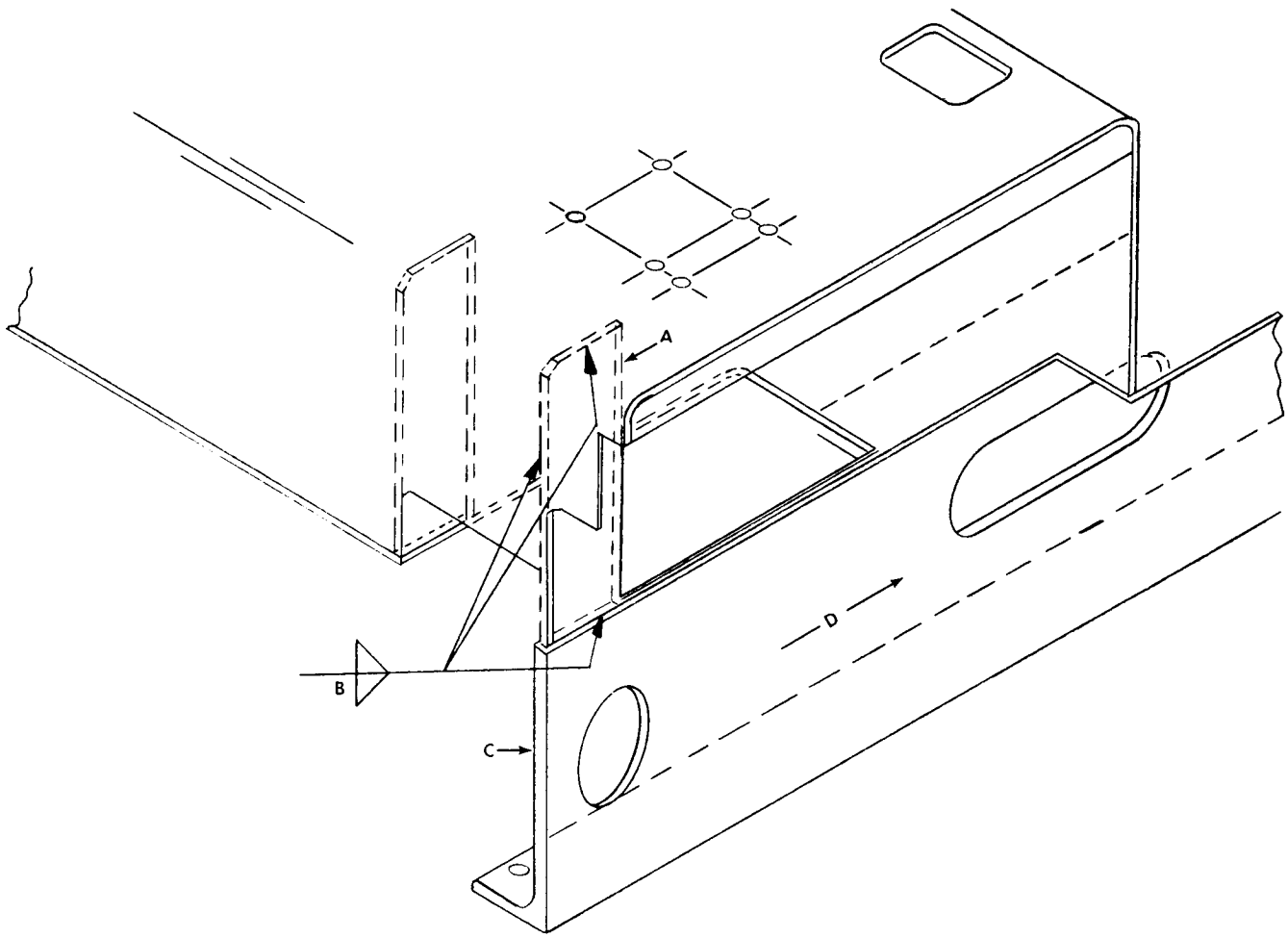

TS-11707 B

Figure 2

A. Reinforcing Gusset, (See Figure 1)
B. .19" (4,8) Fillet Weld both sides
C. Right Hand Rear Corner of Cockpit
D. Front of Cockpit

NOTE: Use 3/16 AWS-E-7014 electrode or equivalent

CLARK Service gram

13 November 1974

MICHIGAN SG-492B
Group Ref. No. 900

(This bulletin supersedes and replaces SG-492A, dated 23 October 1974. REASON: To provide serial number break for machines built overseas).

SUBJECT: Front Frame Axle Pad Reinforcement
Model 175B Tractor Shovel

An improvement change has been made on the subject model machine, incorporating the use of reinforcing gussets on the front frame axle pads for the purpose of increased rigidity and improved service life. This change became effective on machines shipped from the factory with S/N 427B225, 427B231 and after, 438B149FSC and after, and 427B109ENC and after.

This change may be incorporated, if desired, on machines in the field prior to the above serial number by using parts listed below, and installing same in accordance with the following instructions:

PARTS REQUIRED (per machine):

2 - 2504887 Gusset
2 - 604032 Rec. Flat

INSTALLATION (Refer to Fig. 1):

NOTE: Perform the following operations on both sides of front frame.

1. Remove existing gusset, Item 1. Grind smooth the area from which gusset was removed. Do not remove tapped block, Item 2.

2. *Install and weld in place 604032 rectangular flat, Item 3, as shown in Fig. 1.

3. *Install and weld in place 2504887 gusset, Item 4, as shown in Fig. 1. Center the gusset between the axle to frame bolts.

*NOTE: All paint and foreign material must be removed from areas in which weld is to be placed before welding.

4. Spot paint as required.

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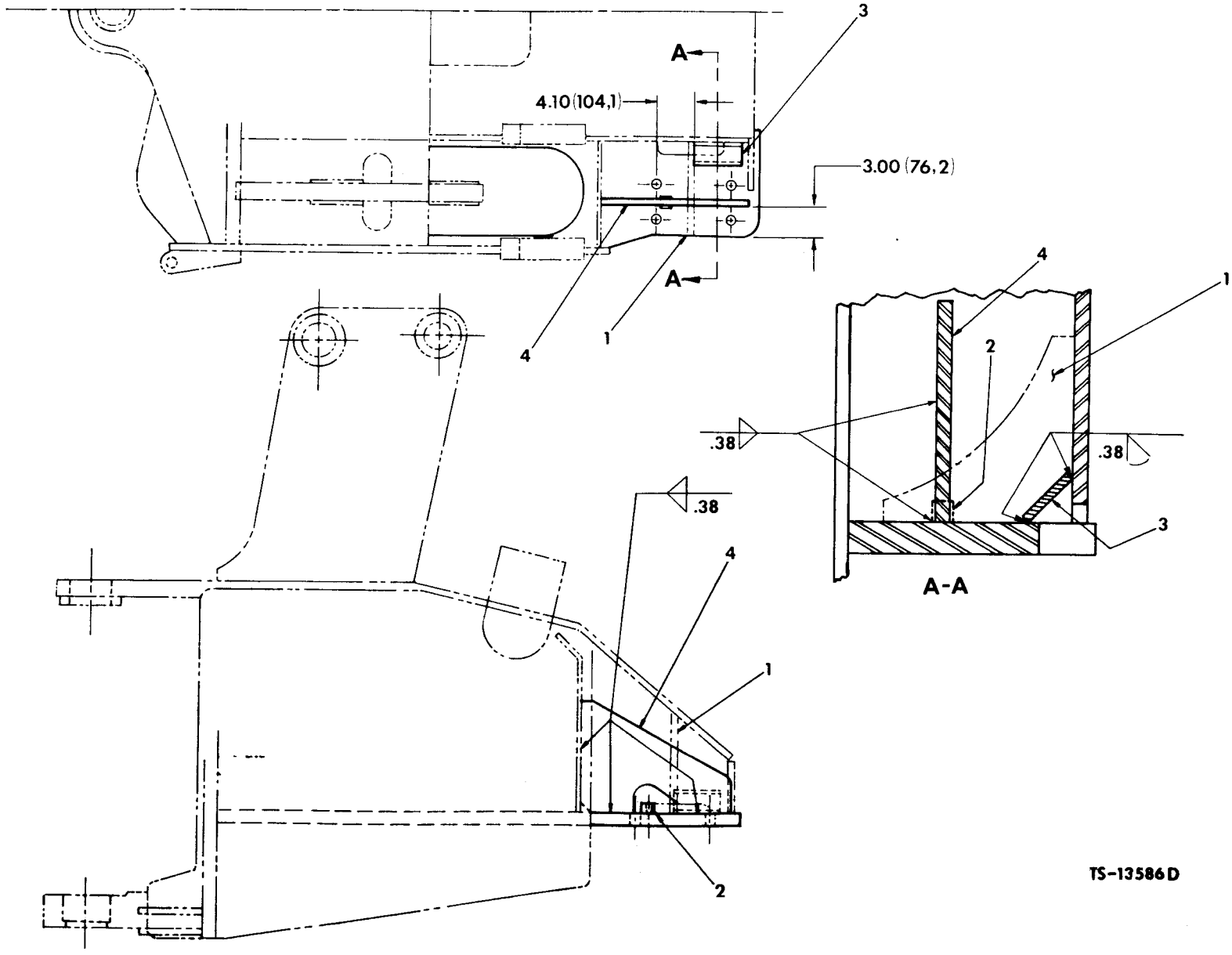

FIGURE 1.

CLARK Service gram

24 April 1974

MICHIGAN SG-507
Group Ref. No. 900

SUBJECT: Rubber Shim Spacer for MICHIGAN Cantilever ROPS Models 45B, 55-IIIA, 75B, 125-IIIA, 125B, 175B, 275B, 475-IIIA, 475B, 280-IIIA & 380-IIIA

A product improvement change has been made on the subject model machines to incorporate rubber shim type spacers on the ROPS support pins, one spacer on each side of the vertical supports, for the purpose of preventing the vertical supports from working sideways on the support pins. This was a running type change and a record of serial number effectivity is not available.

This change may be incorporated, if desired, on machines in the field by ordering the rubber spacers listed below, and installing same in accordance with instructions given herein.

PARTS REQUIRED (per machine):

12 - 2507221 Spacer

INSTALLATION:

1. Refer to Figure 1 and install two 2507221 Spacers at each of the three points indicated on both sides of machine as shown in View AA.

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SPR-05274

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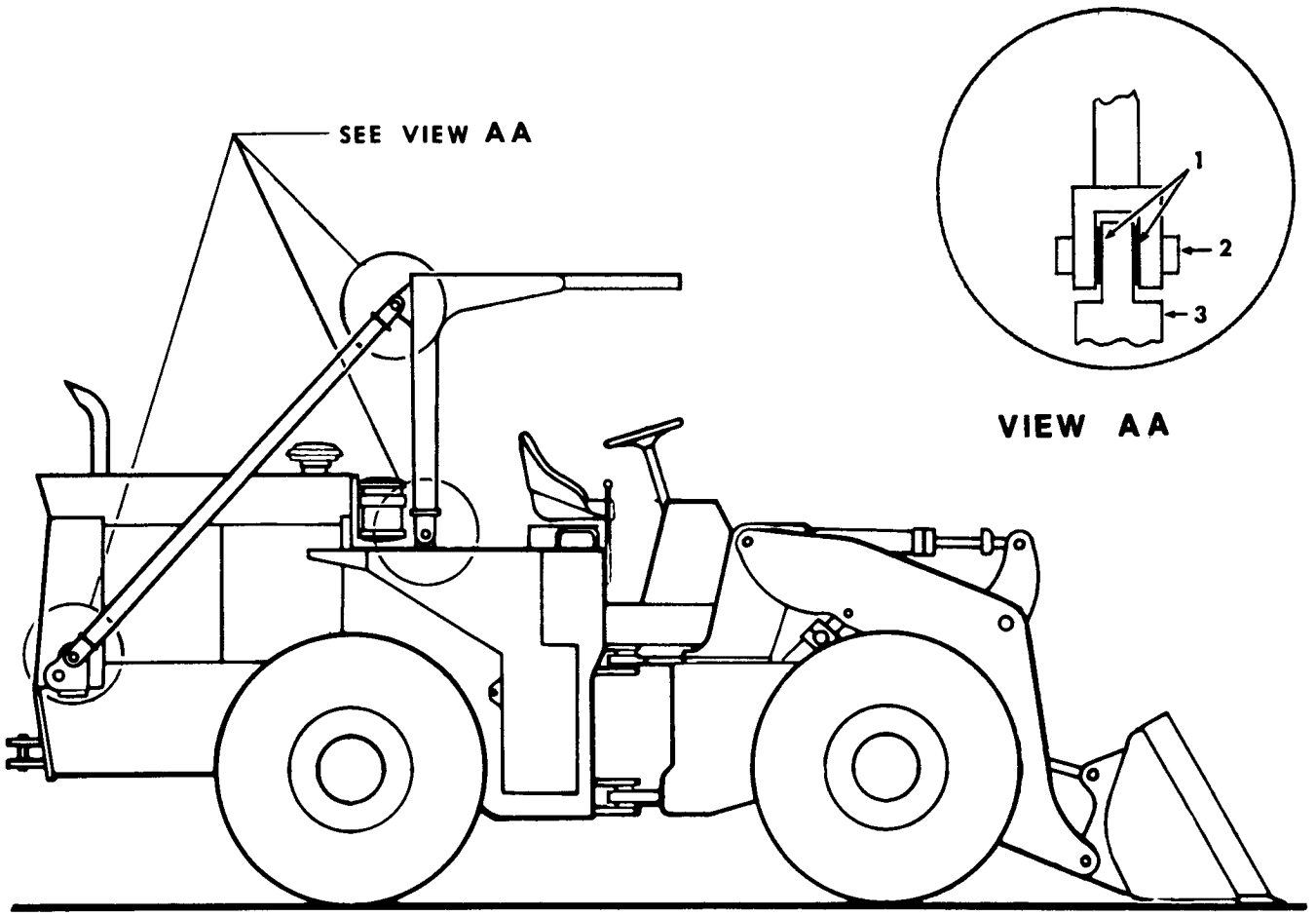

Figure 1

1. 2507221 Spacer (12 required)
2. Pin
3. Mount

CLARK Service gram

September 1981

MICHIGAN SG -543A
Group Ref. No. 900

(This bulletin replaces SG-543 dated 28 May 1975. REASON: To correct Shim Specifications on step 7).

SUBJECT: Lower Hinge Pin Bushing Checkout and Adjustment
Model 75B (S/N 443A and 447A) 125B, 175B and 275B

The lower hinge pin bushing is constructed in a manner which allows for a clearance adjustment between the inner and outer race. By removing shims from between the upper and lower halves of the outer race, the clearnace between the inner and outer race can be adjusted to compensate for wear. A doughnut shaped plate is incorporated in the rear frame plate above the lower hinge and bushing assembly components.

The lateral clearance of the lower hinge pin bushing should be checked for proper adjustment as outlined in the following procedure.

1. Park machine on a level surface, attach safety links and lower bucket.

2. Check center bolt to be certain that is is tightened to specified torque. See Bolt Torque Chart in rear portion of applicable operators manual.

3. If it is necessary to retighten the center bolt, check the lower hinge pin bushing by alternately applying down pressure and raising boom at idle. Look for movement or change in distance between front and rear frame plates. If movement is detected, it will be necessary to check the adjustment of the bushing with a dial indicator.

4. Using a dial indicator, measure the amount of "play" between front and rear frame plates. The dial indicator must be set up as closely as possible to the lower hinge pin itself. Either the boom and bucket or a hydraulic jack can be used to move the front and rear frames with respect to each other. Record dial indicator measurement.

NOTE: *With the bushing properly adjusted, average movement between frame plates will be between .008 (0,2) and .012 (0,3). Minimum movement 2hich will require adjustment is approximately .025 (0,6).*

5. If adjustment is required, refer to Figure 1 for identification of lower hinge pin and bushing assembly components and proceed with Step 6. If movement between frame plates is less than .025 (0,6) no adjustment is required.

6. Remove doughnut shaped plate from above the lower hinge pin assembly, then remove the bushing cap, pin, seal, upper portion of outer race and the inner race (ball).

7. Remove appropriate shim thickness from between the upper and lower halves of the outer race. For every .001 (0,025) movement to be removed, remove .001 (0,025) shim thickness.

8. Reinstall inner race (ball), upper portion of outer race, seal, pin and cap. Tighten cap bolts to specified torque. Reinstall center bolt assembly and tighten center bolt to specified torque. See Bolt Torque Chart in rear portion of applicable operators manual.

9. Reinstall doughnut shaped plate and tighten mounting bolts. Recheck adjustment with dial indicator to confirm adjustment to be within specification.

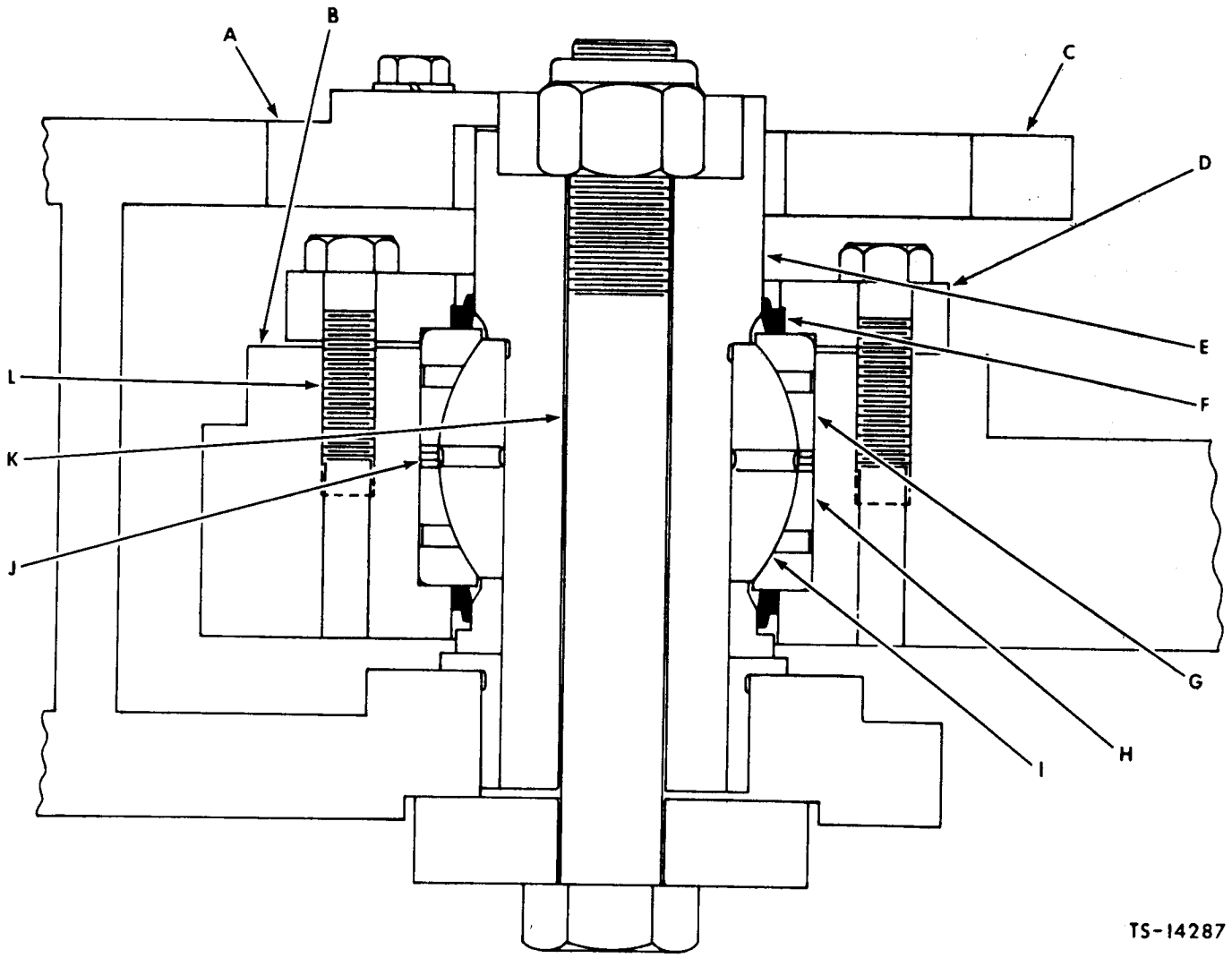

Figure 1

A - Doughnut shaped Plate
B - Front Frame
C - Rear Frame
D - Cap
E - Pin
F - Seal
G - Outer Race Upper
H - Outer Race Lower
I - Inner Race
J - Shims
K - Center Bolt
L - Cap Bolt

(5G20)

CLARK Service gram

1 September 1976

MICHIGAN SG-606
Group Ref. No. 500

SUBJECT: Replacement Bucket Assemblies
Model 175B Tractor Shovels
Serial Numbers 427A or B - 101 and up
or 438A or B - 101 and up

All replacement bucket assemblies fit those machines having sealed bucket pins. Machines not equipped with sealed bucket pins require rework, using an adapter kit. Pin adapter kits consist of two bushing assemblies for each push rod to make the rod end wide enough to fit the new bucket assemblies with the (longer) sealed pins. Rework as follows:

Send orders for replacement Bucket Assembly Kits to:

Clark Equipment Company, CMD
Sales Order Department
P. O. Box 547
Benton Harbor, Michigan 49022

DO NOT place orders for replacement bucket assembly kits with the Central Parts Division. If additional replacement bushings are required for the reworked bucket assembly in the future , such "bushing only" orders are to be placed with Central Parts Division by part numbers given in Form 003128 attached.

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FORM 003128
REPLACEMENT BUCKET ASSEMBLY KITS
AND REWORK DATA FOR
MODEL 175B - S/N 427A or B - 101 and up
438A or B - 101 and up

PARTS REQUIRED - Select applicable kit below:

			ORIGINAL BUCKET #
960627 Bucket Assy Kit - 4.5 cu. yd. Straight Edge		replaces	1548118 1516971
1 - 2506066	Sealed Pin Bucket Assy		
1 -*2509387	Pin Adapter Kit		
960628 Bucket Assy Kit - 4.5 cu. ft. Spade Nose		replaces	1542837 1516967
1 - 2506079	Sealed Pin Bucket Assy		1547656
1 -*2509387	Pin Adapter Kit		
960629 Bucket Assy Kit - 5.0 cu. yd. Straight Edge (Std.)		replaces	1516969
1 - 2505721	Sealed Pin Bucket Assy		1547617
1 -*2509387	Pin Adapter Kit		1539548
960630 Bucket Assy Kit - 5.5 cu. yd. Straight Edge (Material Handling)		replaces	1516970
1 - 2506156	Sealed Pin Bucket Assy		1547778
1 -*2509387	Pin Adapter Kit		
960631 Bucket Assy Kit - 6.0 cu. yd. Straight Edge (Material Handling)		replaces	1516968
1 - 2506053	Sealed Pin Bucket Assy		1549454
1 -*2509387	Pin Adapter Kit		

*2509387 Pin Adapter Kit consists of:

4 - 2509389 Bushing Assembly

1 - 2509388 Bushing pressed into
1 - 2509390 Circular Flat

1 - 1534490 Identification Plate

REWORK INSTRUCTIONS:

1. Remove existing bushing from one end of push rod.
2. Clean both sides of push rod, making sure dirt and grease are entirely removed.
3. Press in notched ends of bushing assemblies from both sides of each push rod as shown in Figure 1.

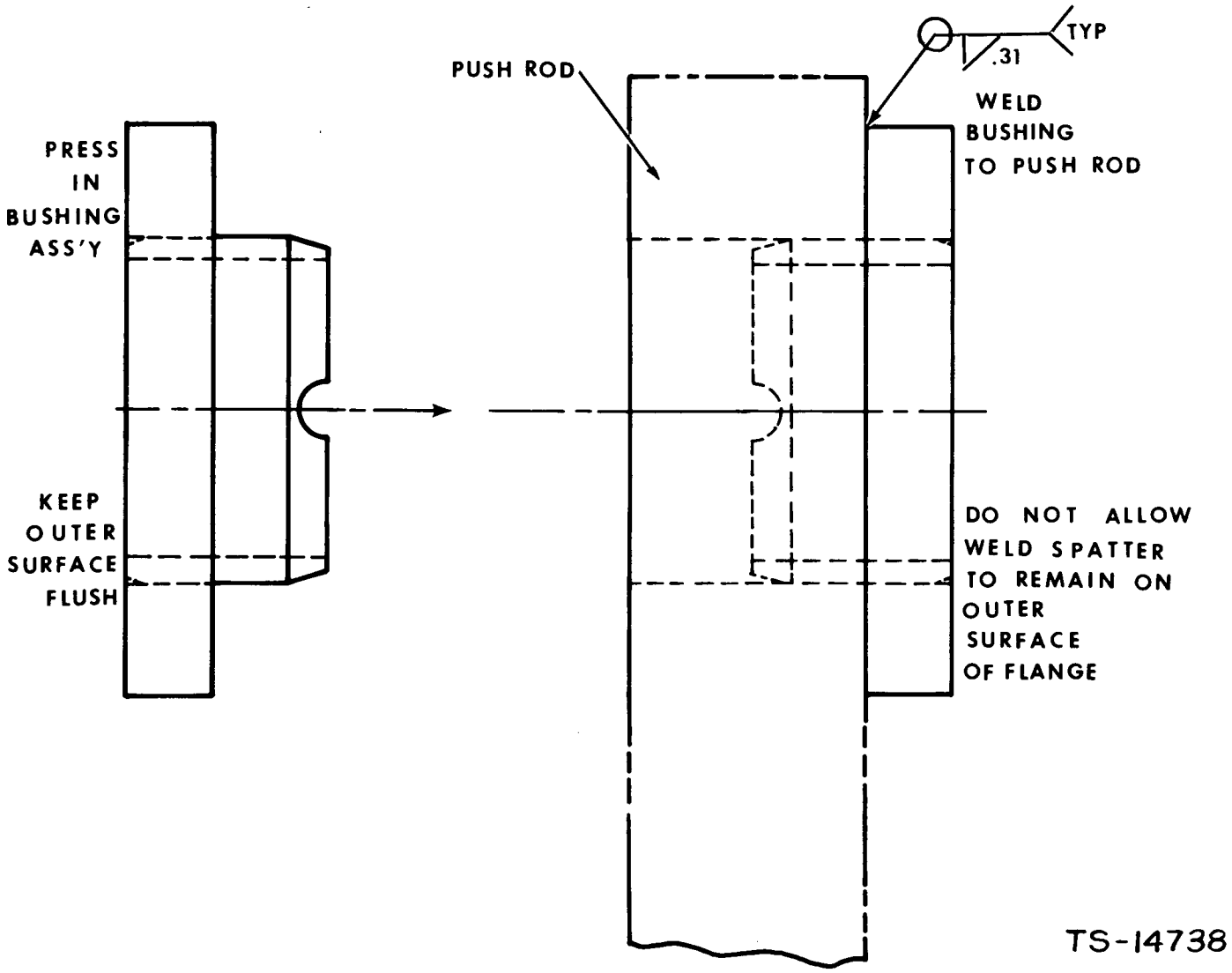


Figure 1

NOTE: The position of the lubricant notches in the bushings is not important.

4. Check alignment of ID of hole for pin and weld outer circumference of bushing assembly to side of push rod, using .31" fillet weld all around. Keep faces and inside diameters of all bosses and bushings free of weld spatter.

5. Push rod end with bushings will now be correct width for insertion between ribs of replacement bucket with proper clearance for installation of sealed pin.

6. Remove existing bucket identification plate and weld in place a new plate, 1534490, using a .12" fillet weld on both ends. Stamp applicable bucket assembly kit part number on new plate, using metal number stamps having about .25" (6,35) high numbers.

MODEL 175B
REPLACEMENT BUCKET DATA, SERIAL NUMBER 427A or B - 101 and up
or 438A or B - 101 and up

ORIGINAL BUCKET ASSEMBLY	CAPACITY (CUBIC YARDS)	CUTTING EDGE	REPLACED BY KIT NO.
1548118	4.5	Straight	960627
1516971	4.5	Straight	960627
1542837	4.5	Spade Nose	960628
1516967	4.5	Spade Nose	960628
1547656	4.5	Spade Nose	960628
1516969	5.0	Straight (Std.)	960629
1547617	5.0	Straight (Std.)	960629
1539548	5.0	Straight (Std.)	960629
1516970	5.5	Straight (Material)	960630
1547778	5.5	Straight (Material)	960630
1516968	6.0	Straight (Material)	960631
1549454	6.0	Straight (Material)	960631

NOTE: Replacement high lift bucket assemblies for High Lift Boom Attachment do not require rework and may be ordered by bucket assembly part number stamped on identification plate on bucket assembly.

CLARK Service gram

5 October 1977

IMPORTANT

MICHIGAN SG-670
Group Ref. No. 900
1500

SUBJECT: Unauthorized Modification of Roll-Over Protective Structures (ROPS)

Occassionally we learn of distributors or customers that have made unauthorized modifications or alternations to the ROPS. Some examples are welding on fire extinguisher brackets, CB antenna brackets and fire suppression systems. Unauthorized modifications of this nature can affect the structural integrity of the ROPS and will void the certification.

The Roll-Over Protective Structures (ROPS) manufactured and sold by Clark Equipment Company have been certified to meet specified test requirements. These certifications are required by the U. S. Department of Labor under OSHA Regulation 1926.1000.

> *Any modification or change to the ROPS automatically voids that certification and may make you, the distributor, if you made that modification, liable in the event of injury or death to the operator because of such modification or change.*

Any planned modification or change must be reviewed in advance by the Engineering Department of Clark Equipment, Construction Machinery Division, to determine if the modification or change can be made within the limits of the certifying tests.

It is important that each person in your distributor organization, including Management, Sales and Service Department be made fully aware of these rules involving ROPS.

Whenever anyone observes a machine ROPS with unauthorized modifications or changes, both the customer and Clark should be notified in writing.

CLARK Service gram

4 October 1978

MICHIGAN SG-713A
Group Ref. No. 900

(This bulletin replaces SG-713, dated 16 August 1978.
REASON: Updated to revise visual inspection time interval.)

SUBJECT: ROPS Maintenance

Rollover Protective Structures are for the protection of the operator if a machine rolls over. As each machine continues in service, it is possible that fatigue cracks can develope in the ROPS. If this condition is undetected, it could cause failure of the ROPS in the event of a rollover. To detect an early change in condition of the ROPS, make a visual inspection of the ROPS structure every 250 operating hours. If a rollover occurs, replace the entire ROPS before you put the machine back into service. Use the following procedure when you make a visual inspection.

1. Check for bent, deformed or broken ROPS legs or mounting brackets. Damage in these areas cannot be repaired. Replace ROPS or mounting brackets in this condition.

2. Check for loose or missing bolts. Replace missing bolts with grade 8 bolts. Tighten loose bolts to the specified torque. Replace all bolts in the ROPS mounting group as well as the ROPS structure if the machine has been in a rollover accident.

3. Check the rubber vibration dampeners for wear and damage. If the ROPS structure makes a rattling noise when you operate the machine, replace the vibration dampeners.

4. If the ROPS was in a fire, replace the entire ROPS, including mounts, brackets, bolts and vibration dampeners.

5. Check for cracks in the metal structure of the ROPS. Some cracks can be repaired. Take photographs of any cracks and check with Clark Equipment Company before attempting any repair.

DO NOT weld or drill on any part of the ROPS. Any unauthorized changes to the ROPS could decrease the ability of the structure to protect the operator in the event of a rollover. Any unauthorized repairs or modifications could void the ROPS certification.

Printed in U.S.A.

CLARK Service gram

15 November 1978

MICHIGAN SG-732
Group Ref. No. 500

SUBJECT: Bellcrank Stop Adjustment Procedure for Machines with Adjustable Bellcrank Stops

When new bellcranks with adjustable bellcrank stops must be installed on machines in the field, use the following adjustment procedure. This procedure requires four spacers .25 in (6,4mm) thick. Magnetic spacers that are the correct thickness are recommended.

1. Put four spacers, .25 in (6,4mm) in thickness, on the boom plates where the bellcrank stops will make contact.

2. Raise the boom to maximum height. Push the bucket control lever into the DUMP position and hold. Make sure the bellcrank stops contact all four spacers. If any of the bellcrank stops does not contact the spacer, lower the bucket. Use a wedge to open the stop until it will contact the spacer. Repeat this step until all four bellcrank stops contact the spacers.

3. Lower the bucket to the ground and remove all four spacers.

4. Weld the bellcrank stops as shown in Figure 1. Make sure to clean slag from all welds and remove all weld spatter.

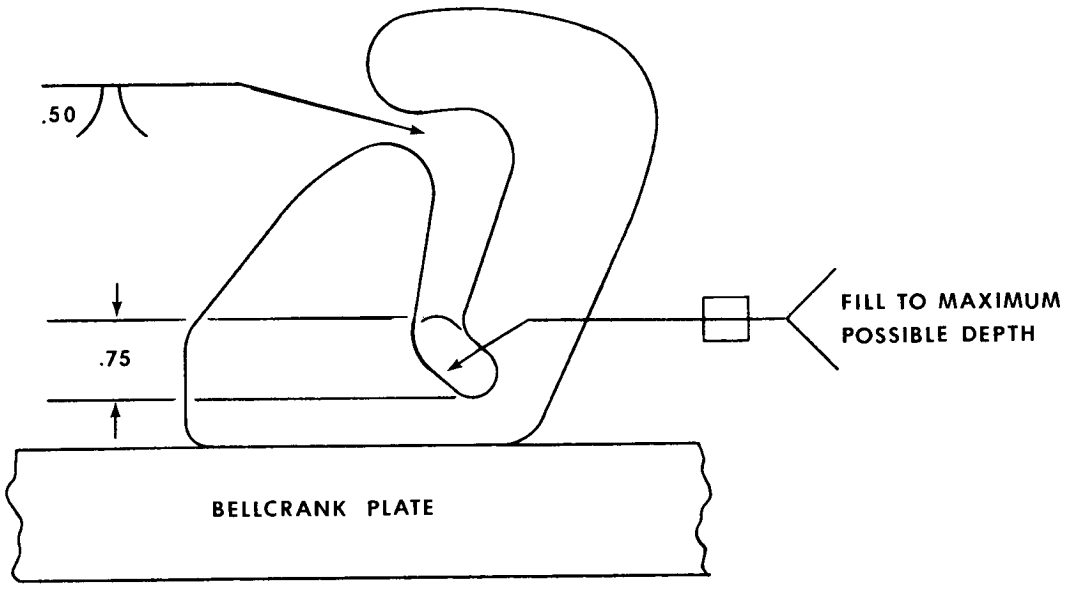


Figure 1.

CLARK Service gram

20 April, 1979

MICHIGAN SG-747
Group Ref. No. 500

SUBJECT: Welding Procedure for Repairing Cracks and Replacing Bucket Cutting Edges

MICHIGAN Tractor Shovels

Repairing or replacement of the main cutting edge of the bucket may become necessary at some time.

The recommended welding preparation procedure information in this bulletin gives instructions for repair or replacement of the main bucket cutting edge.

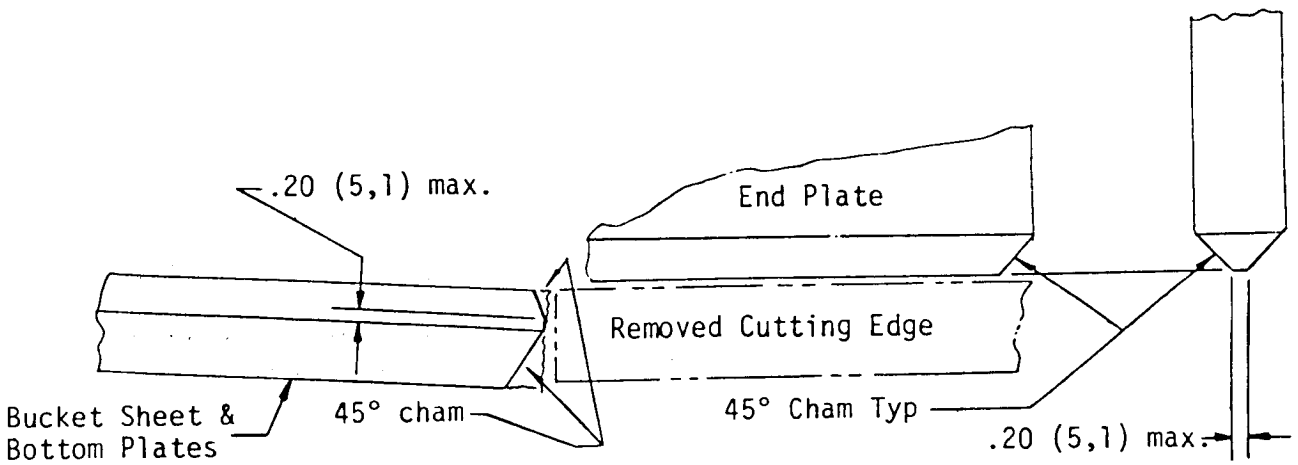
NOTE: Disconnect the battery ground cable before welding on a machine.

The welder must meet the qualifications for "all position" welding per Part II of the AWS Standard "Qualifications for metal arc welding".

PREPARATION:

1. Using carbon arc (air-arc) remove cracks or remove existing cutting edge - removing all the old weld. Use grinder or pneumatic chipper when necessary.

2. Chamfer adjoining parts to permit 100% weld penetration.



TS-15496

Printed in U.S.A.

3. The area to be rewelded should be ground to remove carbon deposits.

4. Clean area of repair removing all grease, oil, rust and scale from surfaces to be joined.

Incorrect welding or installation could cause property damage, personal injury or death.

INSTRUCTIONS:

1. During the welding and cooling procedure, the bucket is to be kept out of the wind, or draft that will impair or rapidly cool the weld and adjoining plates. Keep ambient temperature at a minimum of 70°F. (21°C).

2. Weld the inside, or top side of the cutting edge to the bucket sheet first. Start at the center and work towards the ends or outside.

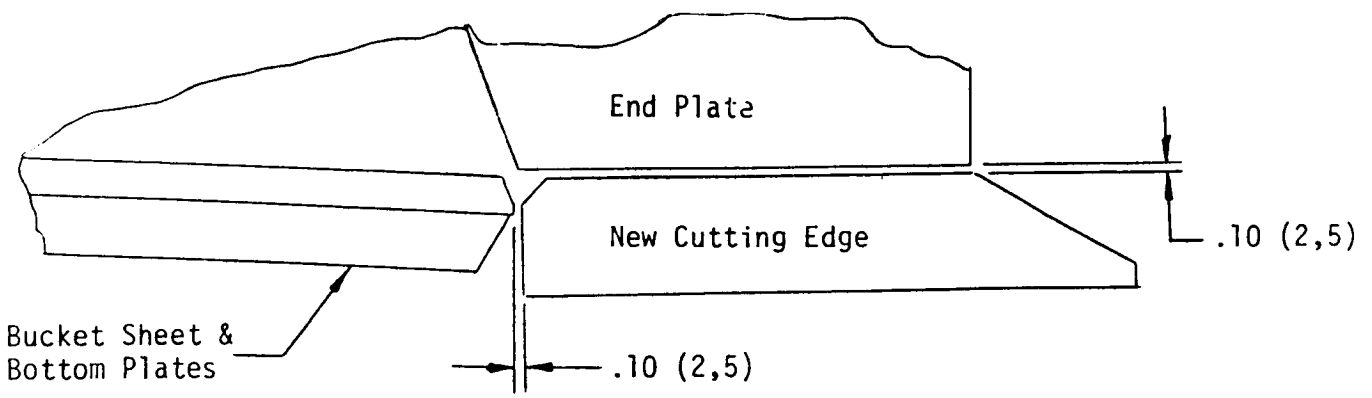
3. Weld the bottom side of the cutting edge second.

4. Weld the end plates last. Weld by alternating from outside to inside until entire corner is welded.

INSTALLATION:

1. Put part in position. A minimum of .10 (2,5) inch gap is to be left between the cutting edge and adjoining plates.

2. Tack weld part into position.



Position and Tack

TS-15497

PREHEAT:

1. Before welding, preheat the entire cutting edge to 200°F (93°C).

2. Before welding the cutting edge to the corner plates, preheat both - the cutting edge and corner plates to 200°F (93°C) minimum.

WELDING:

1. Recommend metal arc process.

   A. Weld the cutting edge into place using 88-C3-3/32 wire, or T-75-3/32 wire with 30-32 volts and a minimum of 450 amps.

2. If rod must be used -

   A. Use red #E7018 low hyd. The rod to be used must be dry and be kept in an oven at 500°F (260°C) to 600°F (316°C) for a minimum of thirty (30) minutes, before welding.

3. While welding, check the inner pass temperature often to make sure that the temperature does not exceed 600°F (316°C). If the temperature is close to, or over 600°F (316°C), stop welding and allow the area to cool before continuing.

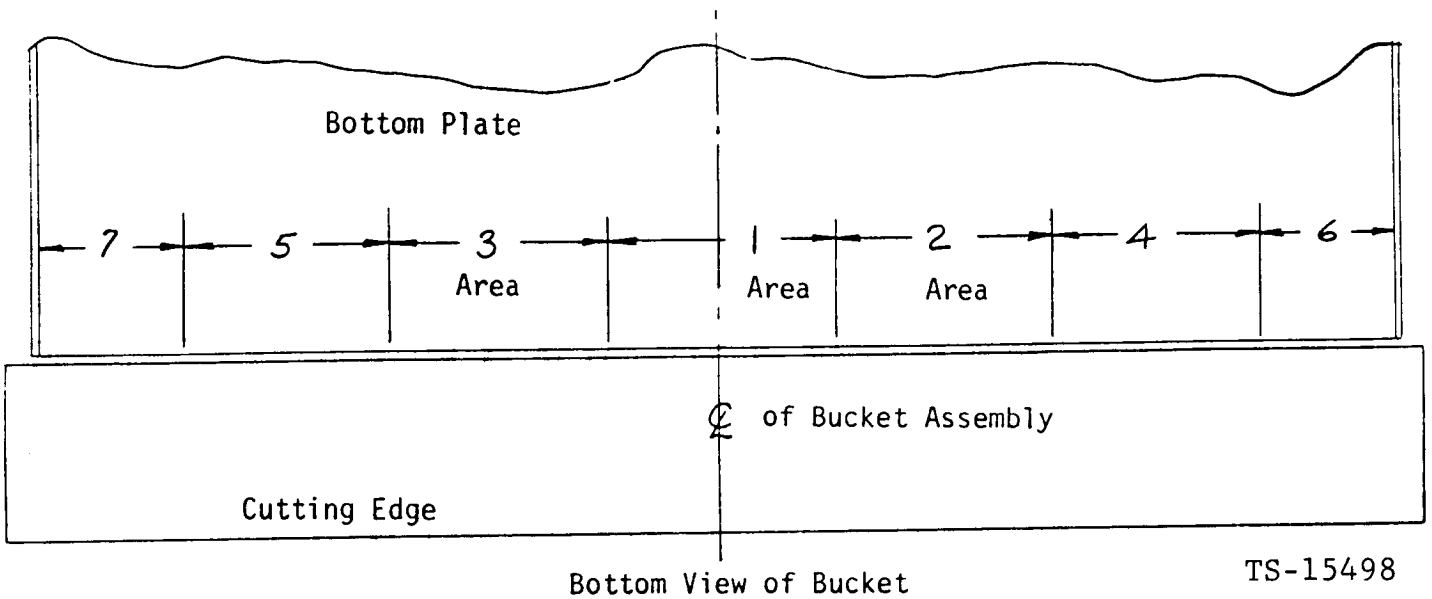
   A. Weld

      1. A specific length of weld to be made should be known before preheating and welding.

      2. The length of the weld to be made is to be determined by how much of the groove can be preheated, welded, and started cooling in one day's time.

      3. The first area to be welded will be in the center of the bucket. Each area then will alternate left to right of the completed center area until the entire groove, bucket end to bucket end, has been welded.

      4. After the size of the area to be welded has been found and preheated, the welding is to be confined to within this area, and the welding will continue until the entire groove within the area is filled, unless too much heat build-up, as previously stated, requires a cooling period.



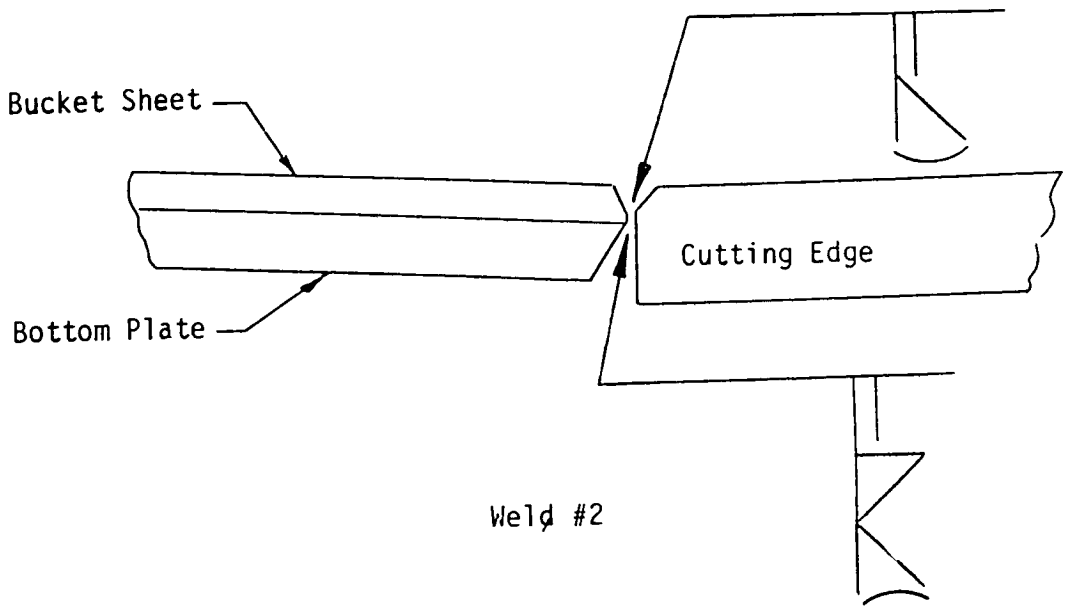
POST HEATING:

1. After the welding within an area has been finished, check the temperature of the cutting edge and adjoining plates, and if necessary, reheat the entire area to *reach a uniform (*) 200°F (93°C) temperature. This procedure will permit the weld to cool evenly with adjoining plates not letting one side or the other cool faster decreasing or eliminating weld cracks.

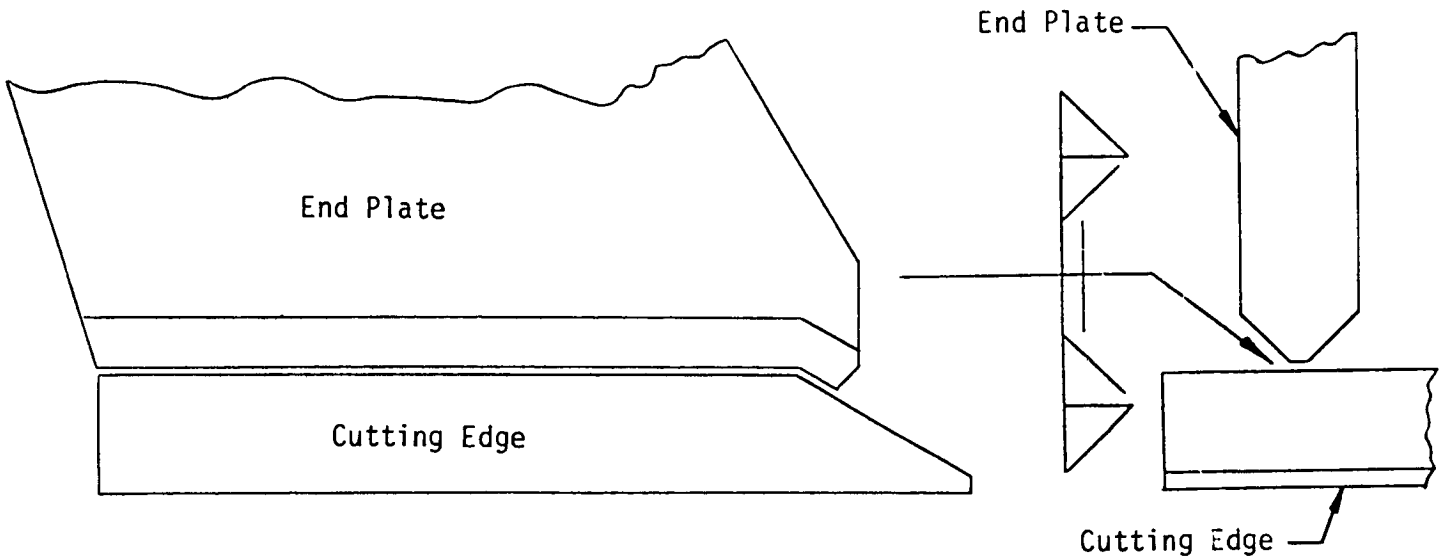
COOLING:

1. The welded area should cool slowly and, if necessary, the welded area should be covered to hold the heat for a slower cooling rate.

Weld #1



Weld #2



Weld #3 & #4

CLARK Service gram

October 1982

MICHIGAN SG-748A
Group Ref. No. 500

*(This bulletin replaces SG748, dated 20 April 1979. REASON: To change preheat instructions).

SUBJECT: **Welding Procedure for Installation of Bucket Teeth Adapters**
Clark Wheel Loader Models: 125B 125C 175B
175C 275B 275C 475B 475C 475C Turbo Transmission

Replacement of weld-on bucket tooth adapters may become necessary at some time.

The recommended welding procedure information in this bulletin gives instructions for replacement of weld-on bucket tooth adapters.

NOTE: *Bolt-on adapters do not need this information as they are for use on drilled cutting edges only.*

The welder must meet the qualifications for "all position" welding per Part II of the AWS Standard "Qualifications for metal arc welding".

Incorrect welding or installation could cause property damage, personal injury or death.

INSTRUCTIONS:

1. Disconnect the battery ground cable before welding on a machine.

*2. Preheat adapter and cutting edge to 425°F (218°C) to 475°F (246°C) to remove any moisture.

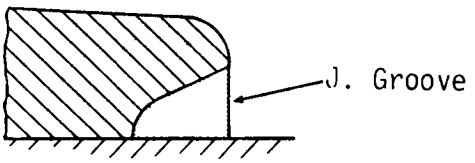
3. For Electrode welding - use AWS E-7018 Low Hydrogen Rod.

4. For Semi-Automatic Gas Metal Arc - use AWS 70-T-2 wire, or AWS 70-T-1 Duel Shield - 111 A.N.C.G.

5. Start weld at center of adapter and work one side at a time (See Figure 1).

6. Groove weld should completely fill J-groove (See Figure 1).

7. Fillet weld size should completely cover J-groove to get effective weld strength. Weld angle must be held close to 45° (See Figure 1).



PROCEDURE

REMOVE ALL OLD WELD USING CARBON ARC (AIR-ARC) GRINDER OR PNEUMATIC CHIPPER WHEN REQUIRED OXY-ACETYLENE TORCHES SHOULD NOT BE USED

IF A CARBON ARC IS USED THE AREA TO BE REWELDED SHOULD BE GROUND TO REMOVE CARBON DEPOSITS

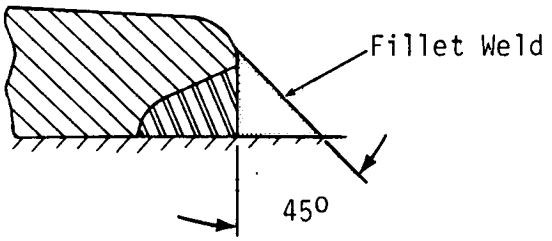
CLEAN AREA OF REPAIR REMOVING ALL GREASE OIL RUST AND SCALE FROM SURFACES TO BE JOINED

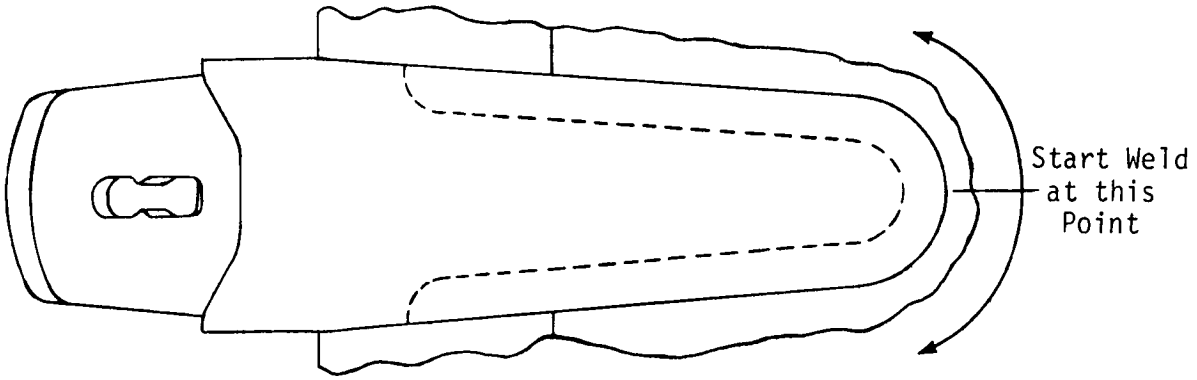
DISCONNECT BATTERY GROUND CABLE WHEN WELDING ON MACHINE

LOCATE PART AND WELD USING METAL ARC PROCESS IN ACCORDANCE WITH DRAWING SPECIFICATIONS

NOTE
WELDER SHALL BE QUALIFIED FOR THE TYPE OF WELD BEING MADE IN ACCORDANCE WITH AWS D14.3 (LATEST ISSUE)
QUALITY AND WORKMANSHIP OF WELD SHALL BE IN ACCORDANCE WITH AWS D14.3 (LATEST ISSUE)

WARNING
FAULTY WELDING OR IMPROPER INSTALLATION COULD CAUSE PROPERTY DAMAGE PERSONAL INJURY OR DEATH



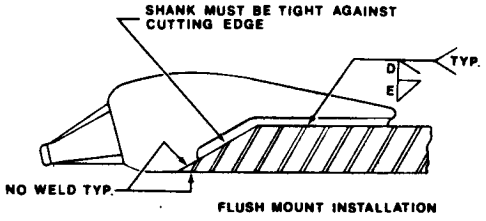


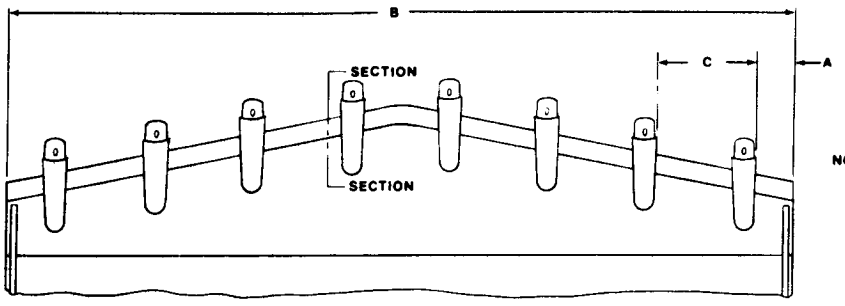
TS-15506

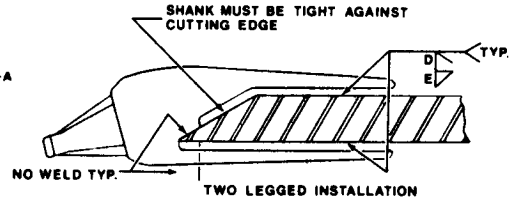
Welds to be per sizes shown
on chart (See Figure 2)

Figure 1

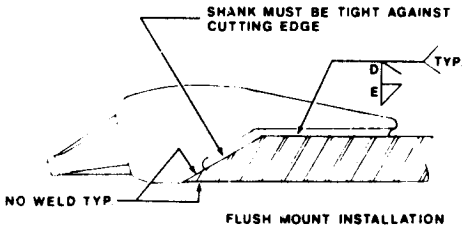
MODEL	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION E
125	6.68 (169,6)	114.76 (2914,9)	14.00 (355,6)	.62 (15,7)	.56 (14,2)
125	7.76 (197,1)	120.00 (3040,0)	14.44 (366,8)	.62 (15,7)	.56 (14,2)
175	6.80 (172,7)	122.0 (3098,8)	15.00 (381,0)	.62 (15,7)	.56 (14,2)
175	7.80 (198,1)	124.0 (3149,6)	15.00 (381,0)	.62 (15,7)	.56 (14,2)
275	6.76 (171,7)	138.50 (3517,9)	17.24 (437,9)	.50 (12,7)	.50 (12,7)
475	3.12 (79,3)	162.25 (4121,15)	21.25 (539,8)	.75 (19,1)	.75 (19,1)

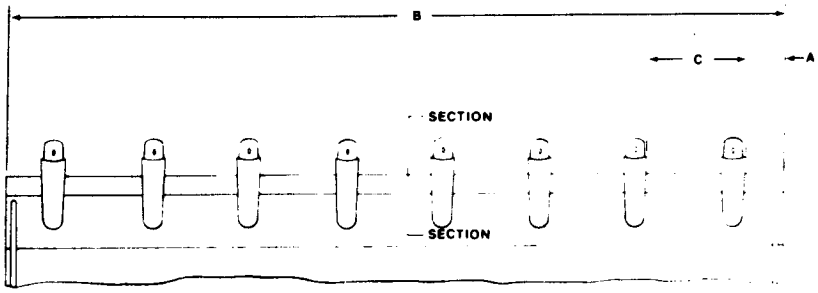


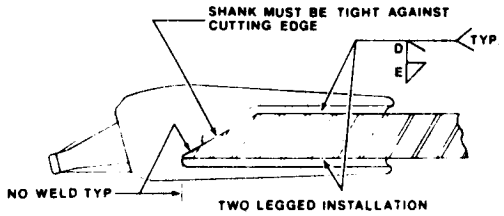




TS-10916

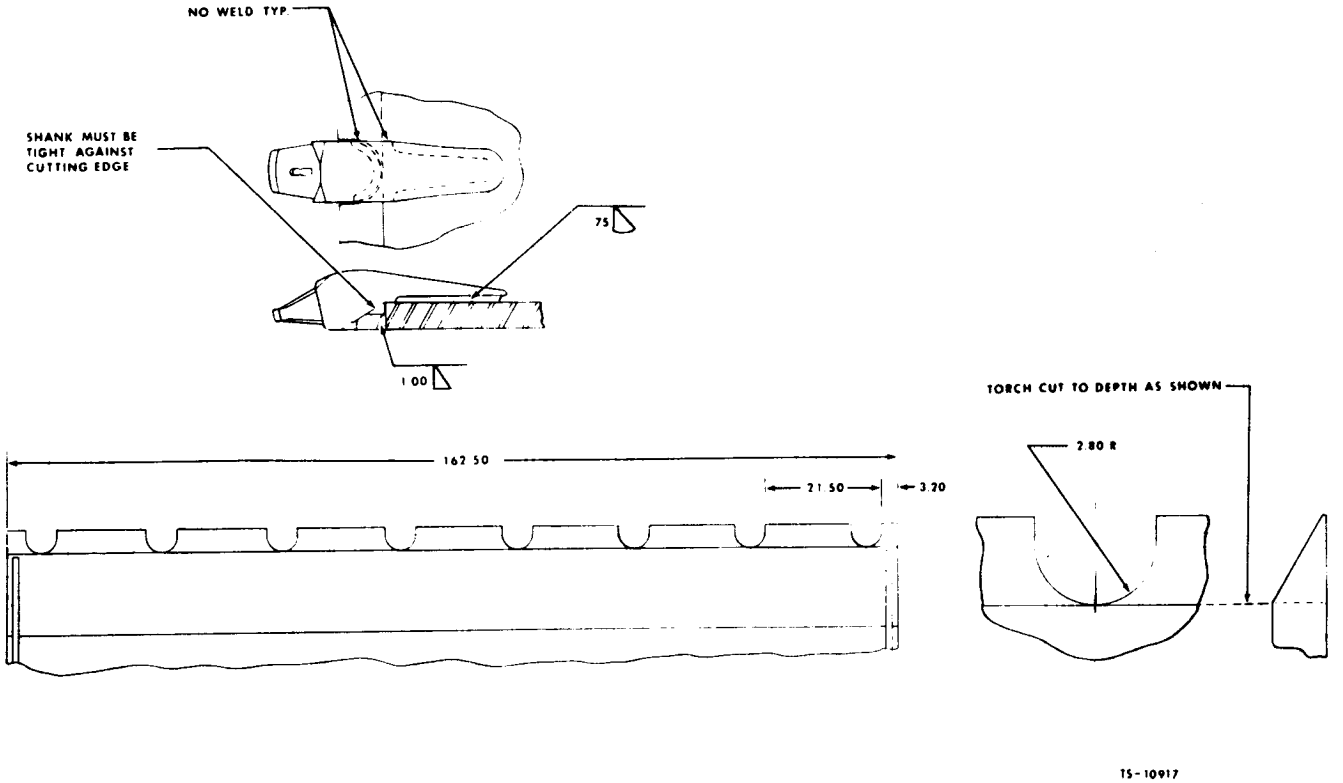






TS-10919

Figures 3 and 4 give installation information for single leg flush mount, weld-on adapters for use on Model 475B Tractor Shovels only. These adapters require special cut-outs in the main cutting edge. Cut-outs may be torch cut to dimension shown.



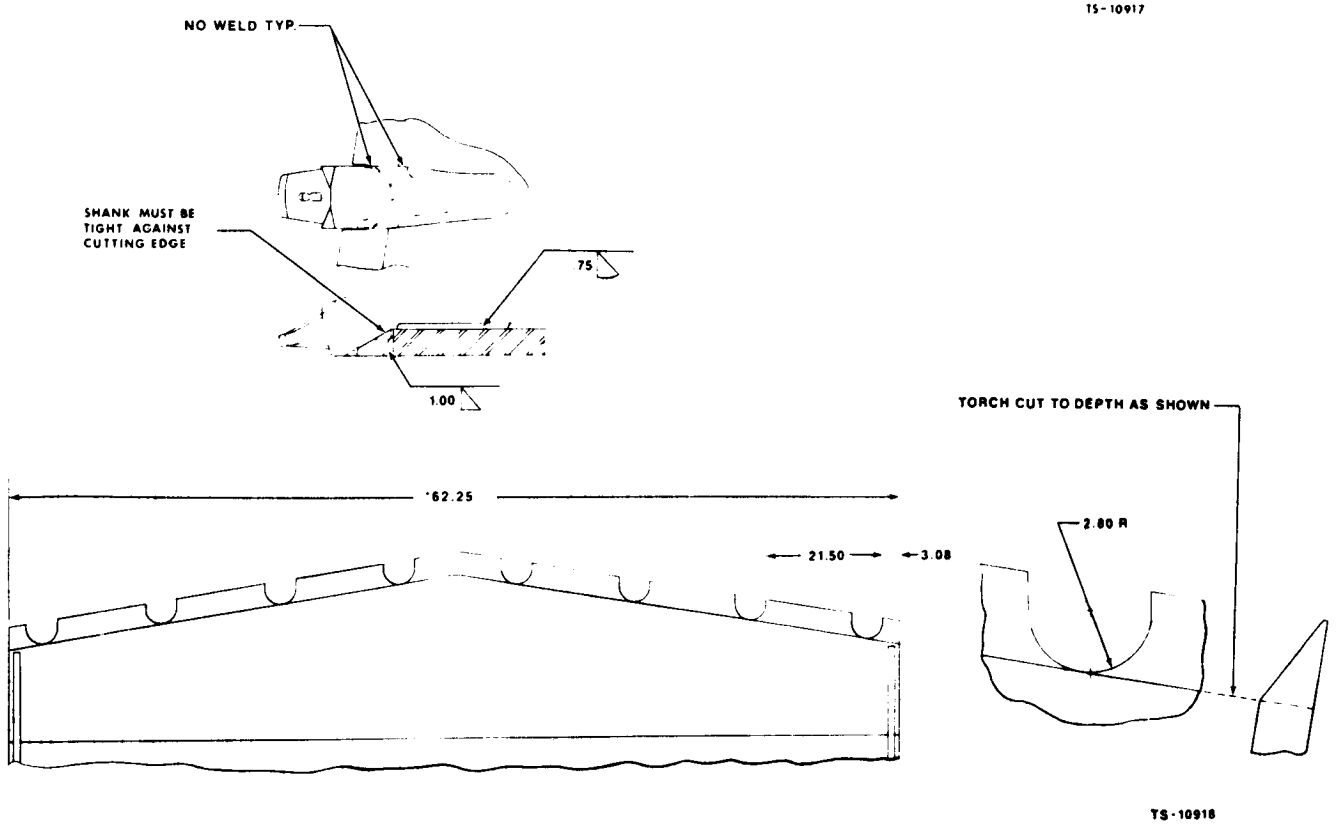


Figure 4

CLARK Service gram

November 1980

MICHIGAN SG-838
Group Ref. No. 500

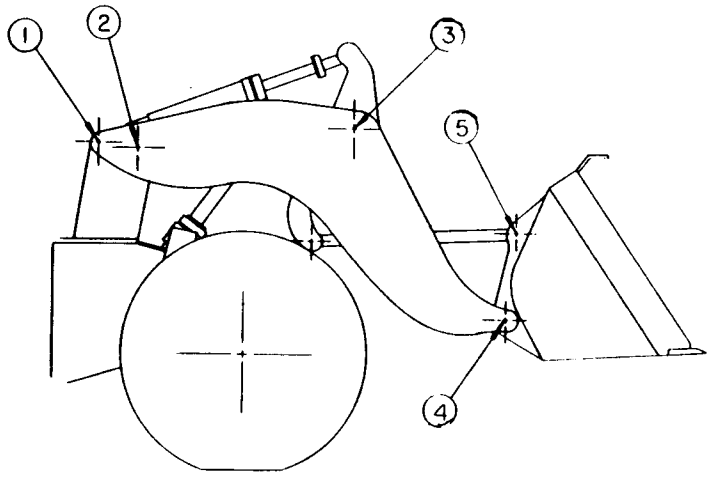
SUBJECT: **Shim Installation**
Models 55 thru 475 Tractor Shovels

Boom and bucket area shim installation inspection is required on all new machines at pre-delivery time to make sure that proper shims are installed.

This is especially important when a machine is shipped without a bucket.

The chart shown on Figure 1 lists the shims that are available in the boom to frame, bellcrank to boom, bucket to boom and pushrod to bucket areas for machines listed above.

See the chart for correct information whenever shims are needed in these areas.



NOTE
PLACE SPACERS AS REQD. TO FILL GAPS

	55 IIIA&B	75-B	85 IIIA	125 IIIA	175-B	275-B	475 IIIA&B	275-B 425-C	125-B	75-B SEALED PIN
(1) BOOM TO FRAME	1547964 .1345 THK.	1547964 .1345 THK.	1540168 .1345 THK.	.1516946 .250 THK.	1516939 .1046 THK.	1516938 .1046 THK.	1546695 .1046 THK.	1516938 .1046 THK.	2508719 .1046 THK.	1547964 .1345 THK.
				1516941 .1046 THK.			1546696 .250 THK.			
(2) BUCKET CYL. TO FRAME	1513236 .1345 THK.	1513236 .1345 THK.	1516947 .1345 THK.	1540169 .1046 THK.	1540169 .1046 THK.	1516939 .1046 THK.	1516943 .1345 THK.	1516939 .1046 THK.	NONE	1513236 .1345 THK.
							1516942 .1046 THK.			
(3) BELLCRANK TO BOOM	1540169 .1046 THK.	1540169 .1046 THK.	1541450 .1875 THK.	NONE	1516940 .1046 THK.	1516938 .1046 THK.	NONE	1516938 .1046 THK.	1516939 .1046 THK.	1540169 .1046 THK.
(4) BUCKET TO BOOM	1547962 .1345 THK.	1547962 .1345 THK.	1547963 .1345 THK.	1540169 .1046 THK.	1516939 .1046 THK.	1516939 .1046 THK.	1547917 .1345 THK.	2508710 .1046 THK.	1540169 .1046 THK.	1540169 .1046 THK.
(5) PUSHROD TO BUCKET	1516945 .1046 THK.	1516945 .1046 THK.	1516944 .1046 THK.	1540169 .1046 THK.	1540169 .1046 THK.	1540169 .1046 THK.	1547917 .1345 THK.	2508719 .1046 THK.	NONE	1516947 .1345 THK.

TS - 15937

Figure 1

CLARK Service gram

January 1981

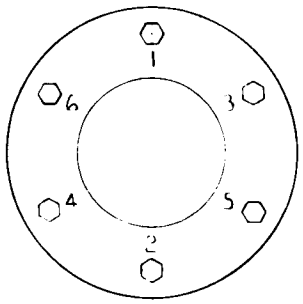
MICHIGAN SG-852
Group Ref. No. 900

SUBJECT: **Frame Hinge Cap Bolt Torque Sequence**
Model 175, 275, 475 Tractor Shovels
Model 280 and 380 Tractor Dozers

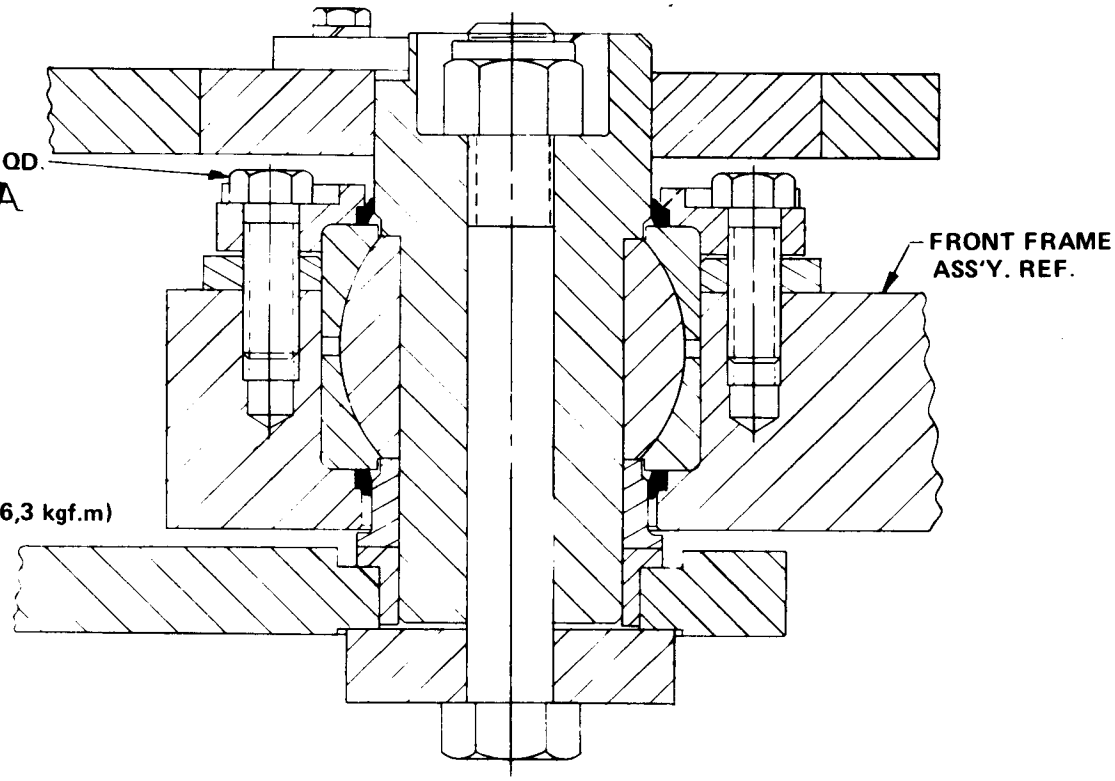
Whenever installing the frame hinge cap bolts on machines listed above, the correct sequence must be followed when tightening the bolts to the specified torque.

When these bolts are not tightened correctly, the hinge cap may become distorted.

See Figure 1 for the correct bolt tightening sequence.



VIEW A



LOWER HINGE PIN ASS'Y.

BOLT TORQUE:

175 – 200 lbf.ft (271,2 N.m) (27,6 kgf.m)
275 – 175-190 lbf.ft (237,3-257,6 N.m) (24,2-26,3 kgf.m)
475 – 475 lbf.ft (644,0 N.m) (65,7 kgf.m)
280 – 275 lbf.ft (372,8 N.m) (38,0 kgf.m)
380 – 297 lbf.ft (402,7 N.m) (41,1 kgf.m)

POSITION OF BOLTS ARE NOT RELATIVE TO MACHINE. SHOWN FOR TORQUE SEQUENCE ONLY.

1. TIGHTEN BOLTS IN ORDER AS SHOWN IN VIEW A.
2. TIGHTEN BOLTS TO THE SPECIFIED TORQUE IN THE CORRECT ORDER AS SHOWN.
3. CHECK EACH BOLT FOR THE SPECIFIED TORQUE IN THE CORRECT ORDER.

Figure 1

TS - 15998

March 1983

CLARK

SERVICE GRAM

SUBJECT: Lower Hinge Pin Shim Installation
Wheel Loaders - 275B 482A, 482B
275C 492A
475B
475C
Wheel Dozers - 280IIIA 280B
380IIIA 380B

CLARK SG - 938A
Group Ref. No. 900

After the hinge pin bearing has been adjusted on machines listed above, there may be a gap between the bearing cap and the hinge plate.

This gap could cause the bearing cap bolts to become loose or broken.

To correct this condition, a new bearing cap (275B,275C,280IIIA,280B only), shims and washers may be added to existing machines.

275B - 275C - 280IIIA and 280B

A new cap is required to provide a flat surface for the hardened washer plus recessed area to maintain clearance between the cap bolt heads and upper frame plate and donut.

Expedent repairs can be made with existing parts by reworking cap to provide proper clearance for bolt head with addition of washer ,plus a flat surface for the washer to seat against.

To make this installation, use the parts listed below denoted for each model and follow the installation instructions.

PARTS LIST FOR ONE MACHINE:

1 -	2541109	Bushing Cap (275B,275C,280IIIA,280B)
6 -	27E10	Washer (275B,275C,280IIIA,280B)
	2540941	Shims (as required) (275B,275C,280IIIA,280B)
	1538850	Shims (as required) (275B,275C,280IIIA,280B)
6 -	4E-12	Washer (380IIIA,380B)
	1514478	Shims (as required) (380IIIA,380B,475B,475C)

INSTALLATION:

1. Put the machine in the 'SERVICE' position: Bucket or blade on the ground, parking brake applied, engine stopped, ignition key removed, red flag in the steering wheel, steering frame lock connected, wheels blocked.

2. Remove the retaining cap.

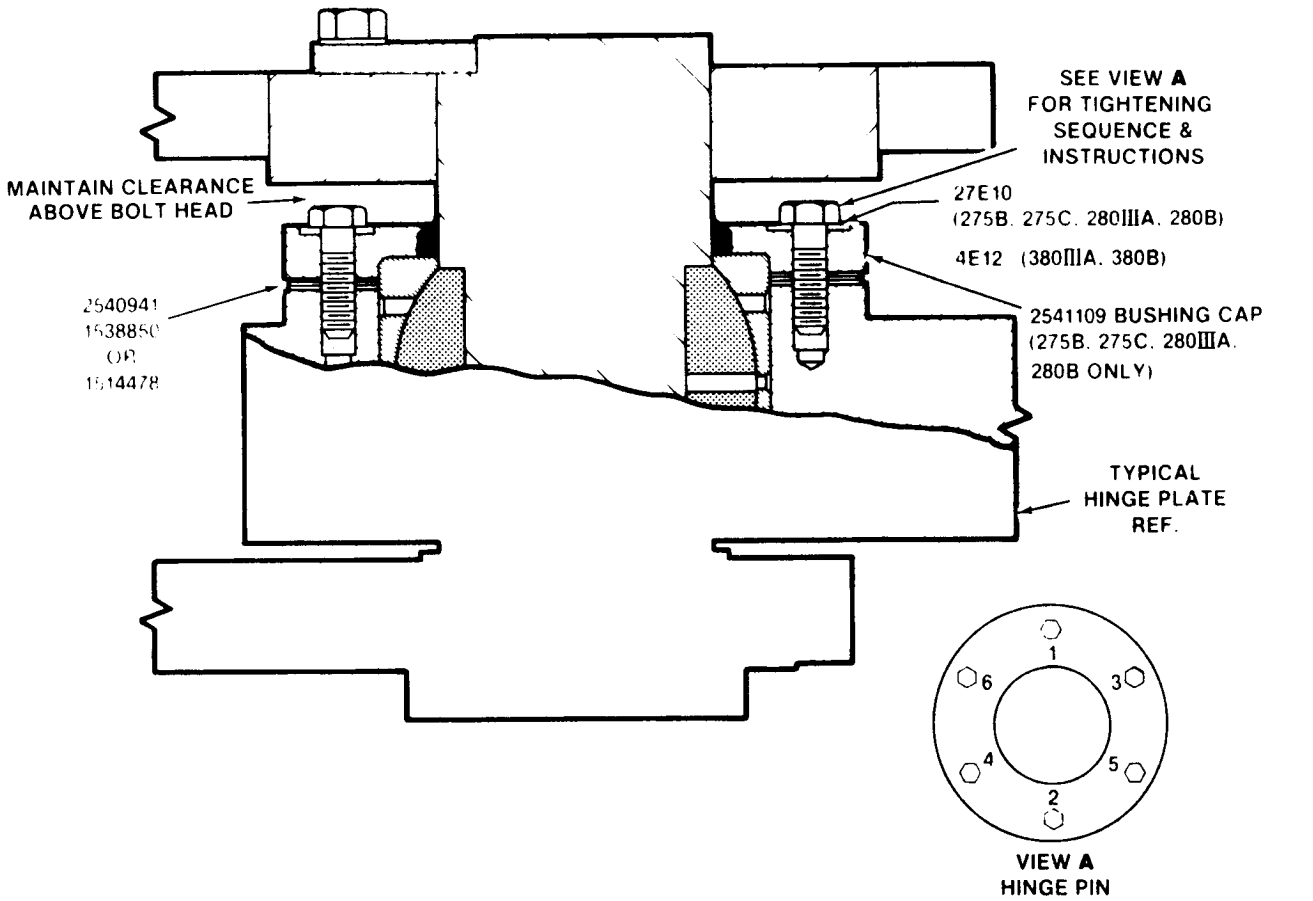
3. Remove the bushing cap attaching bolts. Remove the bushing cap. Install the new 2541109 Bushing Cap (275B, 275C, 280IIIA, 280B only).

CLARK EQUIPMENT COMPANY • P.O. BOX 547, PIPESTONE ROAD • BENTON HARBOR, MICHIGAN 49022

4. See Figure 1 and measure the distance between the hinge plate and bushing cap. Subtract (.020 in) 0,5mm from the distance.

5. Remove the bushing cap and install the new 2540941, 1538850, or 1514478 Shims as required to equal the distance found in step 4.

6. See Figure 1 and install the bushing cap, existing bolts and 6 - new 27E10 Washers (275B, 275C, 280IIIA, 280B) or 4E12 Washers (380IIIA, 380B).



7. Turn the bolts in the sequence shown in View A until the bolts and washer are in contact with the bushing cap.

8. Continue to tighten the bolts a little at a time in the sequence shown in View A until a torque as indicated of 275B,275C,280IIIA,280B 175-190 lbf·ft (237,27-257,61 N·m) (24,19-26,27 kgf·m) 475B,475C 475-615 lbf·ft (644-834 N·m) (65,6-82 kgf·m) 380IIIA,380B 290-380 lbf·ft (393-515 N·m) (40,0-52,5 kgf·m) per machine is achieved.

9. Remove warning flag, disconnect steering frame lock. Remove wheel blocks.

CLARK

July 1984

SERVICE GRAM

SUBJECT: 175B, 175C Center Hinge Reinforcement
For Machines With S/N: 490A101CAC thru 267CAC
491A101CAC thru 226CAC
427D
438D

CLARK SG - 999
Group Ref. No. 900

The lower center hinge pin and retainer plate have been redesigned to provide greater bearing reliability.

The change is now in production and can be made on machines with serial numbers listed above.

To make this change, order the parts from the list below and follow the installation instructions.

PARTS LIST FOR ONE MACHINE:

QTY	P/N	DESCRIPTION	QTY	P/N	DESCRIPTION
1	2554916	Pin	1	59D20	Nut
1	2554909	Retainer, pin	2	27E20	Flat Washer
10	2554912	Shim .005 in (0,13 mm)	1	2555225	Dowel
10	2554914	Shim .005 in (0,13 mm)	6	17C828	Bolt
10	2554913	Shim .015 in (0,38 mm)	6	27E8	Flat Washer
10	2554911	Shim .015 in (0,38 mm)	2	1657104	Seal
1	17C20192	Bolt	1	2519613	Spacer
1	2519612	Bushing	1	2519598	Bearing
1	2519632	Retainer, bearing			

SPECIAL TOOLS REQUIRED:

1. .500 in (12,71 mm) Magnetic Base Drill Motor
2. .4218 in (10,7 mm) Drill Bit
3. .500 in - 13UNC-2B Thread Tap
4. 250 lbf·ft (340 N·m) (35 kgf·m) Torque Wrench
5. 2000 lbf·ft (2712 N·m) (275 kgf·m) Torque Wrench
6. 2-3 in (50-75 mm) Depth Micrometer

INSTALLATION:

1. Put the machine on a level surface.

2. Put machine in "SERVICE" position: Connect steering frame lock, bucket on the ground, parking brake applied, engine stopped, ignition key removed, red warning flag on steering wheel and wheels blocked.

(13B11)

3. Refer to maintenance manual No. 3194 (125B & C) for disassembly of the center hinge.

4. Install 1-2554909 pin retainer, see Figure 1 for proper location, in rear frame and use as template to locate bolt holes. Mark around outside of retainer. Remove retainer and remove paint from area where retainer covers hinge plate.

5. Drill six holes through hinge plate using magnetic base drill motor and .4218 in (10,7 mm) drill bit. Thread the six holes with .500 in- 13-2B Tap.

6. Remove old bushing from lower rear frame hinge plate and install new 2519612 bushing.

7. Clean the bearing bore and check for bore depth of 2.694 in (68,43 mm) to 2.688 in (68,28 mm). If bore is too deep, use center adjustment shims from the removed bearing and place in bottom of bore to obtain correct bore depth.

8. Install new 2519613 spacer, 1657104 lower seal, 1-2519598 bearing, 1-2519632 bearing retainer and capscrews, but do not tighten enough to bend retainer.

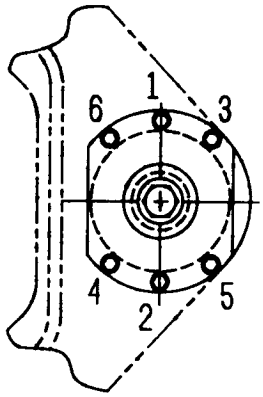
9. Measure the gap between bearing retainer and front frame. Remove capscrews and retainer. Select shims equal to .015 in (0,38 mm) less than gap measured. Install 1-1657104 seal in retainer and install shims, retainer and capscrews. Torque capscrews to 170-220 lbf·ft (230-300 N·m) (23,3- 40,8 kgf·m) in proper sequence.

10. Install 1-2555225 dowel in 2554916 pin, and install 2554916 pin, 2554909 pin retainer, 17C20192 center bolt, 27E20 washers and 59D20 nut. Torque nut to 1450-1850 lbf·ft (1966-2508 N·m) (200, 5-255, 8 kgf·m).

11. Measure the gap between 2554909 retainer and hinge plate. Select shims equal to .005 in (0,13 mm) less than gap measured. Loosen nut and install shims, bolts, and washers. Retorque nut to specifications and torque bolts 90-115 lbf·ft (122-156 N·m) (12,3 15,7 kgf·m) in proper sequence. Repeat torquing sequence.

12. Install propshaft and torque bolts to 95 lbf·ft (130 N·m) (13,13 kgf·m). Remove blocking. Take machine out of "SERVICE" position and check center bearing movement. Refer to maintenance manual No. 3194 (125B & C) and this Service Gram for procedure and specifications.

13. Recheck center bearing movement after every 250 hours of operation and adjust as necessary.



TORQUE SEQUENCE PROCEDURE

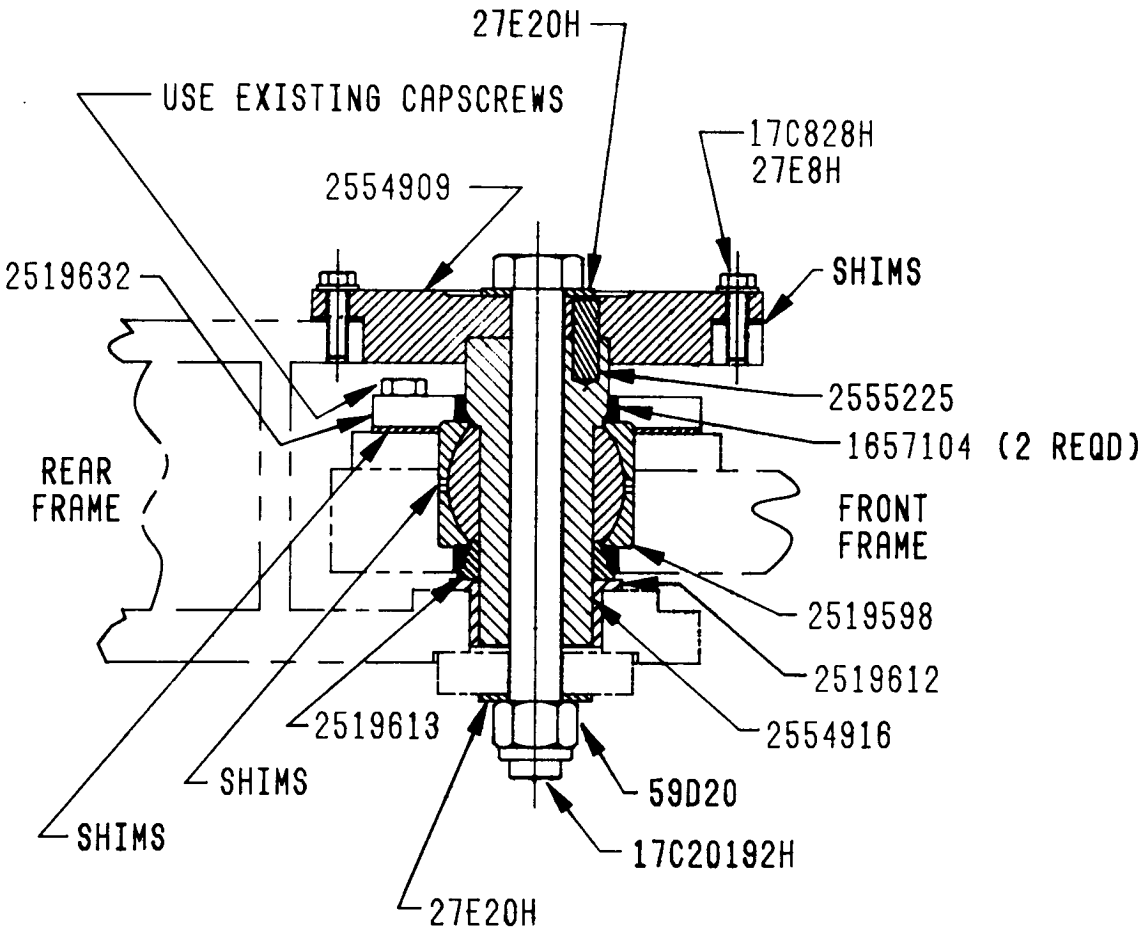


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Figure 1

March 1985

CLARK

SERVICE GRAM

SUBJECT: 175B, 175C Center Hinge Reinforcement for Machines with S/N: 490A101CAC thru 267CAC
491A101CAC thru 226CAC
427D
438D

SUPPLEMENT 1 TO
CLARK SG-999
Group Ref. No. 900

There has been a change in torque for the capscrews in Step-9 of Clark Service Gram-999.

Change the torque in Step-9 of Clark Service Gram-999 to read as follows:

Torque capscrews to 300-330 lbf•ft (406.7-447.4 n•m) (41.4-45.6 kgf•m) in proper sequence.

(13B10)