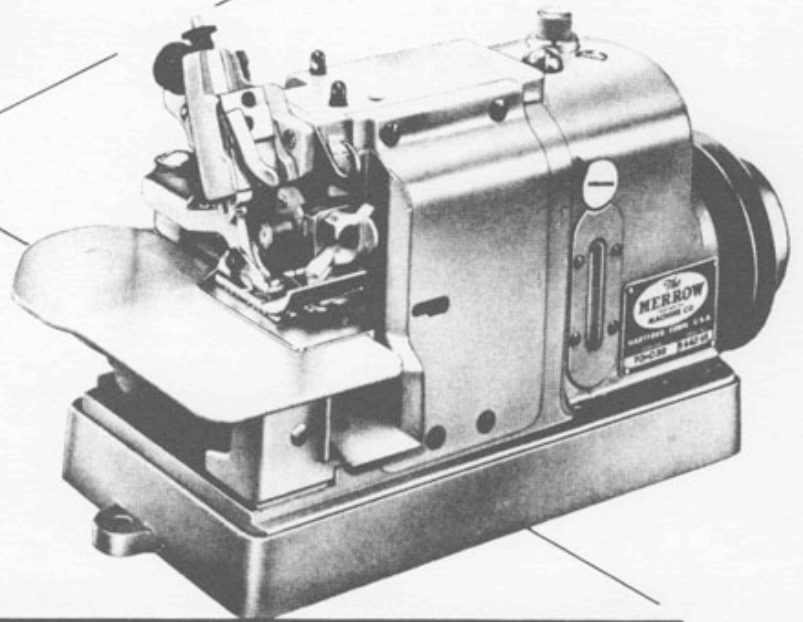


# INSTRUCTIONS FOR SETTING UP AND OPERATING

## CLASS **70** MERROW MACHINES



### INTRODUCTION

This book is published for the guidance of those persons responsible for the operation and maintenance of Merrow Class 70 Butt-Seaming Machines. It contains diagrams and descriptive information concerning the most common adjustments necessary to assure maximum production of the highest quality. For individual problems, consult your nearest Merrow Distributor.

The Merrow Class 70 Machines are designed and constructed for continuous and perfect operation at high speed. The utility and durability of Class 70 Machines are recognized features of their design. Automatic lubrication, light, freely moving parts, and easily adjusted assemblies, reduce to a minimum the maintenance required to obtain superb performance.

Class 70 Machines overseam and trim simultaneously and produce either a one-thread or two-thread stitch formation. By cutter adjustments, the seam configuration may be a true butt seam, a gap seam or an overlap seam, while maintaining the thinness necessary for a good fabric processing joint.

We also make other classes of machines including Class "MG" Overstitching Machines, Plain Crochet Machines, and Shell Stitch Crochet Machines. These machines are being used successfully by manufacturers throughout the world.

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**THE MERROW<sup>®</sup> MACHINE COMPANY**  
240 Day St., Newington, CT 06111  
Telephone (860) 666-0109  
Fax (860) 666-7730

## THE MERROW MACHINE COMPANY

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### HOW TO ORDER

Send parts order to your nearest Merrow Distributor or The Merrow Machine Company, Newington, CT 06111, U.S.A.

When ordering replacement parts, include the Style of the machine, the Name of the part (see diagrams included), and the letters and numbers stamped on the part. (The stamping on a particular part is insufficient information without giving the name of the part.) All enameled parts will be furnished in grey.

If difficulty is experienced in selecting the proper part number desired, we expect to be able to make proper selection from our records if given the following information:

- (1) The Name of Part
- (2) The Style and Serial Number of Machine
- (3) Special information if included below:

- (a) Needle Plates - specify:

Machine Style (70-D3B, 70-Y3B, etc.). Machine mounting, (table, railway, rotary stand, and the manufacturer of such mounting). Type of seam (butt, gap, overlap, etc.), size of needle used, (number of needle plate is stamped on under-side of plate).

- (b) Loopers - specify:

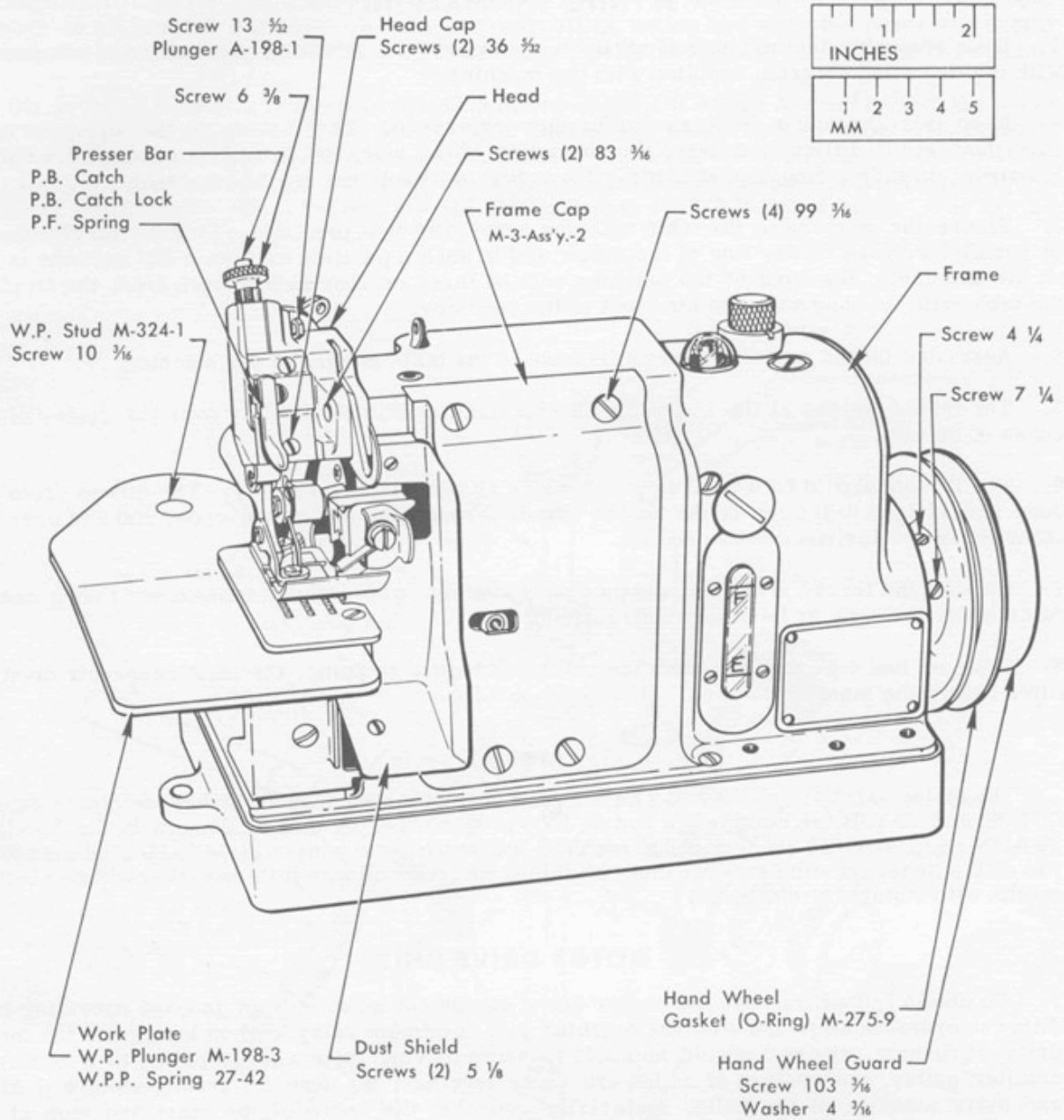
upper or lower, one or two thread stitch. (Number of looper is stamped on the shank near the butt end.)

- (c) Parts for Feeding Mechanism - specify:

front or rear feed if machine has differential (gathering) feed.

When ordering replacement parts for chemical nickel plated machines (styles 70-1D-2 CNP, and 70-D3B CNP) follow the procedure stated above, specifying on the order, parts for chemical nickel plated machine, or write the letter "N" after the part number. (Example, Feed Dog A-81-IN)

MERROW MACHINES ARE DISTRIBUTED BY	OTHER MERROW MACHINES
	<ul style="list-style-type: none"><li>• CLASS MG OVERSTITCHING MACHINES</li><li>• PLAIN CROCHET MACHINES</li><li>• BLANKET HEMMING MACHINES</li><li>• SHELL STITCH CROCHET MACHINES</li></ul> <p>Descriptive literature and samples of stitches produced will be provided on request.</p>



FRONT VIEW

## **INSTRUCTIONS FOR SETTING UP AND OPERATING MERROW CLASS 70**

### **SETTING THE MACHINE**

1. Upon removing the machine from its box, observe its threading carefully and compare it with the threading diagram supplied with the machine.
2. Keep this threading diagram for further reference. The matter of threading is very important and if difficulty arises, the threading of the machine should be compared with the individual threading diagram supplied. Threading is simple but must be accurate.
3. Secure the machine to the table with the screw and bolt provided. This assembly should be parallel with the center line of the motor and in such a position that when the machine is set on the assembly, the front of the machine will be three or four inches back from the front of the table with its hand wheel to the right of the operator.
4. Assemble thread stand and screw its base to the table in back of the machine.
5. The thread guides at the top of the thread stand should be directly over the center of the cones of thread.
6. The thread should be wound on cones which should stand vertically. The thread from the cone should lead to the top of the thread stand, through the eye on the cross rod and over the other leg of the U shaped cross rod.
7. Be sure the thread will come off the cones readily, with uniform tension and that it cannot catch under the cone or be otherwise retarded.
8. Since oil has been drained from the machines before shipping, the main reservoir must be filled before the machine is used. (Note section 14.)

### **SPEEDS**

The Styles 70-D3B-2 and 70-Y3B-2 have a recommended speed of 2250 stitches per minute. Styles 70-D3B and 70-Y3B are designed to run at 1500-1800 stitches per minute, Merrow Styles 70-ABB, 70-ADN-1 and 70-ABBY are designed to run 2800-3000 stitches per minute. Style 70-1D-2 is designed to run 4000 stitches per minute. While these machines may run well with little care, they will give better results with suitable attention.

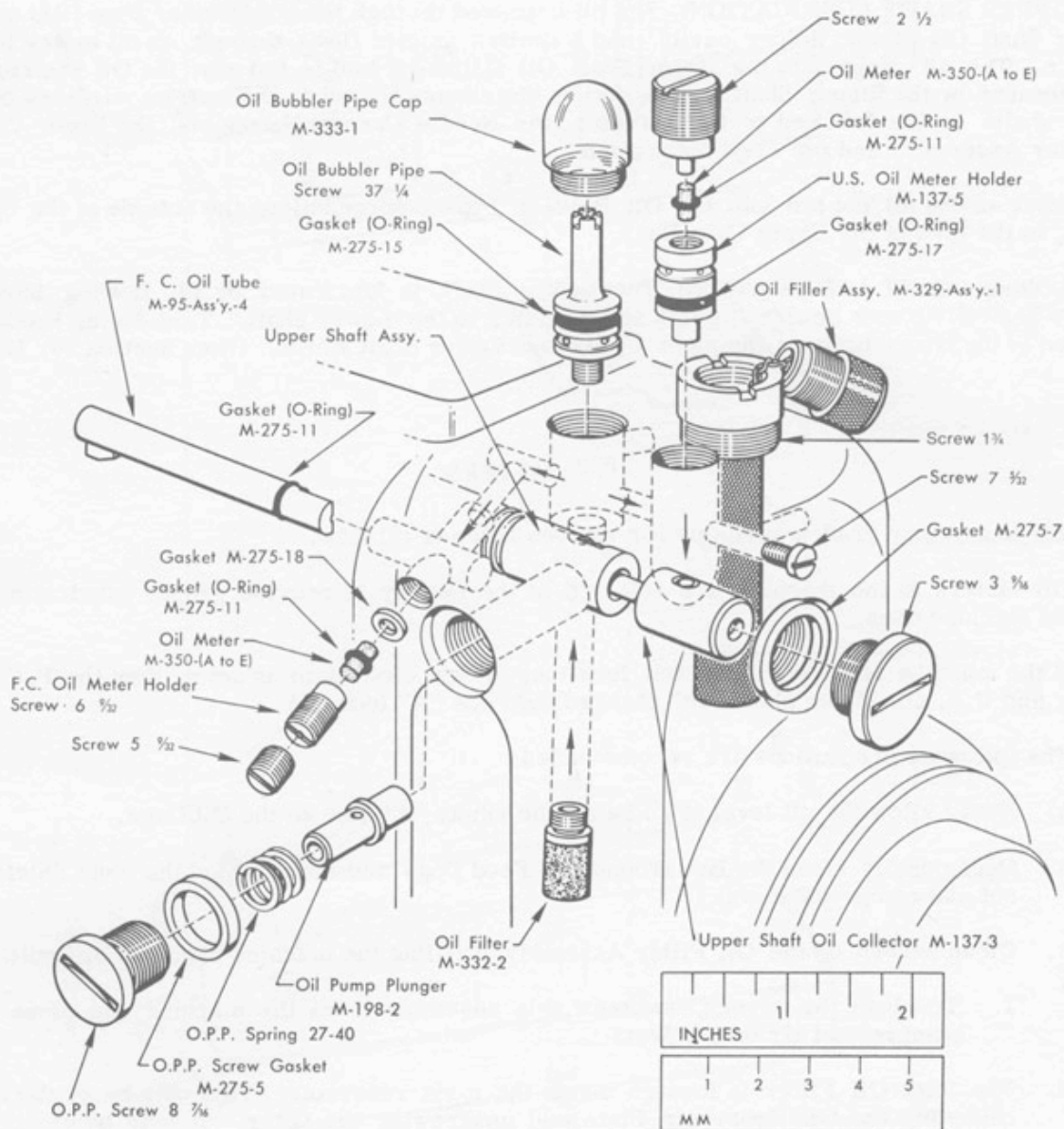
### **MOTOR DRIVE UNIT**

9. To obtain full efficiency, the motor drive equipment must be kept in good operating condition in order to start and stop the machine with minimum delay. When laying out the motor drive equipment, attempt should be made to avoid driving from a large pulley to a relatively smaller pulley, the centers of which are close together, as such an arrangement will allow excessive slippage of the belts, materially reducing the speed of the start and stop of the Merrow Machine.
10. A V-Belt Hand Wheel with an effective (pitch) diameter of 3-1/3" (85 mm) is supplied with 70-D3B and Y3B Models. On 70-ABB and ABBY machines the effective (pitch) diameter is 2-1/8" (54 mm). If an individual motor is used, the machine may be run with a 3/8" (9.5 mm) width endless V-Belt. Where round belting is used, either 1/4" (6.5 mm) or 5/16" (8 mm) round belting may be used.
11. The top of the Hand Wheel of all Class 70 machines must turn away from the operator.
12. Consult your nearest Merrow Distributor to assure proper motor drive equipment.

LUBRICATION

13. GENERAL: In the lubrication of the machine the oil is metered, feeding oil in proper amounts to all bearing surfaces. It is a one-way oiling action and when the reservoir supply is used, the machine must be refilled. The reservoir holds enough for forty hours of seaming.

14. Oil is filled through a hole under the Cap Screw of the Oil Filler Assembly into the main reservoir. About 8 ounces (0.250 litres) of a high grade turbine oil of about 150 Sayboldt seconds at 100° Fahrenheit (37.5°C) is recommended. To drain the oil, dismantle the machine and extend the feed mechanism end of the machine over the end of the table. After providing a means of catching the oil, unscrew the Oil Drain Screw 11-3/8 (located at the rear of the machine in the base) several turns.

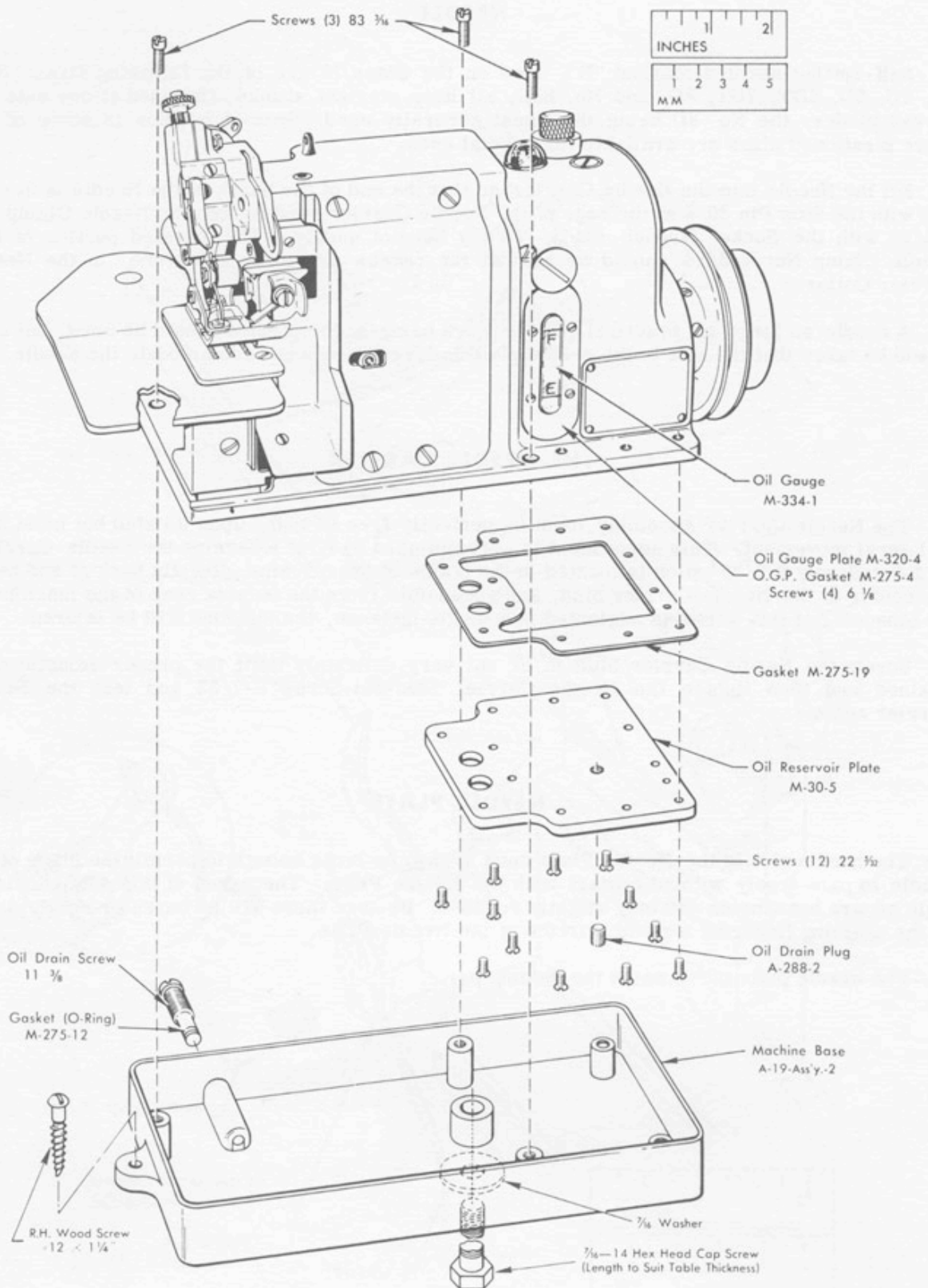


FRAME CAP AND UPPER SHAFT OILING PARTS

15. The oil coming up from the reservoir is filtered by a bronze screw-type filter located in the frame above the Oil Reservoir Plate.
16. The Upper Shaft Pump provides a continuous oil flow to assure proper lubrication without the use of wicks. The Pump is operated from an eccentric groove in the main Upper Shaft. The Upper Shaft Pump draws oil from the main reservoir and forces it through the Oil Bubbler Pipe to the Oil Bubbler Pipe Cap. Some oil is bypassed from the Oil Bubbler Pipe to the F.C. Oil Meter Holder and to the Upper Shaft Oil Meter Holder.
17. **FRAME CAP LUBRICATION:** F.C. Oil Feeder Tube supplies oil to the upper and lower looper carrier assemblies and the cam roll bearings. The oil flows to the F.C. Oil Feeder Tube through an oil meter which is enclosed in the F.C. Oil Meter Holder. The F.C. Oil Meter Holder is located in the frame beside the U.S. Oil Pump Screw.
18. **UPPER SHAFT LUBRICATION:** The oil bypassed through the Oil Bubbler Pipe fills up the Upper Shaft Oil Meter Holder cavity and a limited amount flows through an oil meter in the Holder. The oil drops into the Upper Shaft Oil Collector and is fed past the Oil Distributor Rod located in the Upper Shaft. This action distributes the oil to the bearing surfaces of the main shafts on the left end of the machine, the Needle Carrier Assembly, the Upper Cutter Carrier Assembly, and the Feed Mechanism.
19. Some of the oil not fed into the Oil Bubbler Pipe is forced along the outside of the Upper Shaft, to the face of the Upper Cam Boss.
20. **LOWER SHAFT LUBRICATION:** The Lower Shaft is lubricated by oil flowing into the Lower Shaft Oil Meter Holder through an oil meter to the Lower Shaft. This Meter Holder is located in the frame between the right Upper and Lower Shaft Holes. (Note Section 73, line i.)

## **OIL METERS**

21. There are four grades available for various rates of oil flow.
22. Oil Meters in the machine are selected at the factory to provide proper lubrication for normal machine uses.
23. If the machine is to be used in wet locations or wet cloth is to be sewn, then the F.C. Oil Meter and U.S. Oil Meter should be changed to grade "A" (coarse).
24. The following precautions are recommended:
  - a. Never allow the oil level to go below the empty "E" line on the Oil Gage.
  - b. Occasionally clean the lint around the Feed Dogs and from behind the Dust Shield (do not use compressed air).
  - c. Clean screen on the Oil Filler Assembly if filling the machine becomes difficult.
    1. To clean the screen, unscrew this assembly from the machine and clean with compressed air or a solvent.
  - d. The Inlet Oil Filter is located inside the main reservoir. This may be replaced by removing the Oil Reservoir Plate and unscrewing the filter. It may be cleaned by soaking in solvent and blowing through it with compressed air from the inside out.



MACHINE BASE ASSEMBLY

### **NEEDLE**

25. Self-Setting needles marked "D", used on the Class 70 are of the following sizes: No's 3D, 4D, 5D, 6DT, 7DT, 8D, and No. 8SD, all have straight shanks, flattened at one side and curved blades, the No. 3D being the finest generally used. Special needles in some of the above mentioned sizes are available for special uses.

26. Set the Needle into the Needle Carrier so that the end of the shank of the Needle is in contact with the Stop Pin 36-6 at the rear of the Needle Carrier, and tighten the Needle Clamp Nut 4-3/16 with the Socket Wrench (44-2), firmly but not unduly. The beveled portion of this Needle Clamp Nut 4-3/16 should be against the recess provided, therefore, in the Needle Carrier Collar.

27. A needle as large as practical for the work being accomplished should be used, but care should be taken that the slot in the needle plate is large enough to accommodate the needle.

### **THE NEEDLE CARRIER**

28. The Needle Carrier Assembly must be perfectly free to swing upon its stud but must have no lateral movement. This adjustment is accomplished by first loosening the Needle-Carrier-Stud-Set-Screw 8-7/32 which is located in the frame of the machine, directly back of and below the center of the Needle Carrier Stud, and accessible from the outside rear of the machine. If the loosening of this screw is neglected in a single instance, the machine will be injured.

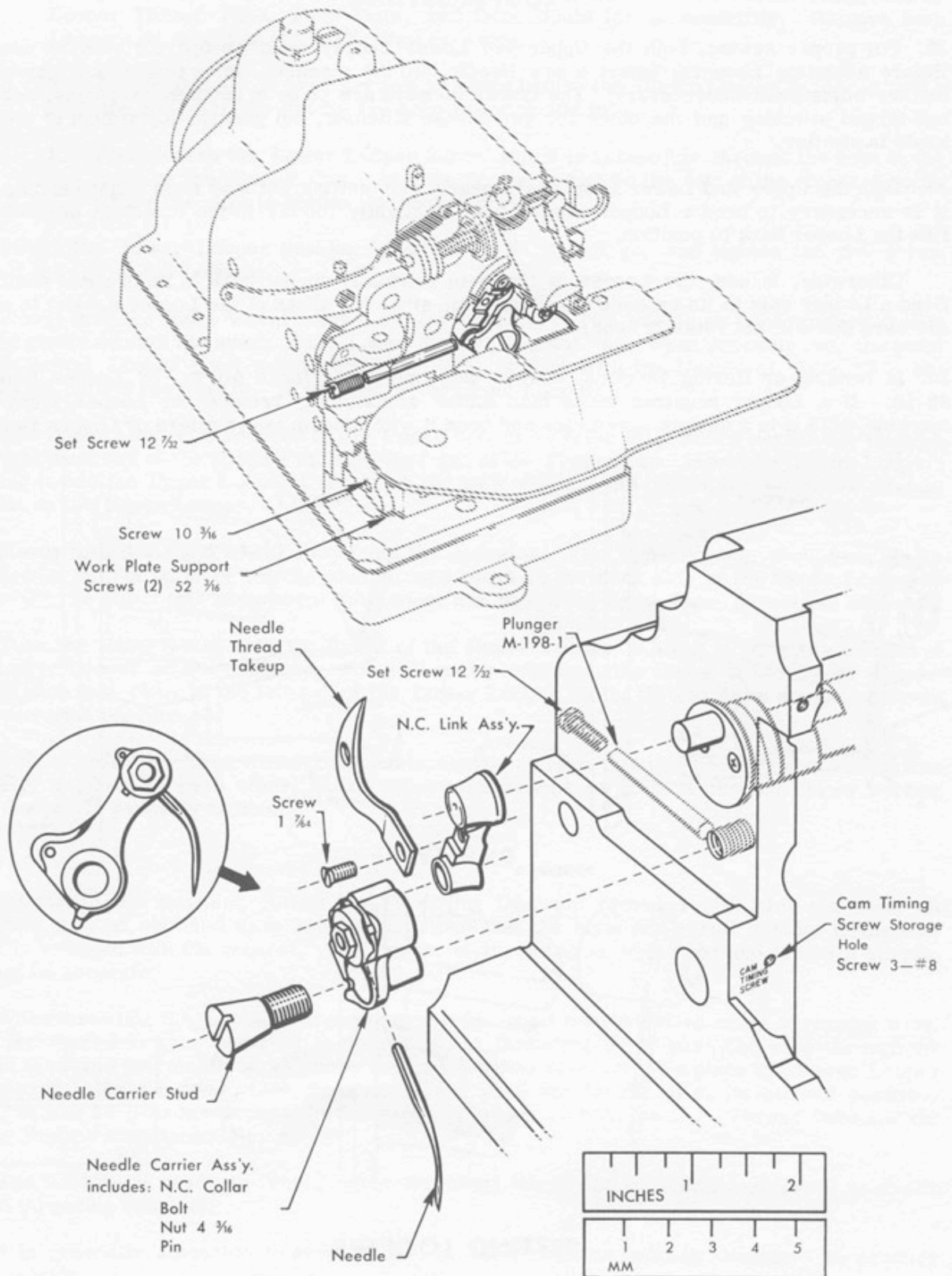
29. Screw the Needle Carrier Stud in or out very delicately until the proper adjustment is attained and then tighten the Needle-Carrier Stud-Set-Screw 8-7/32 and test the Needle Carrier again.

### **NEEDLE PLATE**

30. The needle slot in the Needle Plate must always be large enough to permit the blade of the needle to pass freely without contact with the Needle Plate. The edges of this slot should be quite square but smooth and only slightly rounded. Be sure there are no burrs or rough places on the chaining finger or working surface of the Needle Plate.

31. The needle plate must match the feeding parts.





**NEEDLE CARRIER ASSEMBLY**

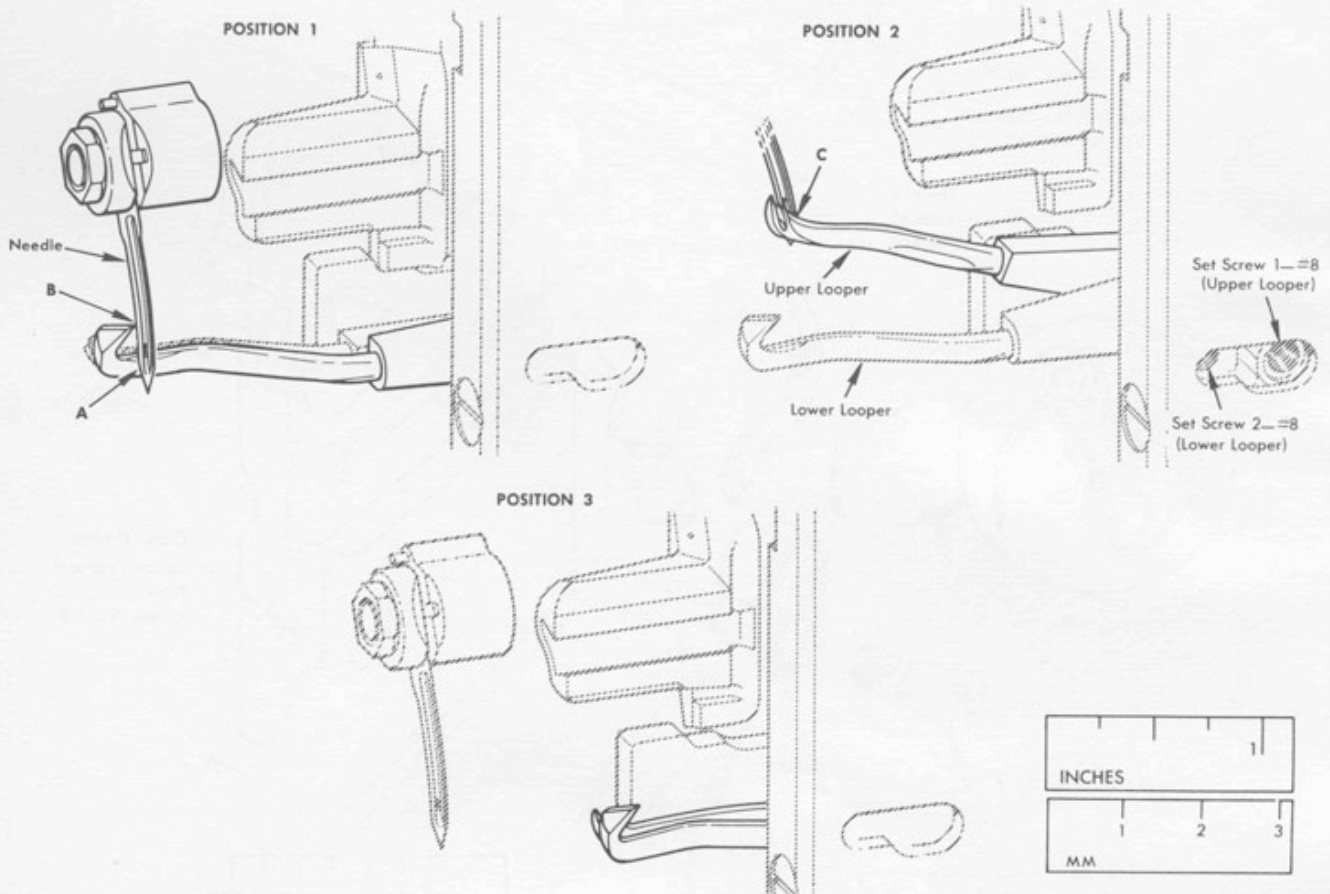
LOOPER SETTING

32. For proper sewing, both the Upper and Lower Loper must co-operate with the needle. Before adjusting Loopers, insert a new Needle into the machine, since this action may make further adjustment unnecessary. The Lower Loopers are made in two general forms, one for one thread stitching and the other for two thread stitching, but general adjustment of the two kinds is similar.

33. Both the Upper and Lower Loper are nearly self-setting but may need slight bending. If it is necessary to bend a Loper always bend it slightly too far in the direction desired and flex the Loper back to position.

Otherwise, in use, the Loper is likely to gradually spring back to its original position. Bend a Loper only in its exposed shank portion, since the areas of the Loper subject to wear are hard and will not retain a bend.

34. In bending or flexing Loopers, always use smooth surfaced pliers, or Loper Bender 30-10. If a Loper requires more than minor adjustment, remove the Loper from the machine, hold it in a smooth jawed vice and bend it with smooth jawed pliers or Loper Bender 30-10.



SETTING LOOPERS

**35. Steps to Setting Loopers:**

- a. Swing the Presser Foot Assembly out of position and remove the Needle Plate, Lower Looper Thread Tube, Feed Dogs, and Dust Shield for accessibility. Remove both Loopers by means of the Set Screws provided.
- b. The Lower Looper is best set and adjusted before the Upper Looper is placed in the machine and after the Needle has been properly set in.
  1. First loosen the Lower Looper Screw which is accessible through the hole in the front of the Frame Cap. As this Screw is just to the left of the Upper Looper Screw, be sure to loosen the proper screw.

36. Insert the Lower Looper pushing it in as far as it will go, and tighten the Set Screw against the flat of the Looper.

37. Slowly turn the Hand Wheel away from the operator. The Needle on its downward stroke should gently contact the shank of the Lower Looper at point "A". When properly set, the point of the Lower Looper must make gentle but firm contact with the Needle at point "B", but should not deflect the Needle. If necessary, bend the Looper.

38. The Upper Looper is secured to the Upper Looper Carrier by a Screw accessible through the right hand end of the opening through the front of the Frame Cap. Insert the Upper Looper, pushing it into the Upper Looper Carrier as far as it will go, and tighten the Set Screw against the flat on the Upper Looper.

39. Slowly turn the Hand Wheel away from the operator. The Upper Looper should not strike the Needle but the point of Needle should pass close to the back side of the Upper Looper at point "C". To effect this adjustment the Looper can be sprung up or down, as well as sidewise.

40. Turn the Hand Wheel until the throat of the Upper Looper is about to pass the left end of the Lower Looper on the upstroke. When properly adjusted, the throat of the Upper Looper should pass just clear of the left end of the Lower Looper on the up and down stroke as shown in illustration position #3.

41. Finally, turn the Hand Wheel completely around and see that the Loopers and Needle are properly adjusted to each other. After adjustment, check to be sure the Set Screw holding each Looper is properly tightened.

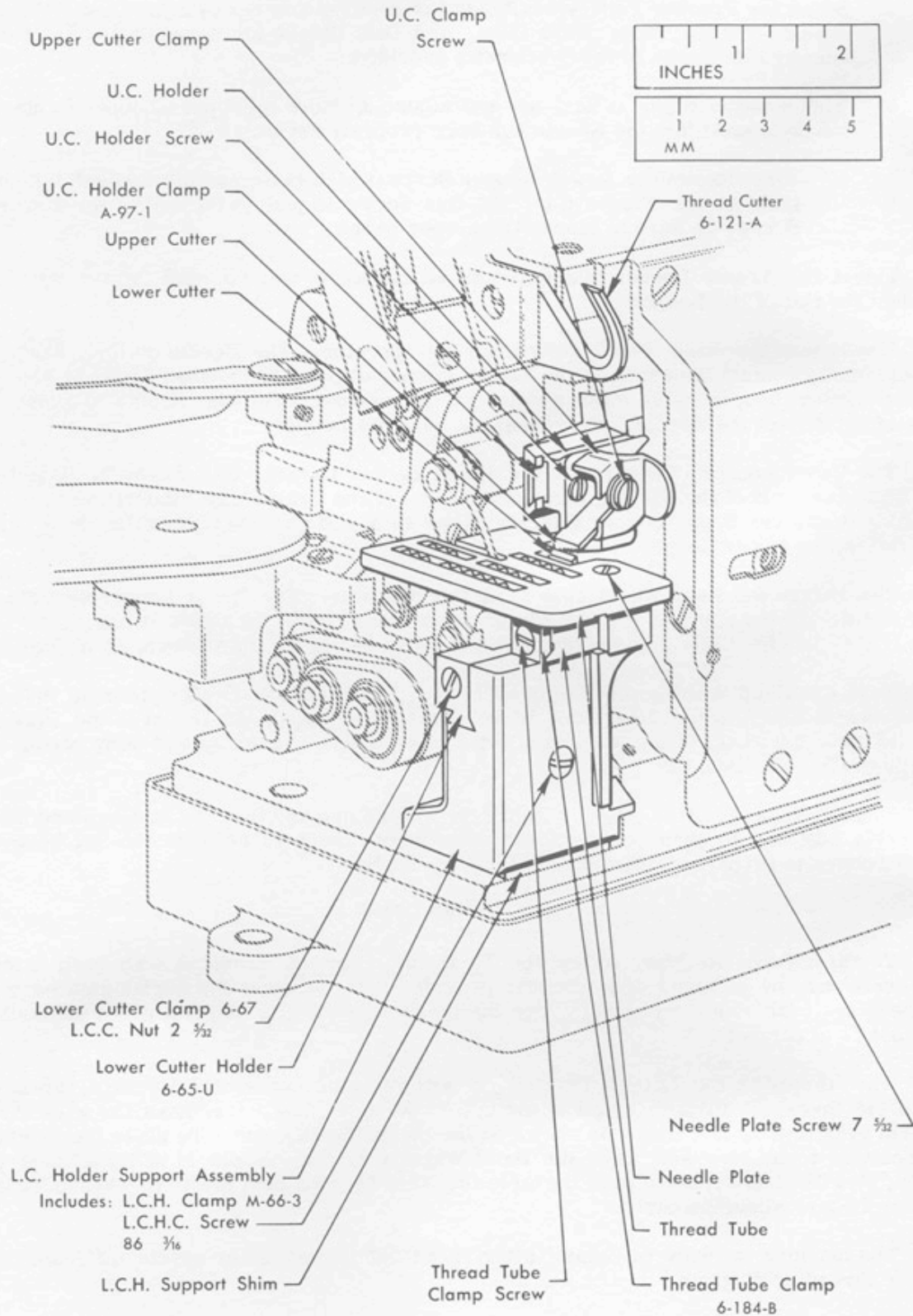
### THREADING

42. To thread the machine, follow the Threading Diagram provided with each machine. A duplicate may be obtained upon request provided that the style and serial number of the machine is included with the request. The matter of threading is important and although simple, it must be accurate.

43. When threading the Looper Threads, it will be found convenient to use a threading wire. With the thread or yarn inserted in the eye of the threading wire, pass the wire through the thread eyes and tension discs as shown on the threading diagram. To place the Lower Looper in position to be threaded, turn the Hand Wheel until the Needle is in its highest position. Then, it will be possible to pass the threading wire through both the L. L. Thread Tube and the Lower Looper simultaneously.

44. The machine is ready to "chain" after threading the needle or needle and looper as shown on the threading diagram.

45. It is generally advisable to keep tension on the thread as light as necessary to produce good results.



**CUTTER MECHANISM**

### **UPPER AND LOWER CUTTER**

46. **GENERAL:** The upper and lower cutter may be adjusted up and down and laterally to the right or left.

47. The position of cutters determines the width of the fabric within the seam. When a butt seam is desired, the cutting surfaces should be positioned approximately in the middle of the Needle Plate Chaining Finger. When a gap seam is desired, the cutting surfaces should be positioned as for a butt then moved to the left about 1/2 the width of the gap required. Lap seams are created by setting the cutting surfaces to the right of the butt seam position. The position of the cutters will vary with the thickness of fabric and some trial settings should be made to determine the correct position for each weight of material. Loosely woven materials require a wider setting than tight fabrics.

48. The L.C. Holder slides in the L.C. Holder Support Assembly providing lateral movement to the Lower Cutter. Do not allow the Lower Cutter to push too tightly against the Upper Cutter. If more than a light pressure is required, it usually indicates that the cutters are dull and should be sharpened.

### **ADJUSTMENT**

49. Set the cutting edge of the Lower Cutter slightly above the upper surface of the Needle Plate by means of the L.C.C. Nut 2-5/32. Do not set this cutter high enough to contact the lower surface of the Presser Foot.

50. Clamp the L.C. Holder to the width of trimming desired by Screw 86-3/16. Turn the machine over by hand and set the Upper Cutter so that in its lowest position its cutting edge is a little below the top edge of the Lower Cutter. This adjustment is made by U.C. Clamp Screw and U.C. Holder Screw.

51. Loosen L.C.H.C. Screw 86-3/16 and turn the Machine over by hand. The downward projection at the rear of the Upper Cutter should be in contact with the lower Cutter at all times.

52. Press the L.C. Holder lightly to hold the cutters together and tighten the L.C.H.C. Screw 86-3/16.

### **SHARPENING THE CUTTERS**

53. The Upper and Lower Cutters must be sharpened in a Cutter Grinder, which has a Jig to hold the cutters at the proper angle. Those customers who do not have a Merrow Cutter Grinder can have dull cutters sharpened by sending them to your distributor or to the Merrow Machine Company, Newington, Connecticut 06111.

54. When using the Merrow Cutter Grinder, be sure that the retaining groove for the cutter is perfectly clean before inserting the cutter and clamping the cutter into the cutter holder. The cutter should be carried entirely across the grinding face of the wheel, to prevent the wheel from becoming worn unevenly and requiring replacement so that cutters may be sharpened properly.

55. Very little need be ground off the cutters. If too much is ground at one passage across the face of the wheel, the temper of the cutter will be drawn and its cutting quality greatly impaired.

56. The cutter should not be discolored by grinding.

## **FEEDING MECHANISM**

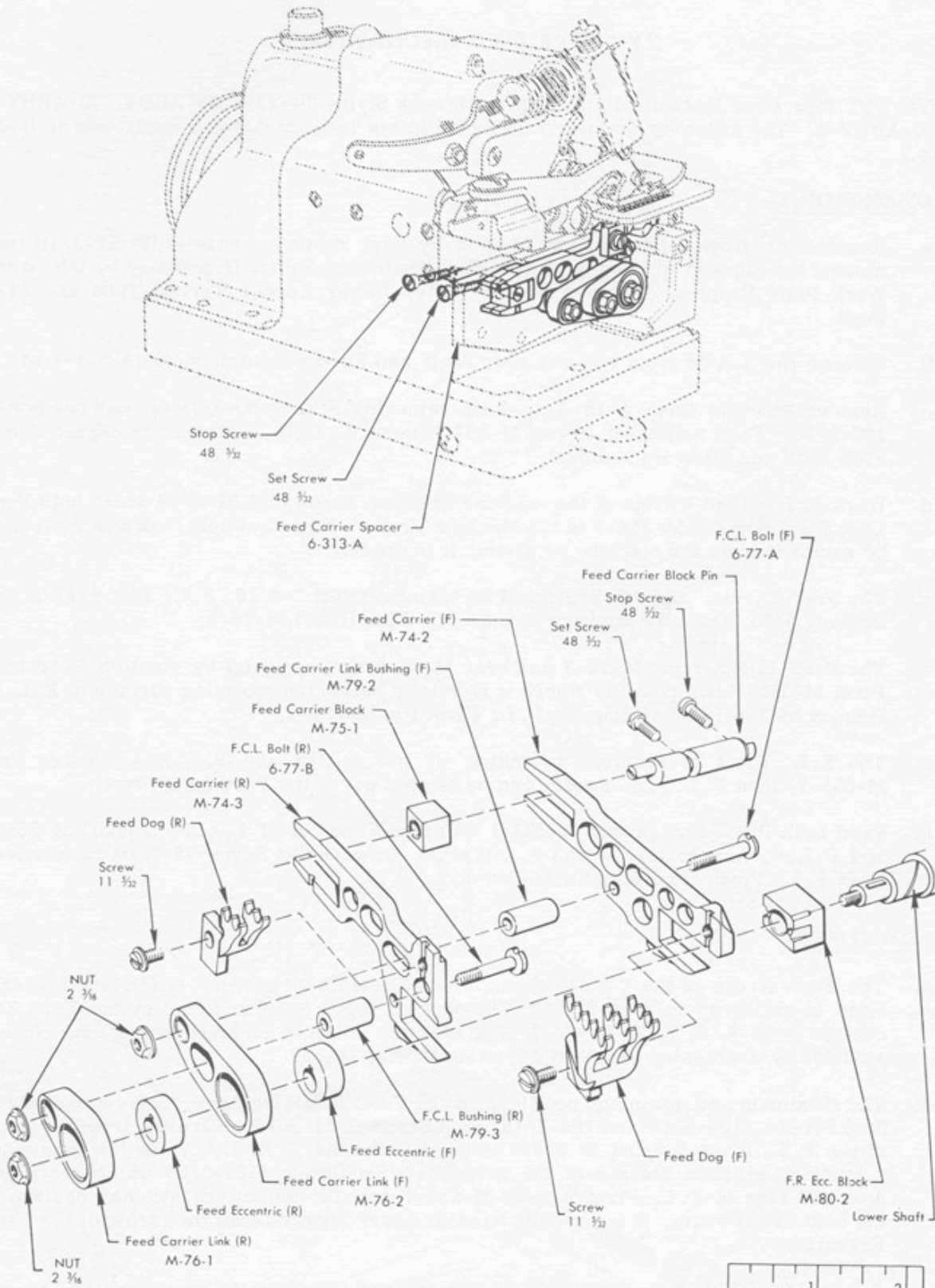
57. Feed Dogs are provided with either fine cut teeth or coarse cut teeth, single row or double row, dependent upon the work. Generally the feed dogs should be set as low as practical.

58. The length of feed can be changed by removing the Feed Eccentric and substituting another Feed Eccentric of different throw. Feed Eccentrics are marked to indicate approximately the number of stitches per inch produced at the edge of the fabric.

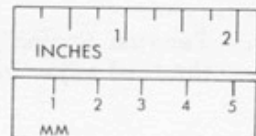
59. Feed Dogs and Needle Plates must match each other.

60. The letter "D" in the Style 70-D3B or 70-ABBD means it contains a differential or gathering feed. The differential contains two separate Feed Dogs with their separate Feed Carriers and separate Feed Eccentrics. When it is desired to prevent the edge of the fabric from being stretched or lengthened while seaming, the Front Feed Dog is made to travel a greater distance than the Rear Feed Dog. In most cases, a slight difference is sufficient and the number of each Feed Eccentric and the difference between the two is dependent upon the number of stitches required per inch and the elasticity of the fabric itself.

61. On certain fabrics it may be desirable to tilt the Feed Mechanism. To make this adjustment, loosen the Set Screw 48-5/32, slowly turn the F.C. Block Pin to the desired location and tighten this Set Screw. When the screw slot in the pin is level with the base of the machine, the Feed Dog will be in their standard level position. It is never necessary to remove the Stop Screw 48-5/32. This leveling device on the feed mechanism permits delicate adjustment of feed dogs.



**FEED MECHANISM (DIFFERENTIAL)**



### **"Y" TYPE FEED MECHANISM**

62. The "Y" Type Feed Mechanism is used on Merrow Styles 70-Y3B, 70-ABBY, 70-ABBY-1 and 70-ABBY-4. The following sections dealing with this feed mechanism apply only to these styles.

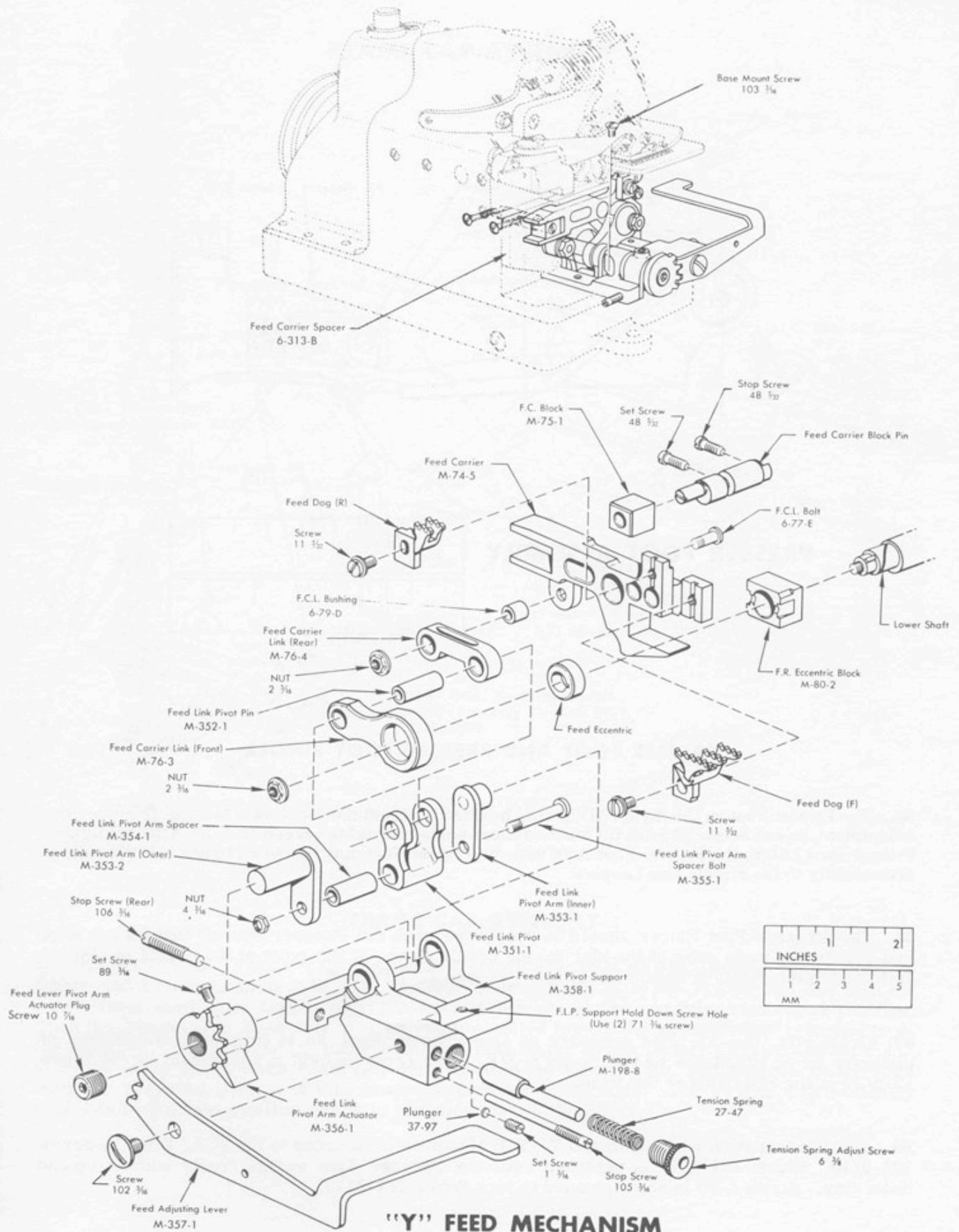
#### **63. DISASSEMBLY**

- a. Remove the Work Plate Support M-29-5 by first removing Screws (2) 52-3/16 then moving the Support to the rear. The Work Plate and Fabric Guard may be left on the Work Plate Support. Remove Needle Plate, Lower Loper Thread Tube and Feed Dogs.
- b. Remove Nut 2-3/16 from end of Lower Shaft and Feed Eccentric 6-82-(4-5-6-7-etc.).
- c. Remove Machine Base A-19-Assy-2 by removing Screws 83-3/16 (2) and one Screw 103-3/16. Feed Adjusting Lever M-357-1 must be fully depressed to expose Screw #103-3/16 and allow its removal.
- d. Working from the bottom of the machine unscrew Screws (2) 71-3/16 which hold Feed Link Pivot Support M-358-1 to the Machine Frame. Now the whole feed assembly may be removed from the machine by sliding it to the left.
- e. The Feed Carrier may be separated by taking off Nut 2-3/16, F.C. Bolt 6-77-E and Bushing 6-79-D which connect it to the F.C. Link (rear) M-76-4.
- f. The F.C. Links, front M-76-3 and rear M-76-4 are removed by rotating Feed Link Pivot M-351-1 to a position where it is totally below the mounting surface of F.L.P. Support M-358-1 and sliding out F.L. Pivot Pin M-352-1.
- g. The F.L. Pivot is removed by taking off Nut 4-3/16 and F.L.P.A. Spacer Bolt M-355-1, then F.L.P.A. Spacer can be slipped out of the Feed Link Pivot.
- h. Feed Link Pivot Arm (inner) M-353-1 will now slide out of F.L.P. Support M-358-1 and F.L.P. Arm (outer) M-353-2 will slide out when Set Screw 77-3/16 is removed from F.L. Pivot Arm Actuator M-356-1.

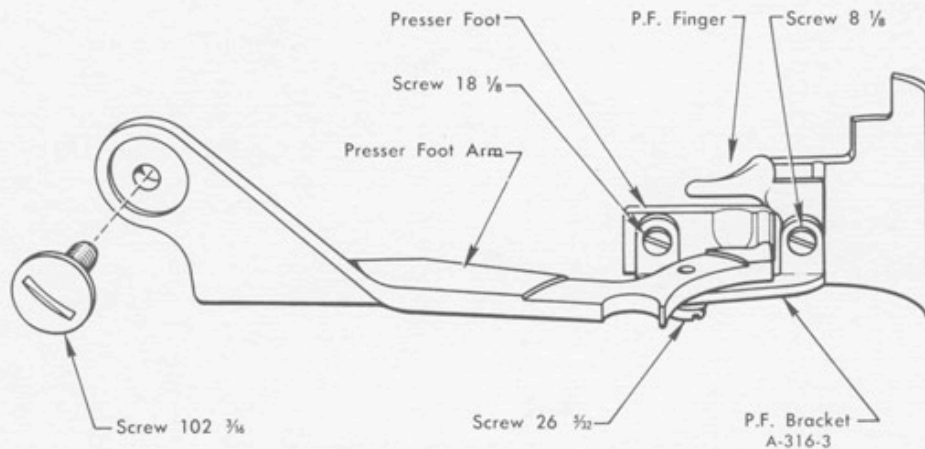
#### **64. ADJUSTMENT**

- a. The Feed Stroke of the "Y" Mechanism is adjustable to produce stitch length variations in ratios up to 4 or 5 to 1. The normal stitch spacing is set by the Feed Eccentric (6-82-4, 5, 6, 7, 8, etc.). The multiple stitch is achieved by a stroke change actuated by depressing the Feed Adjusting Lever, M-357-1.
- b. The maximum and minimum positions of the Feed Adjusting Lever are controlled for Stop Screws #105-3/16 and 106-3/16, Stop Screw #105-3/16 protrudes from the front of the F.L. Pivot Support M-358-1 is used to set the F.A. Lever for the maximum number of stitches desired at the selvages. Set Screw #106-3/16 which protrudes from the rear of F.L. Pivot Support M-358-1 sets the number of stitches desired in the body of the seam. It is possible to make fewer stitches than the rating of the Feed Eccentric.
- c. Tension Spring Adjustment Screw #6-3/8 is used to adjust the spring which returns the feed adjusting lever to its normal position.





**"Y" FEED MECHANISM**



**PRESSER FOOT ASSEMBLY**



**PRESSER FOOT AND PRESSER FOOT FINGER**

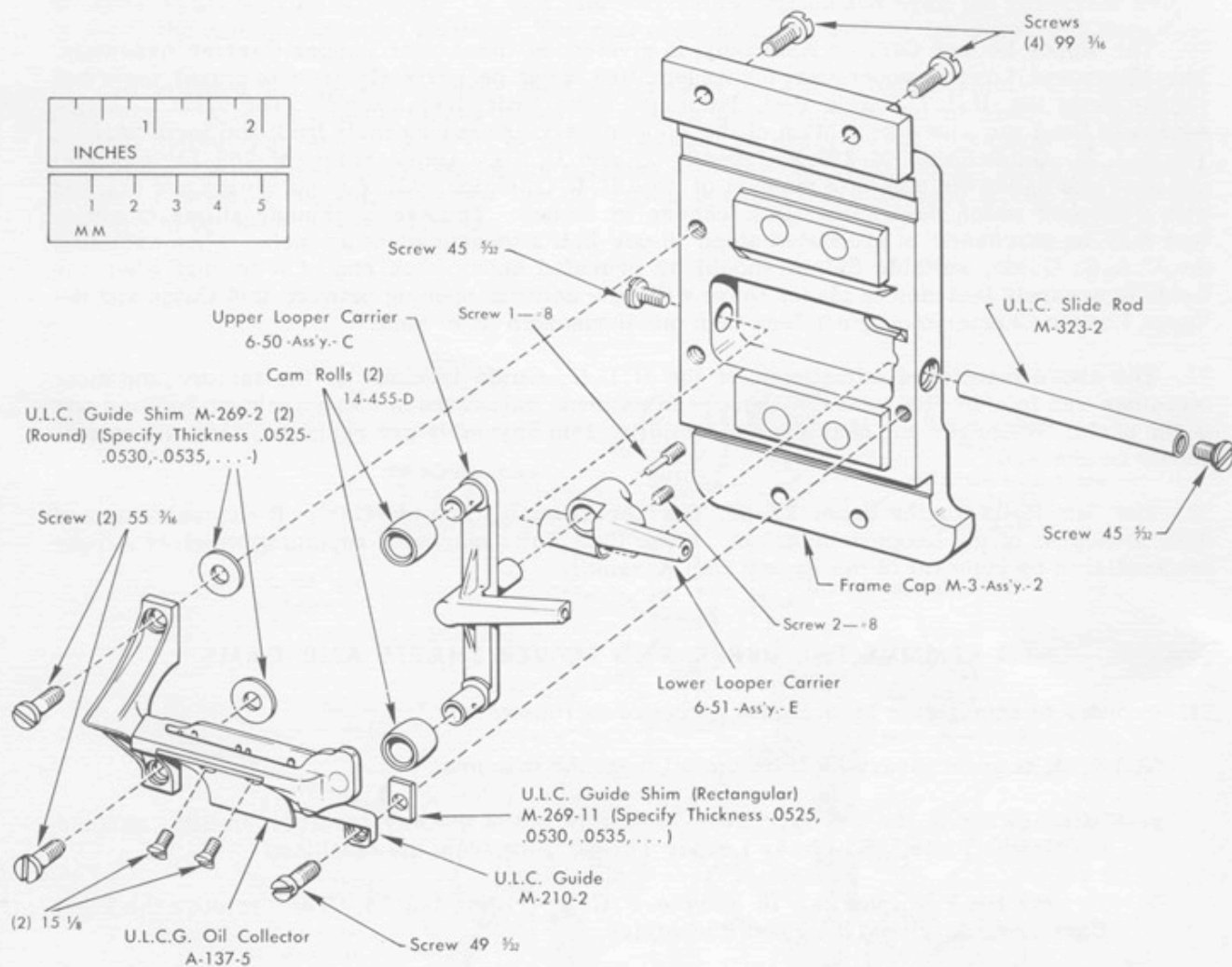
65. The Presser Foot on the Style 70-D3B may be tilted to accommodate certain fabrics. To make this adjustment, loosen Screw 26-5/32, tilt foot to desired angle and tighten Screw 26-5/32. After lifting the Presser Foot Latch, the Presser Foot Arm with its Presser Foot may be swung to one side providing accessibility to the Needle and Loopers.

66. The Presser Foot Finger should be positioned upon the Presser Foot so that its left edge just covers the right edge of the slot in the needle plate. If the point of the needle is slightly deflected to the right, it should not hit the Presser Foot Finger.

67. Ordinarily, use as little pressure on the Presser Foot as is practical, the degree of pressure being adjustable by the Screw 6-3/8. This screw is held in adjustment by Set Screw 13-5/32 at the right side of the Head.

68. The Presser Arm on 70-D3B and 70-Y3B Machines is mounted to the P.A. Pivot by Screw 102-3/16. Screw 102-3/16 is tightened until the Presser Arm swings freely without up and down play. Screw 1-#5 is now tightened to lock Screw 102-3/16.

## FRAME CAP ASSEMBLY



## FRAME CAP ASSEMBLY

69. To remove the Frame Cap Assembly, remove the Dust Shield, Needle Plate, and the Upper and Lower Loopers. Remove the four Screws 99-3/16 in the Frame Cap and turn the Hand Wheel until both Looper Carrier Assemblies are at the extreme right-hand position. Then the Frame Cap Assembly may be readily pulled toward the operator and removed from the machine. To reassemble, place each Cam Roll on the Upper Looper Carrier and oil them. Turn the Hand Wheel while observing the groove in the Lower Cam, and stop the Lower Cam when the observed portion of this groove is farthest to the right. The Frame Cap Assembly may then be put into position as it was removed.

**UPPER LOOPER CARRIER ASSEMBLY AND  
LOWER LOOPER CARRIER ASSEMBLY**

70. The Upper Looper Carrier Assembly is pivoted on the Lower Looper Carrier Assembly. The Upper and Lower Looper Carrier Assemblies must be perfectly free to travel their full stroke along the U.L.C. Slide Rod, but must have little lost motion. The U.L.C. Guide serves to limit the sidewise motion of the Looper Carriers during their back and forth stroke. The U.L.C. Guide Shim M-269-2 (round) (2) and U.L.C. Guide Shim M-269-11 (square) are provided under the points of support of this U.L.C. Guide. All of these Shims are marked with a number which designates its thickness in inches. Thicker or thinner shims of either type may be purchased in graduated steps of one-half a thousandth of an inch. When adjusting the U.L.C. Guide, suitable Shims should be provided under each end of it so that when the Guide is securely fastened in place, there will be a uniform opening between this Guide and the Upper Looper Carrier of slightly less than one thousandth of an inch.

71. The above mentioned adjustment of the U.L.C. Guide is made at the factory and most machines run four or five years without readjustment unless there be an accident spoiling one of the parts. Whenever any of the parts comprising this assembly are replaced, this adjustment should be checked.

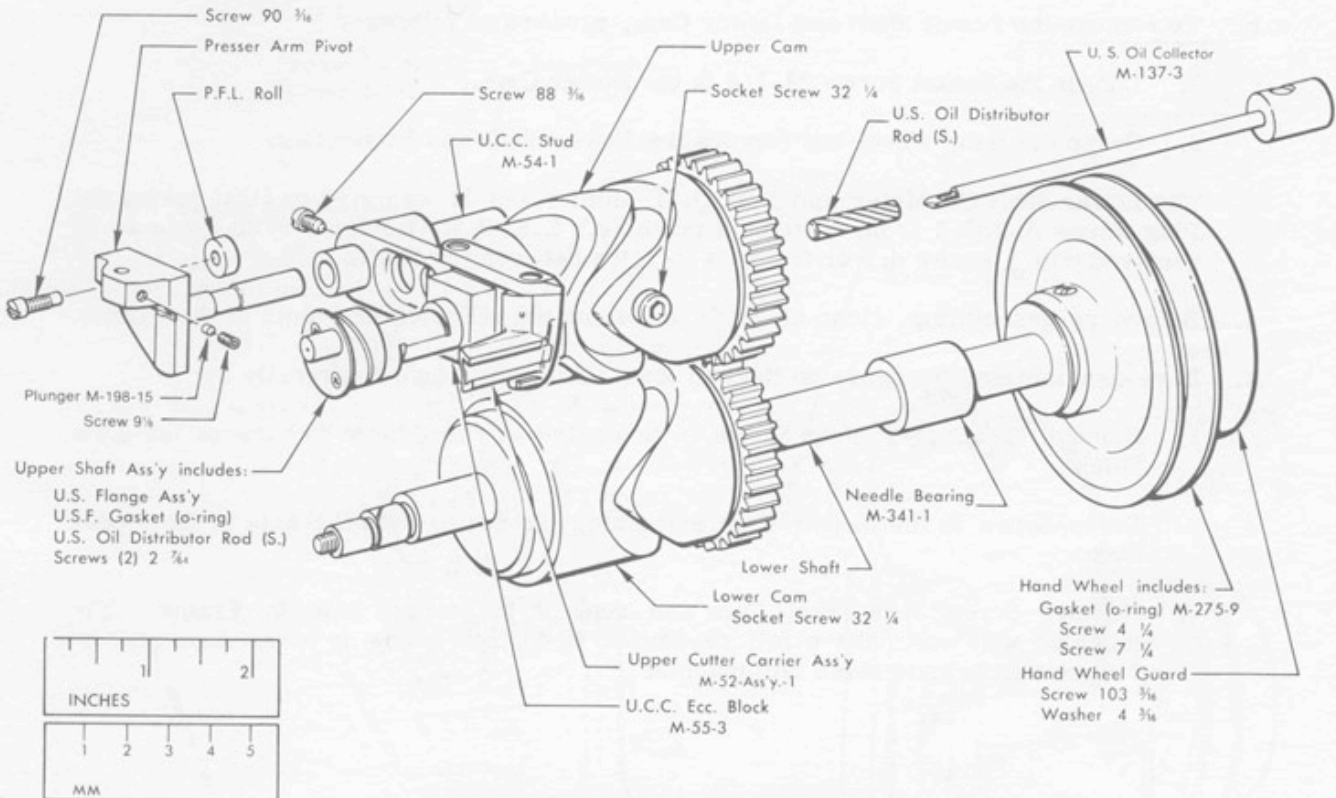
72. The Cam Rolls for the Upper Looper Carrier Assembly are identical. If excessive up and down looseness of the Loopers develops, these Cam Rolls may need replacing which is simply accomplished by removal of the Frame Cap Assembly.

**TO REMOVE THE UPPER AND LOWER SHAFTS AND CAMS**

73. In order to remove the Main Shafts, proceed as follows:

NOTE: It is unnecessary to drain the oil from the machine.

- a. After swinging the Presser Foot Assembly out of the way for accessibility, remove the Needle Plate, and Lower Looper Thread Tube from the Machine.
- b. Remove the F.E. Nut 2-3/16 and the F.C.L. (r) Nut 2-3/16. Then remove the Feed Carrier Link (r) and the Feed Eccentrics.
- c. To remove the Work Plate Support take out the two Screws 52-3/16 which hold the Work Plate Support to the Frame.
- d. Slide the Feed Carriers from the F.R. Eccentric Block and the F.C. Block and remove the Blocks.
- e. Remove the Needle Carrier Stud after loosening the Set Screw 8-7/32. Slide the Needle Carrier Assembly and the N.C. Link Assembly from the machine.
- f. Remove the Frame Cap Assembly as described previously.
- g. To remove the Upper Shaft Assembly and Upper Cam, proceed as follows:
  1. Remove the Upper Shaft Pump Parts (Screw 8-7/16, Spring 27-40, and Oil Pump Plunger). Care must be taken not to harm the O.P.P. Screw Gasket.
  2. Loosen Screw 5-9/32 and remove F.C. Oil Feeder Tube Assembly, M-95-Assy. -4. Note: When replacing this part, point projection on this tube downward.



**MAIN CAMS – MAIN SHAFTS**

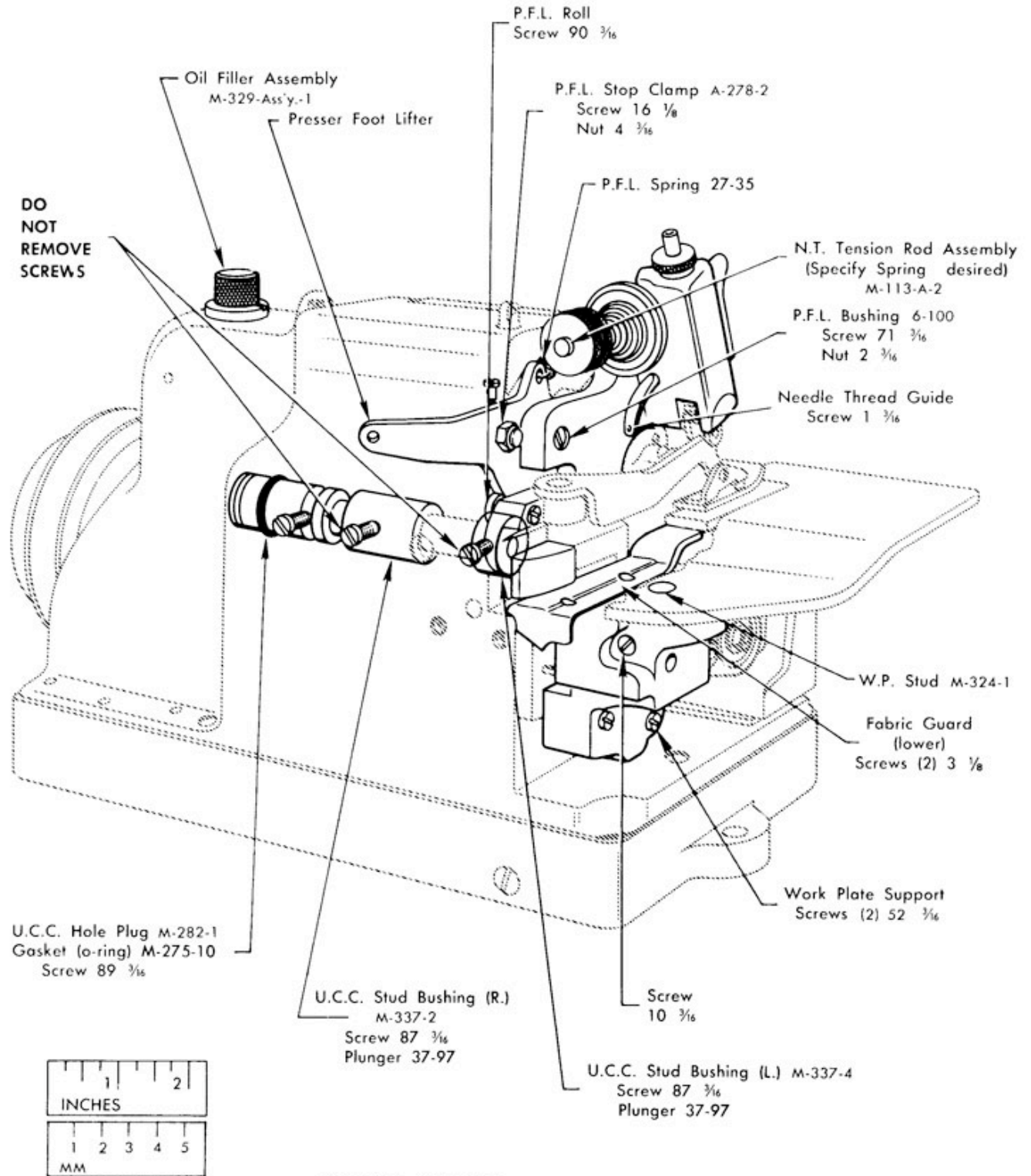
3. Remove Screw 2-1/2, now insert a 7/32 Screw several turns into the U.S. Oil Meter Holder M-137-5. Pull this part up and out of the machine. Note: When replacing U.S.O.M. Holder M-137-5, place pointed projection on this part into the hole in U.S. Oil Collector M-137-3.
4. Insert a 1/8 Screw several turns into the U.S. Oil Collector M-137-3 and remove from the machine.

**NOTE:** When replacing U.S. Oil Collector M-137-3, place into the machine with the hole in the large end pointing upward.

5. Loosen the Socket Screw 32-1/4 in the Upper Cam.
6. Pull the Upper Shaft Assembly out until the end of the eccentric cut on the Upper Shaft strikes the U. C. C. Eccentric Block (about 1/2 inch) (12 mm). While exerting pressure to pull the Upper Shaft Assembly further out, move the Upper Cutter Carrier Assembly up and down. This action will allow removal of the Upper Shaft Assembly and the Upper Cam.

**NOTE:** If it is necessary to use a rod to loosen the Upper Shaft Assembly from its bearings, use a soft rod of between 1/4" (6.5 mm) and 3/8" (9.5 mm) diameter.

- h. To remove the Lower Shaft and Lower Cam, proceed as follows:
  - 1. Loosen the Socket Screw 32-1/4 in the Lower Cam.
  - 2. Grasp the Hand Wheel and remove the Lower Shaft and Lower Cam.
- i. The Lower Shaft Oil Meter and L.S.O.M. Holder 6-9/32 removed by first taking out Plug Screw A-288-3 from bottom of machine. L.S.O.M. Holder 6-9/32 may now be removed with a screw driver from its location between the Shafts.
- j. Before re-assembling, clean all parts including the oil holes and slots in the Frame.
- k. In re-assembling, the gears on the two Main Cams are meshed correctly by:
  - 1. Remove the Cam Timing Screw 3-#8 located in the Frame in back of the Dust Shield.
  - 2. Place Screw in the Lower Cam and match the Screw with the hole in the Upper Cam.
  - 3. Remove Screw 3-#8 from Cam and replace in storage hole in Frame. The machine will not make a full revolution when this Screw is in the Cam and the Frame Cap is assembled into machine.



**REAR VIEW**



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