

KOLDWELD® LLC

Cold-Pressure Welding Equipment

KBM-5ER

Buttwelding Machine

OPERATING MANUAL

KBM-5ER BUTTWELDER

The KBM-5ER Instruction Manual mirrors that of the KBM-5 Manual Buttwelder. The only difference being the Part Number Configuration. Enclosed, please find the KBM-5ER parts list.

INTRODUCTION

The Koldweld Model KBM-5ER Cold Pressure Butt welder is a precision tool capable of producing true metallurgical welds without heat or electricity. While operation of this machine is simple and easily taught, as well, it is suggested that operators familiarize themselves with the KBM-5ER by first reading through this Manual before attempting to use, maintain, or repair the machine. Particular attention should be paid to Sections 1 and 4, which provide General Information and Instructions for making a weld.

The KBM-5ER is an economical, rugged, and reliable machine. However, a success with it depends upon three things, all controllable by the machine's owner; proper installation; proper operation; and regular maintenance. This Manual covers most of the questions occurring in these areas. Adherence to the Manual's Instructions will more than repay the time in reading them with long service and minimal downtime. Should any questions or problems arise that the Manual does not satisfactorily answer, the producers of Koldweld equipment stand ready to assist you.

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1. The Koldweld Model KBM-5ER Cold Pressure Buttwelding Machine
General Informational

The Koldweld Model KBM-5ER Cold Pressure Buttwelding Machine is intended for joining wires and the like in the range of 14 gauge (.064") through 5 gauge (.181") inclusive. Welding dies for half-gauge sizes from 14-1/2 gauge (.060") through 5-1/2 gauge (.1713") are also available. Special dies can be made for any wire diameter not classed as a standard gauge if the desired size falls within the machine's capacity for standard sizes. Also certain shapes other than round wires can be cold pressure welded in the Koldweld KBM-5ER Machine, but these shapes are limited to a cross-sectional area not greater than that of 8 gauge wire, and to a maximum width of 1/2". Special welding dies must be designed for other-than-round shapes.

Cold pressure welds can be made in copper, aluminum, lead, zinc, silver, nickel, copel, chromel, constantan, tantalum, alumel, the precious metals, and many alloys. Other materials not listed also may be suitable for cold welding. Combinations in the following materials can be made: copper to aluminum, nickel, tantalum, chromel, and the precious metals to each other. Of course, all materials and combinations, in particular, alloys have not been tried in the cold pressure welding process. However, in general, materials, which are hard or have low ductility, may not be weldable.

While it is usually best to cold pressure weld wire in the bare condition, tinned wire can sometimes be joined without removal of the tin coating. Likewise, some enameled wires can be cold pressure welded, but heavy enamel or tin coatings should be removed prior to cold pressure welding because these coatings may cause slippage or build-up in the dies. All surface lubricants should be removed from the gripping area of wire to be cold pressure welded. Immersion of the wire ends in trichloroethylene, petroleum spirits, or other degreasing solvent may help to prevent lubricated or insulated wire from slipping in the welding die.

NOTE

Piece numbers mentioned in the following instructions refer to parts shown on Figures A, B, C, E and G of this Manual.

2. Receiving Inspection of the Koldweld Model KBM-5ER Cold Pressure Buttwelding Machine

The Operating Handle (33) of your new Koldweld Model KBM-5ER Cold Pressure Buttwelding Machine has been removed for space consolidation and protection from damage in shipment to you. Prior shipment to your machine was thoroughly tested, inspected and approved. Sample welds made on your machine will be found in an envelope at the top of the machine.

The Operating Handle should be replaced by first running Hex Nut (39) all the way up the handle threads. Then screw the handle fully into the tapped hole in Handle Adapter (14) at the right side of the machine. Finally, lock the operating handle to the handle adapter by running the hex nut back down the handle threads against the adapter. Gently move the operating handle up and down several times to be sure that your machine's internal parts are free.

Visually compare your machine with the illustration and drawings of the Koldweld KBM-5ER Buttwelder in this Manual to determine if any external parts are missing or damaged. Promptly report any damage discovered on receipt of the machine to your delivering carrier.

Unwrap your welding die set from the waterproof paper wrapping. Check to be certain that the wire size marking etched on the die set is correct. If the die size is not the one ordered, or if the machine appears to have a factory defect, promptly notify the manufacturer.

THE KOLDWELD MODEL KBM-5ER COLD PRESSURE BUTTWELD MACHINE

BASIC ASSEMBLY

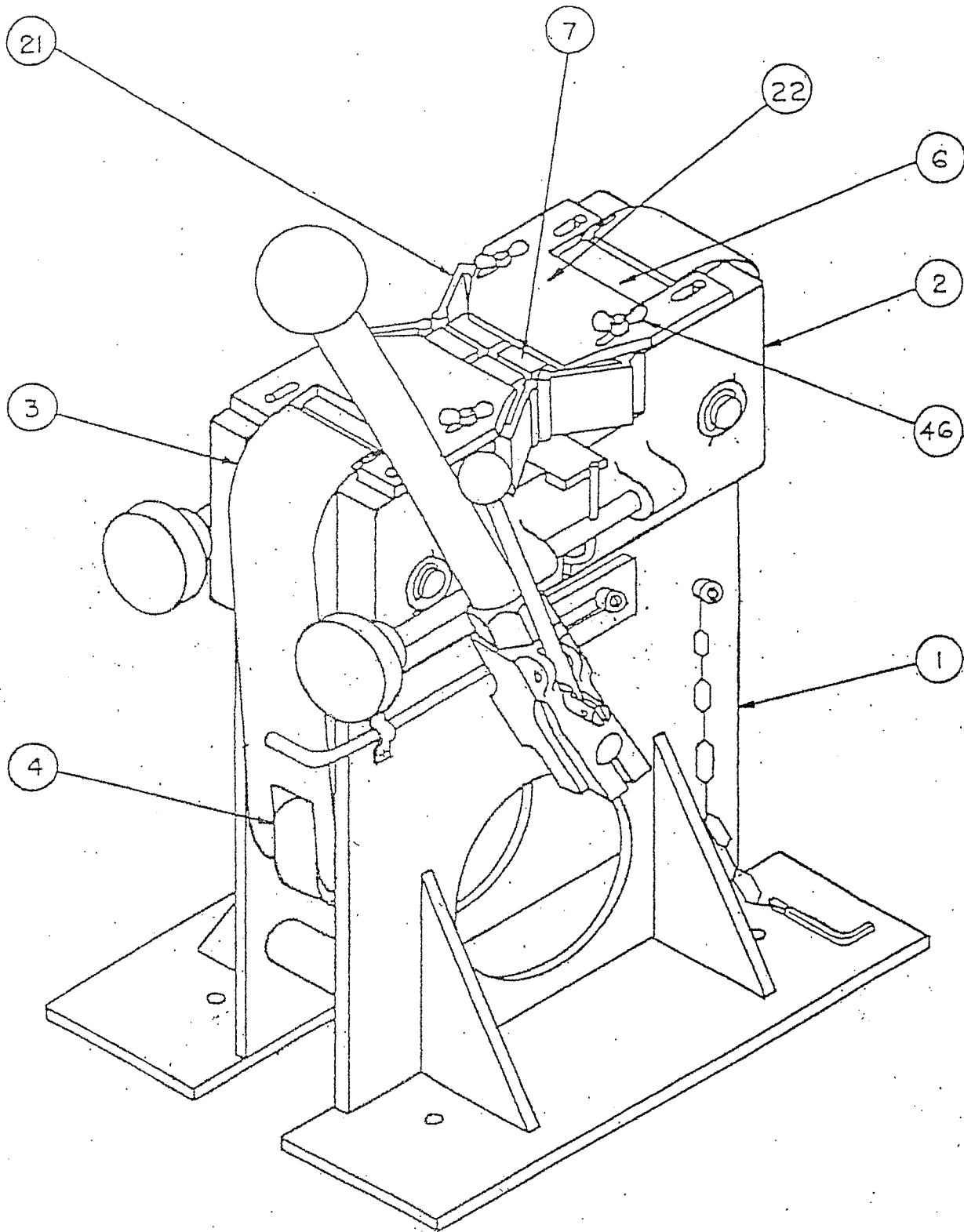


FIGURE A

- | | |
|-------------------------------|---------------------|
| 1. Frame Weldment Assembly | 7. Die Assembly |
| 2. Upper Frame and Die Holder | 21. Finger Assembly |
| 3. Rocker Arm | 22. Cover Plate |
| 4. Sliding Yoke | 46. Thumb Screw |
| 6. "V" Block Assembly | |

3. Preliminary Lubrication of the Model KBM-5ER Cold Pressure Butt welder

Although your new Model KBM-5ER Butt welder has been lubricated at all internal points at the time of manufacturer, prior to initially operating the machine, the following minor lubrications should be performed.

- 3A. To prevent rusting, lightly coat all exposed surfaces of the welding die set with a good grade of fine machine oil. Take care not to get oil into the wire gripping cavities of the die.
- 3B. Remove the four Thumb Screws (46) from the top of the machine and lift off Cover Plates (22). This will expose four oil wicks in vertical holes in the "V" Block assembly (6). Saturate the two wicks in each "V" Block with SAE 90 oil. Replace the cover plates and thumb screws.
- 3C. The driving surfaces of the "V" blocks and corresponding angular surfaces of the welding die set should be lightly coated with Molykote G grease, as supplied in the Maintenance Kit (see accessories), or equivalent.

TOP VIEW AND MOUNTING

(Die Removed)

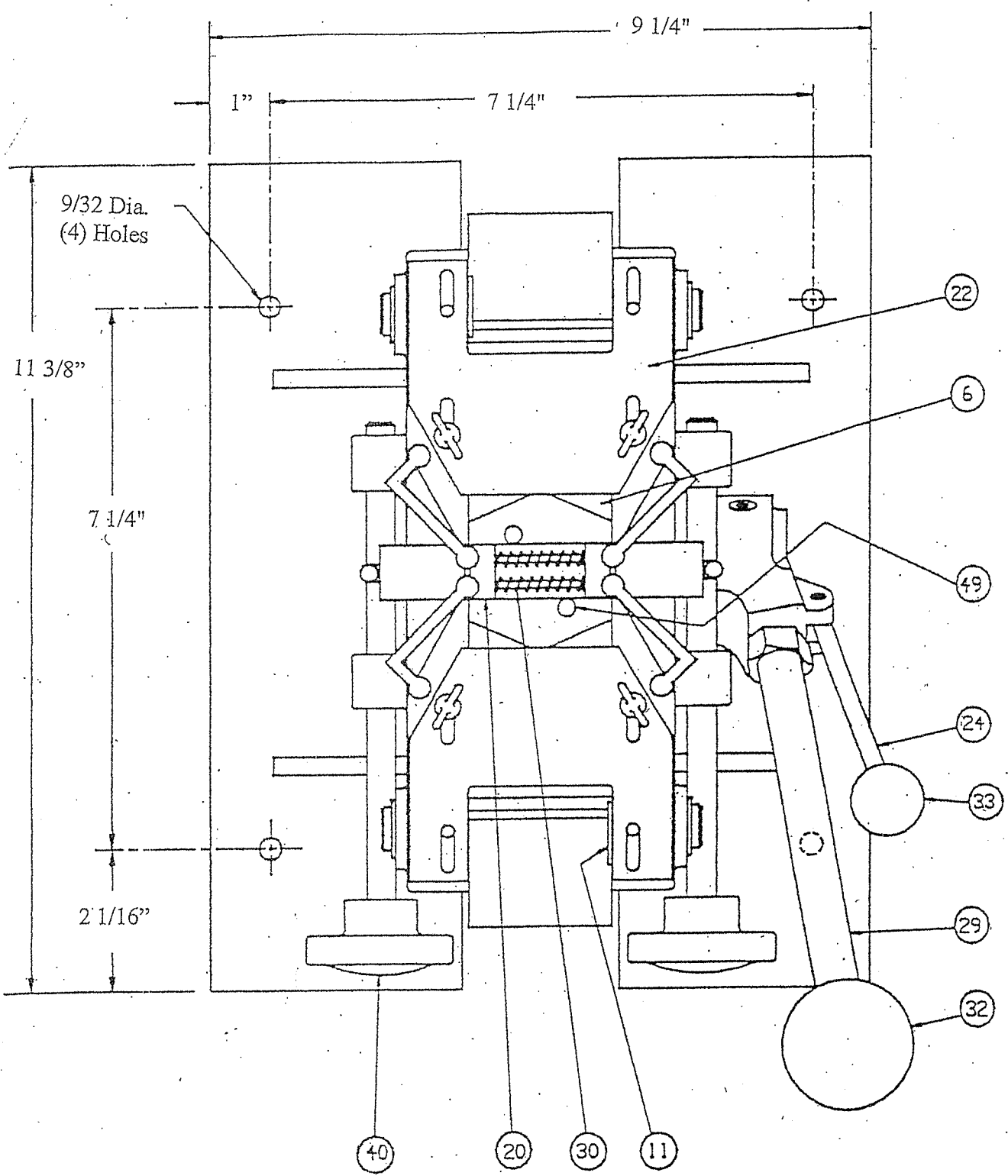


FIGURE B

- | | |
|---------------------------|---------------------------------|
| 6. "V" Block Assembly | 30. Finger Equalizer Spring |
| 11. "V" Block Return Link | 32. Ball Handle (Operating) |
| 20. Finger Equalizer | 33. Ball Handle (Index Release) |
| 22. Cover Plate | 40. Knob (Finger) |
| 24. Index Release Handle | 49. Die Ejector Pin |
| 29. Handle | |

4. Operating Instructions -- Model KBM-5ER Cold Pressure Buttwelding Machine

4A. Mounting

Before attempting to operate your New Model KBM-5ER buttwelder, the machine should be firmly mounted to the Special Tool Stand, which appears in Section 9 of this Manual on Page 14 as Part Number 183775, or a rugged production bench. If your machine is mounted to a production bench, Figure B on the opposite page of this Manual gives mounting hole sizes and spacing.

After your machine has been mounted, it is ready for die installation and wire size adjustment.

4B. Die Installation

Press to the left on Index Release Handle (24), which permits the operating Handle to move upward and provides the maximum opening between the "V" Blocks. Slide the Cover Plates clear and place your welding die set in the cavity between the "V" Blocks. The die is properly oriented when the wire cavity holes are toward the sides of the machine. It may help in seating the die set to pull the die set open sideways sufficiently to clear the tapered plungers in the "V" Blocks Assembly. Push the die set directly downward against the pressure of Die Ejector Pins (57) until the top of the die set is level with the "V" Blocks. If your die set stops above the "V" Blocks, slightly rock the operating Handle up and down while maintaining the downward pressure on the die set, but take care not pinch fingers in the die set. After the die set is properly seated, slide the Cover Plates over the edges of the die set and tighten the four Thumb Screws. Pull the operating Handle downward until Index Pin (26) snaps into place, and then release the operating Handle.

THE KOLDWELD MODEL KBM-5ER COLD PRESSURE BUTTWELD MACHINE

FRONT VIEW

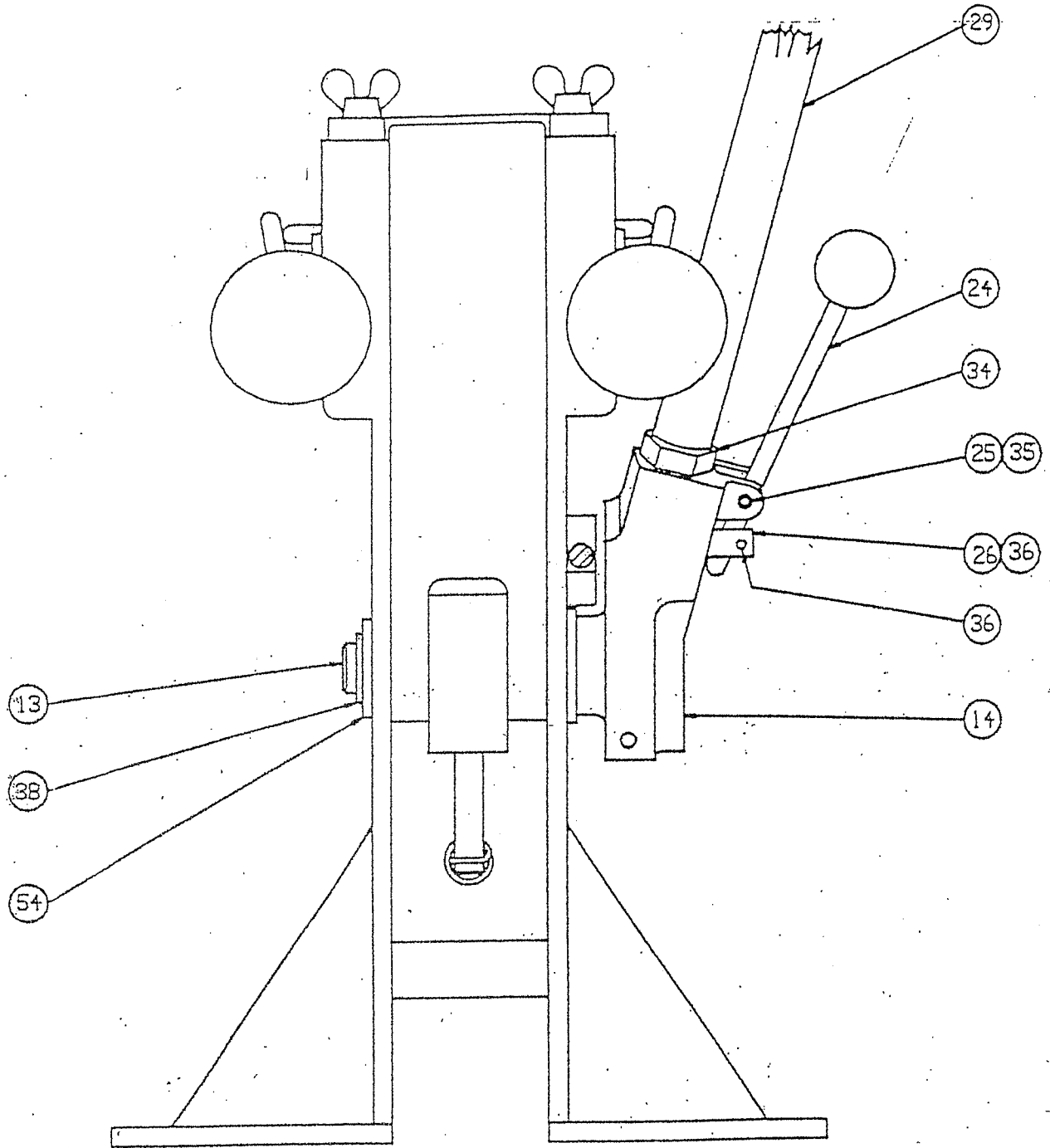


FIGURE C

- | | |
|--------------------------|---------------------------------|
| 13. Cam Actuator Rod | 24. Spring Index Release Handle |
| 14. Handle Adapter | 34. Hex Nut |
| 24. Index Release Handle | 35. "E" Ring |
| 25. Pivot Pin | 36. Dowel Pin |
| 26. Index Pin | 38. "E" Ring |
| 29. Handle | 54. Bushing |

4C. Wire Size Adjustment of the Die Set

The gap between front and back die segments on both the right and left hand sides of the die set should be about one-third (1/3) that of the wire diameter for which the die set is intended. Gap measurement may be made by eyeball when the operating handle is at the top limit of its stroking range. If the gap is significantly smaller than 1/3 of the wire diameter, wire feeding difficulties are likely. If the gap is significantly larger than 1/3 of the wire diameter, wire clamping difficulties may occur. It is good practice to gauge the gap between the front and back die segments each time a different die set is installed to determine if wire size adjustment of the die set is necessary.

Should it be necessary to open or close the gap in a die set, this is accomplished by using the die adjuster, located just above the handle adapter. Since the Model KBM-5ER has been furnished with two types of die adjusters, first determine if the adjustment mechanism on your machine is the gear-type or cam-type adjuster. Then follow the die adjustment instructions below that pertain to your machine's adjuster.

4C1. Gear-Type Adjuster

NOTE

It may be of help to refer to Figure E and well as Figure C, which are on the opposite page, in following this instructions.

Loosen Gear Screw (63) and turn Gear (29). You will note that Gear (29) engages Index Gear (27), which has an eccentric hub. This eccentric varies the position of the Index Pin (26) in the handle adapter and the position of the index pin controls the position of the operating handle as well as the opening between front and back segments of the die set. Move the operating handle downward enough to lift the index pin away from the index gear and successively turn Gear (29), release the operating handle and measure the gap between the die segments until the proper gap is obtained. When the proper die setting has been reached, tighten the gear screw to lock the adjustment.

THE KOLDWELD MODEL KBM-5ER COLD PRESSURE BUTTWELD MACHINE
CAM-TYPE ADJUSTMENT MECHANISM

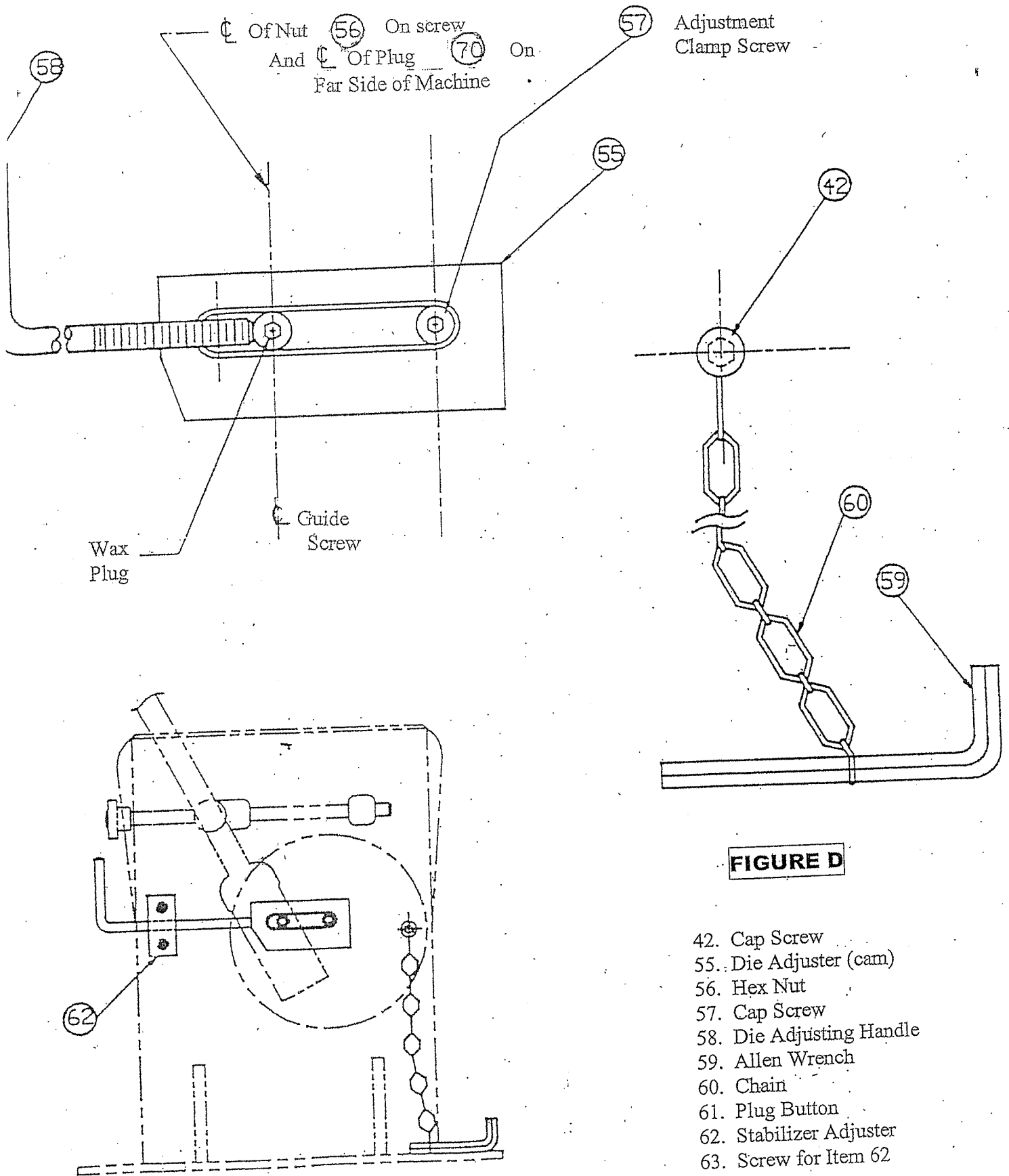


FIGURE D

- 42. Cap Screw
- 55. Die Adjuster (cam)
- 56. Hex Nut
- 57. Cap Screw
- 58. Die Adjusting Handle
- 59. Allen Wrench
- 60. Chain
- 61. Plug Button
- 62. Stabilizer Adjuster
- 63. Screw for Item 62

4C2. Cam-Type Adjuster

Using Allen Wrench (68), which is attached to the machine frame with Chain (69), loosen only the right hand Cap Screw (67) that clamps the L-shaped Die Adjuster (Cam) (65) to the outside of the machine. Successfully turn the Die Adjusting Handle (66) and gauge the opening between the front and back segments of the die set until the proper die spacing is obtained. Finally, tighten the cap screw to secure the adjustment.

5. Making a Weld with the Model KBM-5ER Cold Pressure Buttwelding Machine

After the machine has been properly lubricated and the die set also properly lubricated, installed and adjusted, your new Model KBM-5ER is ready for action. Like any other piece of precision equipment, your KBM-5ER will function best if it is kept free of wire lubricants and dirt. In particular, any efforts to keep lubricants and dirt out of the welding zone of wires to be joined and the die set will pay dividends in reduced downtime and freedom from maintenance problems.

To weld with the KBM-5ER, first make sure that the operating handle is at the top of the stroking range. Turn the finger control Knob (45), on either the right or left hand side of the machine, toward the machine centerline to open Finger Assembly (21). Pass one of the wires to be joined through the open finger assembly and just through one-half of the die set. Looking from the top of the machine, the wire end should be visible in the center of the cavity between the right and left hand halves of the die set. Repeat this loading procedure for the opposite side of the die set. The ends of the wires to be joined should be in abutment at the center of the cavity between the halves of the die set.

Now press the operating handle downward to the bottom limit of its stroking range. You will see the die segments first grasp the wire ends and then press them together, upsetting the abutting ends. Release the operating handle. Repeat this procedure three or more times to cold pressure weld the wires. While experience will best determine the fewest number of upsets needed to join your wires, it should be pointed out that extra strokes of the operating handle will not continue to improve weld quality, but will work-harden the wire, and this condition could cause redrawing difficulties.

THE KOLDWELD MODEL KBM-5ER COLD PRESSURE BUTTWELD MACHINE
EXTERNAL OPERATING MECHANISM

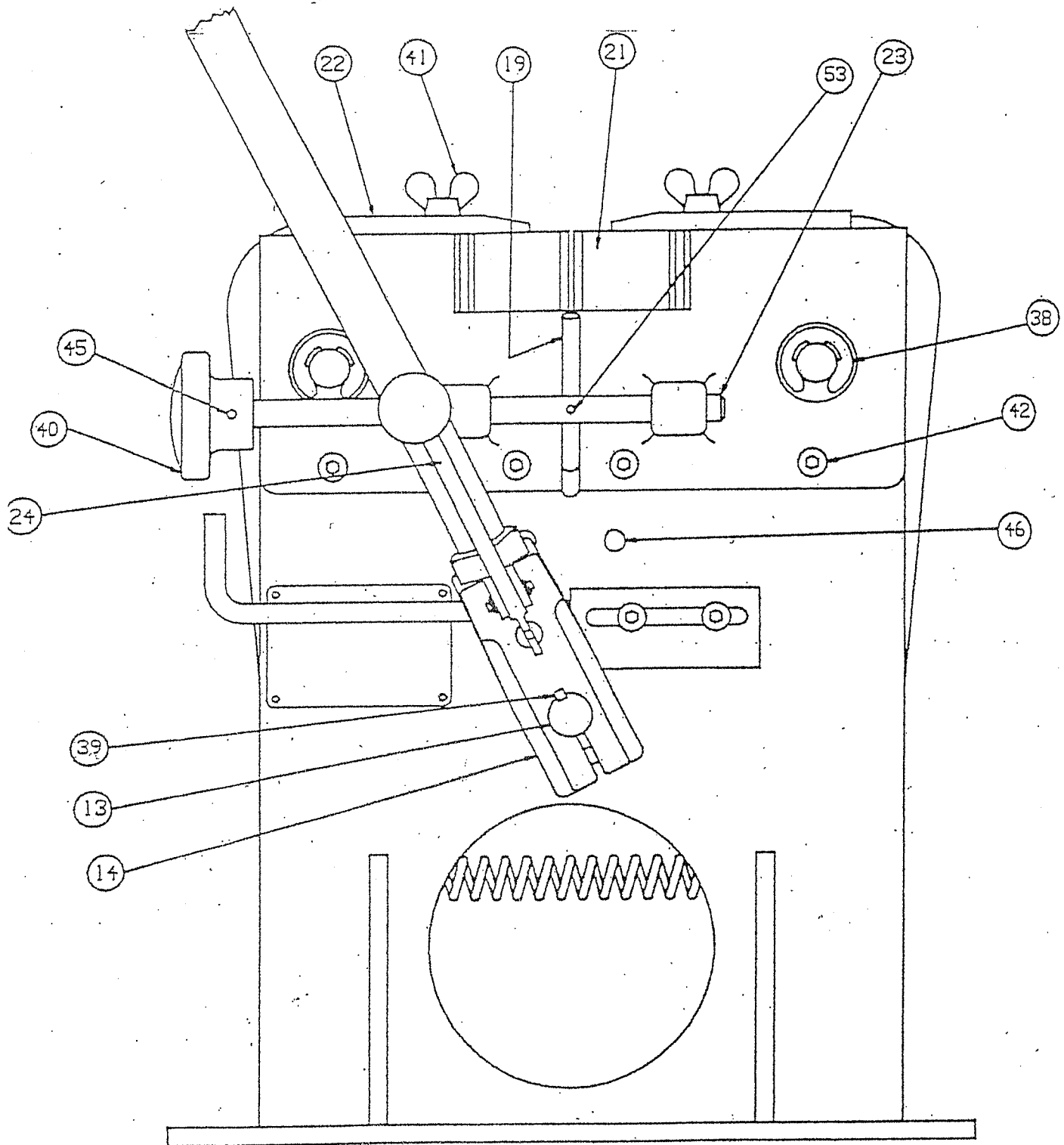


FIGURE E

- | | |
|----------------------------|-------------------|
| 13. Cam Actuator Rod | 39. Key |
| 14. Handle Adapter | 40. Knob (Finger) |
| 19. Equalizer Actuator Rod | 41. Thumb Screw |
| 21. Finger Assembly | 42. Cap Screw |
| 22. Cover Plate | 45. Set Screw |
| 23. Finger Actuator Rod | 46. Dowel Pin |
| 24. Index Release Handle | 53. Roll Pin |
| 38. "E" Ring | |

DOWEL PIN - VERTICAL
3/16 X 1 1/4 LG
(1 REQUIRED)
PART NO. - 158648

HORIZONTAL PIN
(1 REQUIRED)
PART NO. - 158645

"Wire Cavity"

"Snout"

DOWEL PIN - HORIZONTAL
3/16 DIA X 1 1/2
(3 REQUIRED)
PART NO. - 158647

VERTICAL PIN
(1 REQUIRED)
PART NO. - 158646

#6-32 X 1/4 LG
BUTTON HD. CAP SCREW
(4 REQUIRED)
PART NO. - 158649

NOTE

Double or single-cavity dies are available for the Model KBM-5ER. A double-cavity wire die is shown here. Double-cavity dies can be furnished with identical cavities or cavities not more than two wire gage sizes, or the equivalent, apart.

FIGURE F

MODEL KBM-5ER DIE ASSEMBLY

