

502

# *Operating Instructions*

## **DI-ACRO BRAKES and SHEARS**

**PRONOUNCED**

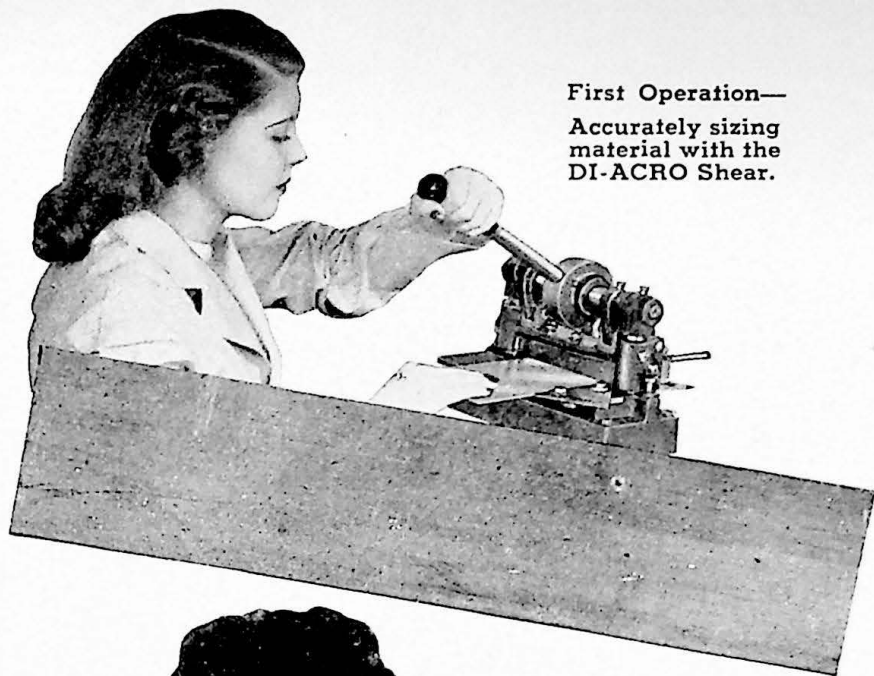
### **DI-ACRO**

**DIE-ACK-RO**



TRADE MARK REG. U. S. PAT. OFF.





First Operation—  
Accurately sizing  
material with the  
DI-ACRO Shear.



Second Operation—  
Forming the sheared  
material into channel  
with the DI-ACRO  
Brake.



Third Operation—  
Bending channel to  
desired radii with the  
DI-ACRO Bender.

# "DIE-LESS DUPLICATING" HOW IT WORKS

The photographs illustrate a typical example of "Die-Less Duplicating" employing the three basic machines offered for this purpose.

Here is recorded the evolution of a piece of flat plane material going through three separate processes:

1. Precision Shearing to size.
2. Accurately forming non-stock size channel.
3. Finishing to die tolerance an intricate part formed in six different surface planes.

The finished piece represents a composite example, typical of a great variety of special shapes that can be quickly produced by the DI-ACRO System of Die-Less Duplicating for many experimental and manufacturing requirements.

DI-ACRO Precision Machines can be readily adjusted to cover an unlimited range of duplicating requirements in a wide variety of materials, thereby making them invaluable for the fabrication of a few experimental pieces or quantity production runs.

Although DI-ACRO Precision Machines are extremely valuable when used cooperatively, they are equally as serviceable in performing their individual functions of shearing, forming, punching and bending when only one of these operations is required to fabricate a part.

The Die-Less Duplicating possibilities of DI-ACRO Equipment are only limited by the material capacity of each unit and the ingenuity of the operator since the universality built into these machines allows them to be quickly arranged right on the job for a great variety of duplicating operations.

Numerous parts which are to be produced in great quantities usually must be changed many times before production dies are prepared. In such instances, it is extremely practical to produce pilot runs with DI-ACRO Equipment as changes in the part can be made as required by simple adjustment of the DI-ACRO Machines being used.

## DI-ACRO ENGINEERING SERVICE

The services of our Engineering Department are at your disposal to assist you in applying the DI-ACRO System of Die-Less Duplicating to your problems. Just send us blueprints, sketches or samples of your parts together with a few pieces of material for testing purposes, if possible, and we will promptly forward our "Die-Less Duplicating" Report.

A copy of the complete DI-ACRO Catalog will be mailed to you gratis upon request. See our offer on Page 16 of this booklet.

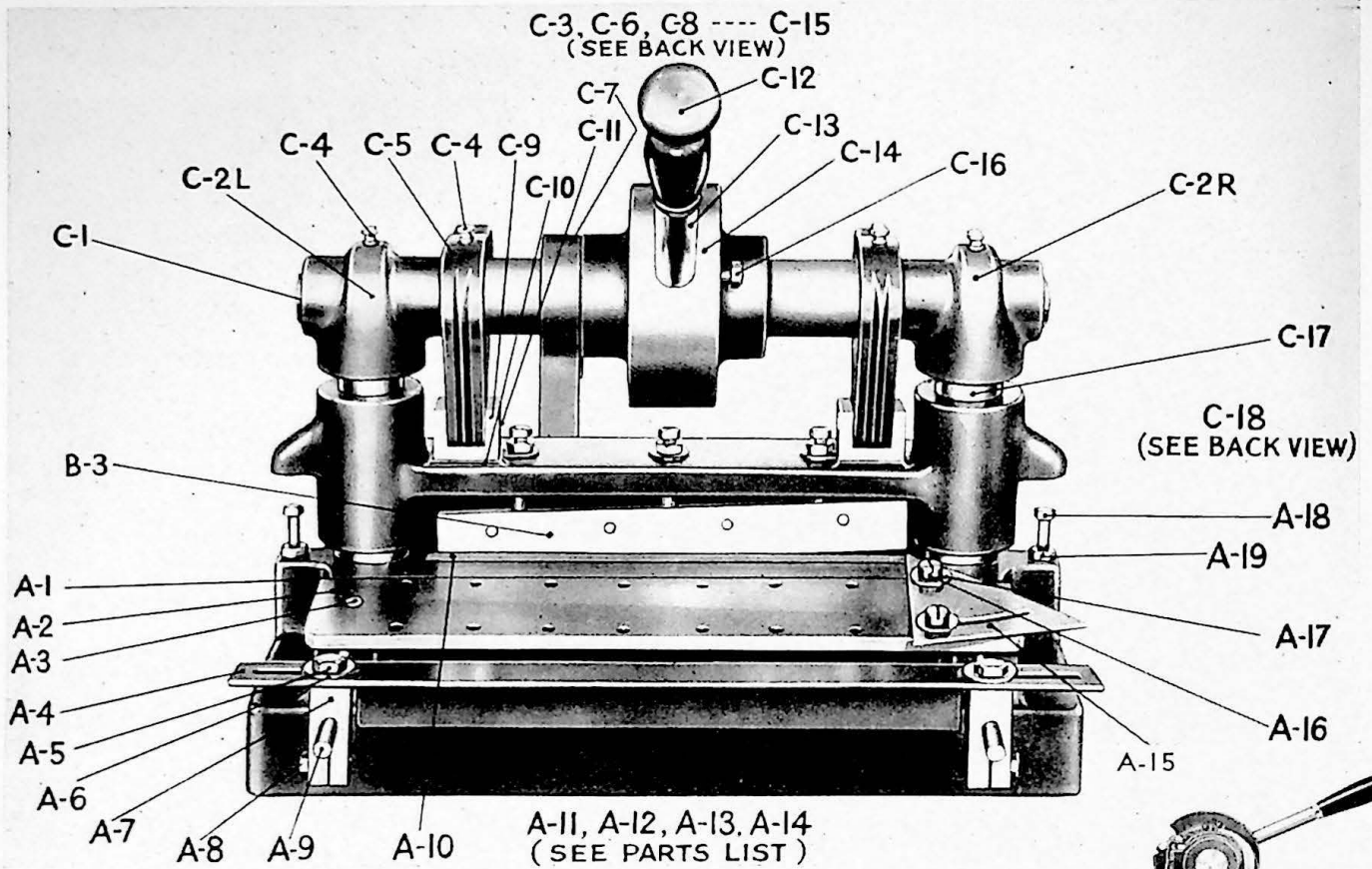


**O'NEIL-IRWIN MANUFACTURING COMPANY**

280 EIGHTH AVENUE

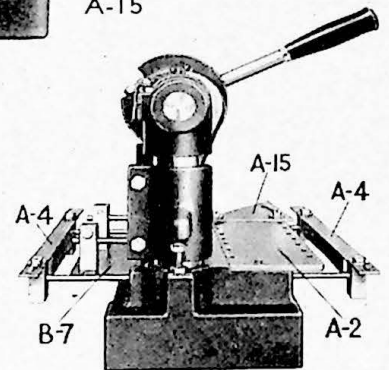
LAKE CITY, MINNESOTA, U.S.A.

CABLE ADDRESS—DI-ACRO

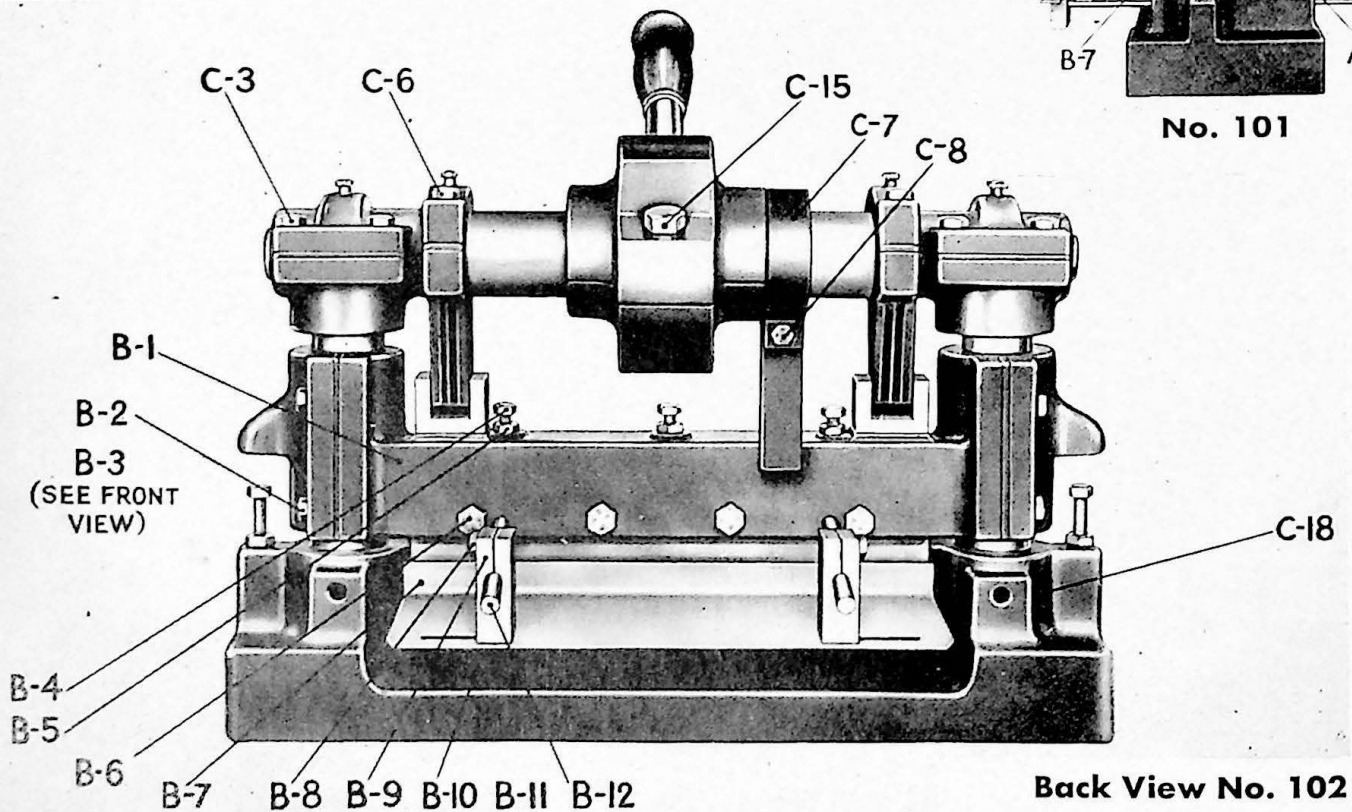


Front View No. 100

# THE DI-ACRO SHEAR



No. 101



Back View No. 102

## PARTS LIST—DI-ACRO SHEARS

When ordering parts for DI-ACRO Shears, always give model and serial number as shown on the nameplate as well as the part number and name.

EXAMPLE: Part No. A-2-Table—DI-ACRO Shear No. 2—Serial Number W1386.

PART NO.	PART NAME	NO. PER MACHINE
A-1	Base Casting .....	1
A-2	Table .....	1
A-3	Table Screw .....	2
A-4	Material Gauge .....	1
A-5	Locking Bolt .....	2
A-6	Bolt Washer .....	2
A-7	Gauge Block .....	2
A-8	Clamping Bolt .....	2
A-9	Gauge Rod .....	2
A-10	Bottom Shear Blade .....	1
A-11	Blade Adjustment Screw .....	1
A-12	Blade Mounting Bolt .....	Varies on Models
	(located in Base Casting A-1)	
A-13	Blade Support Bolt .....	Varies on Models
	(located in Base Casting A-1)	
A-14	Bolt Lock Nut .....	Varies on Models
	(located in Base Casting A-1)	
A-15	Protractor Gauge .....	1
A-16	Gauge Screw .....	2
A-17	Gauge Washer .....	2
A-18	Stop Bolt .....	2
A-19	Bolt Lock Nut .....	2
B-1	Top Blade Casting .....	1
B-2	Bearing Adjustment Bolt .....	4
B-3	Top Shear Blade .....	1
B-4	Blade Support Bolts .....	Varies on Models
		Varies on Models
B-5	Bolt Lock Nut .....	Varies on Models
		Varies on Models
B-6	Blade Mounting Bolt .....	Varies on Models
		Varies on Models
B-7	Material Gauge .....	1
B-8	Clamping Bolt .....	2
B-9	Gauge Block .....	2
B-10	Locking Bolt .....	2
B-11	Bolt Washer .....	2
B-12	Gauge Rod .....	2
C-1	Drive Shaft .....	1
C-2-R	Right Shaft Bearing .....	1
C-2-L	Left Shaft Bearing .....	1
C-3	Adjustment Bolt .....	4
C-4	Oil Cups .....	4
C-5	Shaft Link .....	2
C-6	Adjustment Bolt .....	2
C-7	Handle Stop .....	1
C-8	Handle Stop Bolt .....	1
C-9	Link Blocks .....	2
C-10	Block Mounting Bolt .....	2
	(located in Top Blade Casting B-1)	
C-11	Link Bearing Pin .....	2
C-12	Wooden Handle .....	1
C-13	Handle Rod .....	1
C-14	Handle Casting .....	1
C-15	Clamping Bolt .....	1
C-16	Handle Set Screw .....	1
C-17	Shear Post .....	2
C-18	Taper Pin .....	2

# OPERATING INSTRUCTIONS—DI-ACRO SHEARS

(For parts numbers, see illustrations on page 2)

The DI-ACRO Shear, when shipped, is partially knocked down for convenience in packing. To set up the DI-ACRO Shear for operation, the following procedure is suggested.

1. Insert Handle, C-12, in the hole provided in the Handle Casting, C-14, and tighten Handle Set Screw, C-16.

The Handle can be placed in any position to suit the convenience of the operator by loosening Clamping Bolt, C-15, positioning handle, and then tightening the Clamping Bolt.

2. Adjust Handle Stop, C-7, to rest against Top Blade Casting, B-1, when Handle is in an upright position just over the center and tighten Clamping Bolt, C-8.

3. Mount Table, A-2, on Base Casting, A-1, with the Table Screws, A-3.

4. Protractor Gauge, A-15, can be mounted in any desired position on Table, A-2, by use of the Gauge Screws, A-16, provided for this purpose. In Illustration No. 100 note the position of this gauge for accurate squaring of materials.

5. Material Gauge, B-7, is provided for accurately gauging narrow strips of material. When using this gauge, screw Gauge Rods, B-12, which are threaded at one end, into holes provided in the Top Blade Casting, B-1.

Mount the Material Gauge on the Gauge Rods as shown in Illustration No. 102.

Note that this gauge now moves vertically with the Top Shear Blade allowing the gauge to be moved inward to the very edge of the Bottom Shear Blade in order that extremely narrow widths of material may be accurately gauged.

Material Gauge, A-4, is a two purpose gauge which can be mounted in back of the Shear for accurate sizing of stock or in front of the Shear for precision trimming of edges of parts. (See Illustration No. 101.) When using this gauge, screw Gauge Rods, A-9, which are threaded at one end, into the holes provided in the Base Casting, A-1, (either front or back). Mount the Material Gauge on the Gauge Rods as shown in Illustration No. 100.

6. For most efficient operation, the DI-ACRO Shear should be bolted to the flat surface of a rigid table or bench and shimmed, if necessary, to insure level mounting. Four holes are provided in the Shear Base for mounting purposes. The smaller models of DI-ACRO Shears can also be mounted in a substantial vise.

## OPERATING PROCEDURE FOR SHEARING

When setting up the DI-ACRO Shear for a production run of pieces, it is desirable to carefully adjust the various working parts of the machine in order that the sheared pieces may be accurately duplicated. The following procedure is suggested:

1. Mount the Protractor Gauge, A-15, in the most practical position on the Table, A-2, and adjust it to the desired angle.

In the event a square cut is required one edge of a precision square should be placed against the Top Shear Blade, B-3, and the other edge can then be used for accurately adjusting the Protractor Gauge.

2. Mount and position the proper Material Gauge. If the material lengths to be sheared do not extend beyond the base of the machine, Material Gauge, B-7, should be employed. For longer lengths, Material Gauge, A-4, should be used as explained in Paragraph 3 below.

When adjusting Material Gauge, B-7, for a squaring operation, move the gauge inwards on the Gauge Rods until its entire gauging edge is flush against the Bottom Shear Blade, A-10.

While in this position, tighten Locking Bolts, B-10, to maintain squareness. Adjust the gauge horizontally on the Gauge Rods until properly positioned for shearing operation and then tighten, Clamping Bolts, B-8.

When setting this gauge for angular cutting, it is suggested that the desired angle first be obtained by use of a protractor or template. Tighten Locking Bolts, B-10, to maintain angularity. Adjust the gauge horizontally on the Gauge Rods until properly positioned for the shearing operation and then tighten Clamping Bolts, B-8.

By adjusting the Protracting Gauge and the Material Gauge properly so that they complement each other, a high degree of accuracy can be obtained in parts sheared to unusual angles or shapes.

3. When gauging longer lengths, Material Gauge, A-4, should be employed. The operation of this gauge is similar to that of Gauge, B-7.

In order to accurately square this gauge, shear a wide piece of material square by using the Protractor Gauge which should already have been squared with the Shear Blade as described in Paragraph 1 above. Move the squared piece of material to the edge of the gauge, square the gauge and lock it into position by tightening Locking Bolts, A-5. Adjust the gauge horizontally on the Gauge Rods until properly positioned for the shearing operation and then tighten Clamping Bolts, A-8.

Material Gauge, A-4, can also be mounted in front of the Shear as shown in Illustration No. 100, and also in the operating photographs shown on Page 5.

By mounting the gauge in this position, it is possible to trim narrow edges of pieces or parts thereby accurately sizing parts previously cut. Since most materials can be sheared with the DI-ACRO Shear without any burr whatsoever, it is sometimes desirable to trim all edges of pieces previously cut by some other method with the DI-ACRO Shear and, in these instances, the Front Positioning Gauge is of extreme value.

The DI-ACRO Shear is now ready for production shearing and a high output can be obtained by the following procedure:

1. Place Material on Table, A-2, and move it against Protractor Gauge, A-15, and Material Gauge, B-7, or A-4.
2. Move Handle, C-12, forward until material is sheared across its entire width and then return handle to its original position.
3. Advance material and repeat the cycle.

## SLITTING AND NOTCHING

As the Top Shear Blade of all DI-ACRO Shears is set at an angle, it is possible to do slitting and notching by merely stopping the shearing action at the desired point. This can be accomplished by adjustment of Stop Bolts, A-18, and proper location of the Protractor Gauge, A-15.

When slitting or notching heavy material, the work may be marked beyond the actual point of shearing. To minimize work marking, the pitch of the Top Shear Blade, B-3,

can be increased by loosening Blade Mounting Bolts, B-6, and adjusting Blade Support Bolts, B-4.

If no work marking can be tolerated, it is merely necessary to grind a small notch in the cutting edge of the Top Shear Blade at the point where the shearing action must be stopped.

**CAUTION:** Do not grind across entire width of shear blade.

On the DI-ACRO Shear No. 1 and No. 2, the Top and Bottom Blades are interchangeable and each have two cutting edges. It is, therefore, possible to notch one cutting edge on each of these blades and still retain two unnotched edges, for ordinary shearing operations. Additional Blades are available from your dealer or the factory.

The Top and Bottom Blades of the DI-ACRO Shear No. 3 and No. 4 each have four cutting edges. They are interchangeable and reversible in every direction. It is, therefore, possible to notch six cutting edges of these Blades and still retain two unnotched edges for ordinary shearing operations.

### ADJUSTMENT AND GRINDING OF BLADES

The precision standards to which DI-ACRO Shears are built eliminate the necessity of adjusting the shear blades after they have been bolted into position against the Base and Top Blade Castings.

This method of manufacture insures continued accuracy and when the machine is shipped from the factory, it will shear its rated capacity in sheet steel as well as the lightest of tissues. If a finer adjustment should become necessary, it can be obtained by placing a shim between the Bottom Blade Casting and the Shear Blade.

The Bottom Shear Blade should, at all times, be located so that its upper edge is flush with the top of the Base Casting and Shear Table.

Vertical Adjustment of the Bottom Shear Blade is obtained by use of Blade Support Bolts, A-13, which are located in the Base Casting directly below the Bottom Blade.

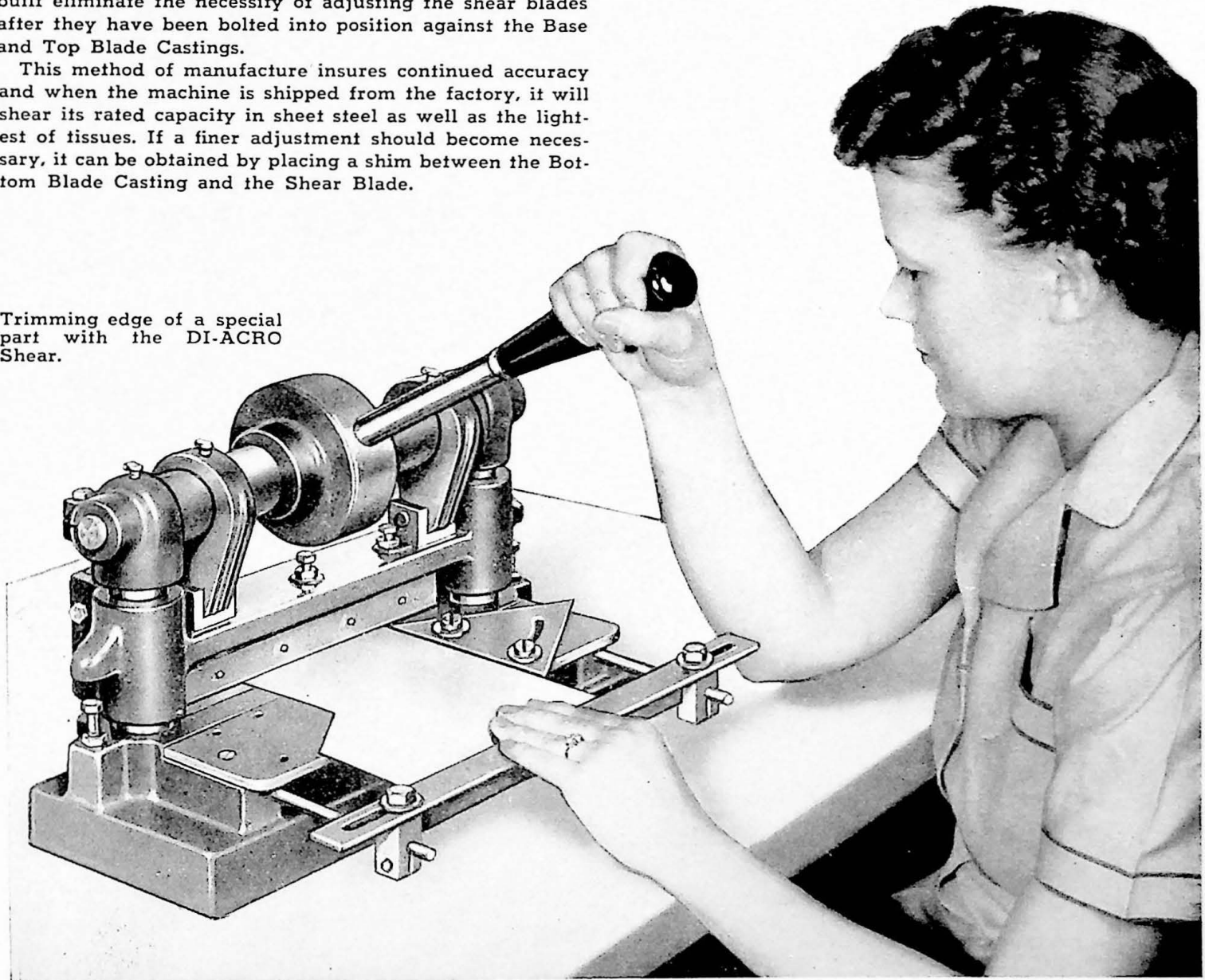
The angle or pitch of the Top Shear Blade, B-3, can be readily increased or decreased by loosening Blade Mounting Bolts, B-6, and properly adjusting Blade Support Bolts, B-4. After this adjustment has been made, Bolt Lock Nuts, B-5, and Blade Mounting Bolts, B-6, should be tightened.

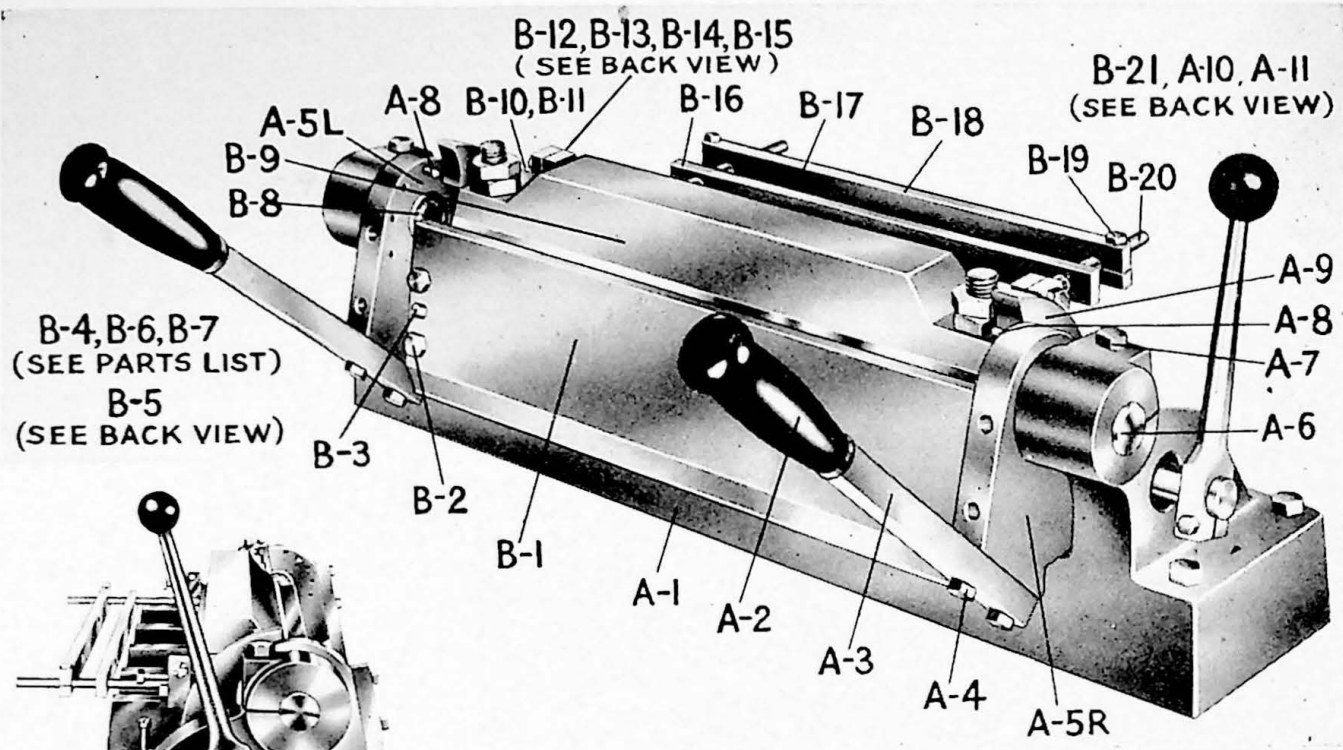
DI-ACRO Shear Blades are made from high quality oil hardening tool steel properly heat treated and precision ground. They can be easily resharpened on an ordinary surface grinder by merely grinding the narrow edge which measures .470" on all models.

**CAUTION:** Do not grind the wide surface of the blade as this will reduce its size and necessitate shimming to obtain proper adjustment.

The No. 1 and No. 2 size Shear Blades are provided with two cutting edges and the No. 3 size has four cutting edges. Blades should be reversed to take advantage of this feature to save grinding time and extend blade life.

Trimming edge of a special part with the DI-ACRO Shear.





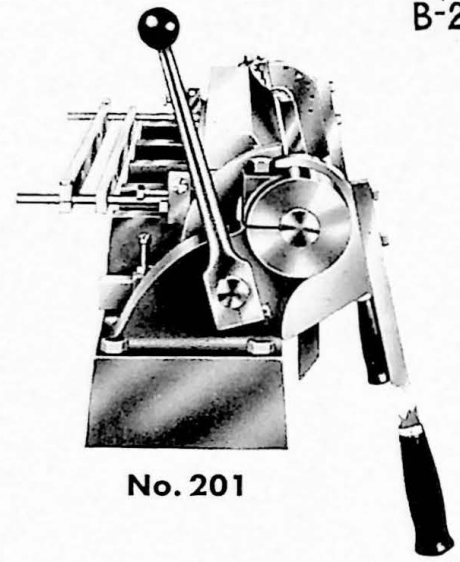
B-4, B-6, B-7  
(SEE PARTS LIST)  
B-5  
(SEE BACK VIEW)

B-12, B-13, B-14, B-15  
(SEE BACK VIEW)

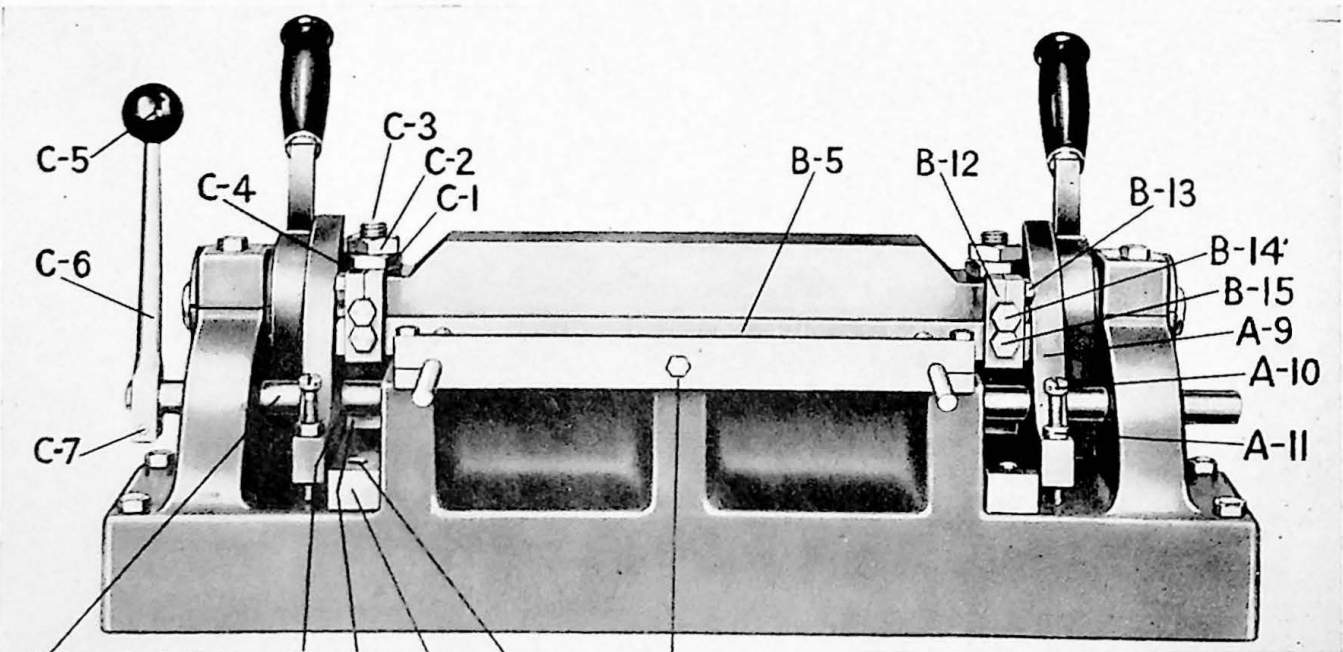
B-21, A-10, A-11  
(SEE BACK VIEW)

Front View No. 200

# THE DI-ACRO BRAKE



No. 201



C-8 C-9 C-10 C-11 C-12 C-13 C-14  
(SEE PARTS LIST)

Back View No. 202



## PARTS LIST-DI-ACRO BRAKES

When ordering parts for DI-ACRO Brakes, always give model and serial number as shown on the nameplate as well as the part number and name.

EXAMPLE: Part No. A-3—Handle Shaft—DI-ACRO Brake No. 2—Serial Number N1715.

PART NO.	PART NAME	NO. PER MACHINE
A-1	Base Casting .....	1
A-2	Wooden Handle .....	2
A-3	Handle Shaft .....	2
A-4	Handle Bolt .....	4
A-5-R	Right Arm .....	1
A-5-L	Left Arm .....	1
A-6	Bearing Pin .....	2
A-7	Bearing Pin Bolt .....	2
A-8	Angle Stop Pin .....	2
A-9	Angle Stop Casting .....	2
A-10	Angle Adjustment Screw .....	2
A-11	Adjustment Screw Lock Nut .....	2
B-1	Folding Blade .....	1
B-2	Blade Bolt .....	4
B-3	Blade Pin .....	2
B-4	Blade Spacer Block, (located behind folding blade B-1) .....	2
B-5	Bottom Plate .....	1
B-6	Plate Pin, (located in Bottom Plate B-5) .....	2
B-7	Plate Bolt, (located in Bottom Plate B-5) .....	2
B-8	Torrington Roller Bearing .....	2
B-9	Top Forming Bar .....	1
B-10	Bar Heel Bolt .....	2
B-11	Bolt Lock Nut .....	2
B-12	Bar Stop Block .....	2
B-13	Block Clamping Bolt .....	2
B-14	Bar Adjustment Bolt .....	2
B-15	Block Mounting Bolt .....	2
B-16	Material Support Bar .....	1
B-17	Support Bar Screw .....	2
B-18	Material Gauge .....	1
B-19	Gauge Clamping Bolt .....	2
B-20	Gauge Rod .....	2
B-21	Gauge & Bar Bolt .....	1
C-1	Bar Adjustment Nut .....	2
C-2	Lock Nut .....	2
C-3	Bar Clamping Bolt .....	2
C-4	Return Spring .....	2
	(located on Clamping Bolt below Top Forming Bar B-9)	
C-5	Handle Ball .....	1
C-6	Handle Shaft .....	1
C-7	Handle Bolt .....	1
C-8	Clamping Shaft .....	1
C-9	Shaft Clamp Stop .....	1
	(located on Clamping Shaft, No. 3 and 4 Brakes only)	
C-10	Stop Clamp Bolt .....	1
C-11	Diamond Retaining Pin .....	2
C-12	ROK-LOK Diamond .....	2
C-13	Rocker Bar .....	2
C-14	Bar Locating Pin .....	2

# OPERATING INSTRUCTIONS - DI-ACRO BRAKES

(For parts numbers see illustrations on page 6)

The Di-ACRO Brake is shipped partially knocked down for convenience in packing. To set up the DI-ACRO Brake for operation, the following procedure is suggested:

1. Attach Brake Handles, A-3, to Brake Arms, A-5-L and A-5-R, by using Bolts, A-4, which are screwed into Brake Arms.

Two positions are provided for mounting the Brake Handles. For forming average weight materials, it is suggested that the handles be placed at an angular position as shown in Illustration No. 200. For heavy forming, the handles should be placed in a vertical position with the wooden handles pointing downward as indicated in Illustration No. 201.

When operating the DI-ACRO Brake, either one of the handles may be removed if the weight of the material being worked is such that the pressure exerted by one handle is sufficient for the forming operation.

2. Screw Gauge Rods, B-20, which are threaded at one end, into the holes provided in the Bottom Plate, B-5, Slide Material Support Bar, B-16, onto these rods. Mount the Material Gauge, B-18, on the rods with Bolts, B-19, facing upward.

3. Mount the Clamping Handle, C-6, on the Clamping Shaft, C-8, and lock in position by tightening Bolt, C-7. Clamping Handle can be mounted at either end of shaft to suit operator's convenience.

4. For most efficient operation, bolt the DI-ACRO Brake to the flat surface of a rigid table or bench and shim, if necessary, to insure level mounting. Four holes are provided in the Brake Base for mounting purposes.

It is suggested that the front edge of the base casting be placed at the very edge of the bench since this will allow close reverse bends in long lengths of material to be formed without interference from the bench. You will note that the design of the DI-ACRO Brake casting allows complete centerline clearance.

The smaller models of DI-ACRO Brakes can also be mounted in a substantial vise.

## PROCEDURE FOR FORMING SINGLE BENDS

When setting up the DI-ACRO Brake for a production run of parts, it is desirable to carefully adjust the various working parts of the machine in order that the finished pieces may be accurately duplicated. The following procedure is suggested:

1. Insert a piece of the material to be formed between the Top Forming Bar, B-9, and the Bottom Plate, B-5, and move the Clamping Handle into a locked position by pulling it forward as far as possible.

Adjust Bar Adjustment Nuts, C-1, so the Top Forming Bar will exert even pressure on the material across its entire length.

It is suggested that sufficient pressure be applied by the top forming bar so that the material being formed cannot be pulled out of position when the clamp is locked. The pressure should not, however, be great enough so that it is difficult to lock the clamping mechanism. When this adjust-

ment has been properly made, tighten Lock Nuts, C-2, so that the Adjustment Nuts will hold securely.

**IMPORTANT**—Bar Heel Bolts, B-10, should be adjusted so that the back edge of the Top Forming Bar will be supported allowing the material to easily pass below this bar when the clamping action is disengaged. An extremely sharp bend in thin material can be obtained by raising the heel of the Top Forming Bar through the use of these bolts which will cause greater pressure to bear on the material at the forming edge.

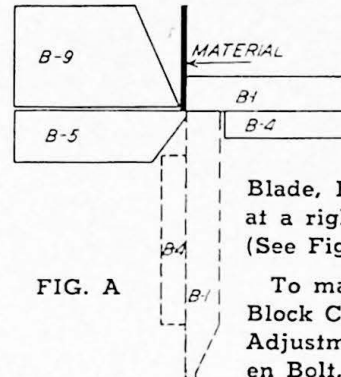


FIG. A

2. Adjust Top Forming Bar, B-9, horizontally to a position which will allow the material to be formed to fit snugly between the front forming edge of the Top Forming Bar and the bending edge of the Folding Blade, B-1, when that blade is placed at a right angle to its normal position. (See Figure A at left.)

To make this adjustment, loosen the Block Clamping Bolts, B-13, adjust Bar Adjustment Bolts, B-14, and then tighten Bolt, B-13.

It is important that the front edge of the Top Forming Bar is exactly parallel with the bending edge of the Folding Blade.

For extremely sharp bends, it is sometimes desirable to reduce the space between the front edge of the Top Forming Bar and the bending edge of the Folding Blade to less than the material thickness since this exerts additional pressure at the point of forming providing an extremely sharp bend. On the other hand, if a radius bend is desired, a natural radius can be developed at the point of forming by moving the Top Forming Bar back from the center line of forming.

3. Adjust the Material Gauge, B-18, to properly locate the bend in the part to be formed. This gauge moves horizontally on the Gauge Rods, B-20, and can be clamped in any desired position by means of the Gauge Clamping Bolts, B-19. (See lower photograph on Page 11 for example.)

The Material Support Bar, B-16, is provided for supporting thin materials and may be moved to any desired location on the Gauge Mounting Rods.

The Material Support Bar, B-16, also serves as a gauge for short lengths of material that do not extend beyond the back edge of the Top Forming Bar, B-9. When gauging in this manner, it is merely necessary to mount a thin piece of material (preferably a piece of the material which is to be formed) on the Material Support Bar, B-16, with the Support Bar Screws, B-17, and move it inwards between the Bottom Plate, B-5, and the Top Forming Bar, B-9, to the desired position. (See lower photograph on Page 11 for illustration and note short lengths being gauged.) When this procedure is followed, the Material Support Bar and the Material Gauge should be bolted together with Gauge and Bar Bolt, B-21, in order that the clamping action of the

material gauge can be employed for securely locking the gauge into position.

4. The degree of angularity required in the bend to be formed can be readily obtained by proper adjustment of the stops provided for this purpose. Place Angle Stop Pins, A-8, in the holes in Brake Arms, A-5-L and A-5-R, to obtain the approximate adjustment required and move operating handles forward until the Angle Stop Pins, A-8, strike the Angle Stop Casting, A-9. Precision angularity adjustment can now be obtained by use of the Angle Adjustment Screws, A-10. To insure continued accuracy, Adjustment Screw Lock Nuts, A-11, should be tightened when the adjustment is completed.

5. The DI-ACRO Brake is now ready for the forming of a single bend and a high rate of production can be obtained by the following procedure:

a. Insert material between the Top Forming Bar, B-9, and the Bottom Plate, B-5, and move against the Material Gauge, B-18.

b. Pull Clamping Handle, C-6, until it locks the position.

c. Move Brake Handles, A-3, forward until stopped by Angle Stop Pins, A-8.

d. Lower Brake Handles, release Clamping Handle and remove material.

**IMPORTANT**—If several bends are required in a quantity of parts, the best production can usually be obtained by completing the first bend in all parts before adjusting the Brake for the next bend.

## PROCEDURE FOR FORMING REVERSE BENDS

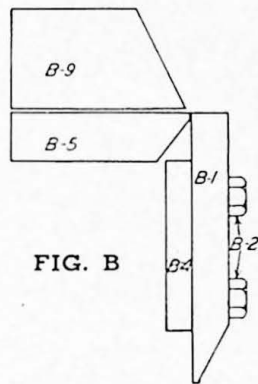


FIG. B

The Folding Blade, B-1, is provided with two forming surfaces; a wide edge for ordinary forming operations and a narrow edge for use in obtaining extremely close reverse bends.

When the DI-ACRO Brake is delivered, the wide edge of the Folding Blade is in operating position and this edge should be used for all bending operations except when close reverse bends are required. (See Figure B at left.) In order to use the narrow edge of the Folding Blade, it is only necessary to remove the Blade Bolts, B-2, from the Brake Arms, A-5-L and A-5-R and remove the two Blade Spacer Blocks, B-4, which are located between the Brake Arms and the Folding Blade. The Folding Blade should then be located with the beveled edge facing inward and upward so that the narrow edge of the blade will be at the forming center line. (See Figure C at left.) The two spacers which were removed from the Brake Arms should now be placed in a similar position on the outside of the Folding Blade and bolted into position. By using the spacers in this position, the same bolts may be used for holding the Folding Blade in position, otherwise, shorter bolts would be required.

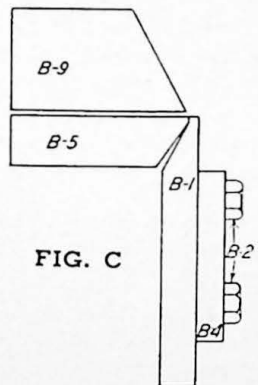


FIG. C

## CONVERSION OF TOP FORMING BAR

The Top Forming Bar, B-9, delivered with the DI-ACRO Brake, is hardened and precision ground and should be used for standard forming operations.

All DI-ACRO Brakes can be converted into a Box and Pan Brake by merely mounting the new DI-ACRO Box Finger Bar in place of the standard Top Forming Bar, 29. The center photographs on page 11 illustrate how boxes can be formed by using the Box Finger Bar and also show how an Open End Finger may be mounted for producing rectangular, square and triangular tubes and other similar parts.

Boxes can also be formed by cutting slots in a solid Top Forming Bar which will allow the formed sides of the box to enter just as they do when using the Box Finger Bar. The dimensions of such a bar must be determined by size of the box and material thickness as the only limitation to the depth of the box is the strength of the slotted Forming Bar.

It may sometimes be necessary to cut away a wide section of the Top Forming Bar to relieve interference from some portion of the part being formed and this can be done provided the portion of the bar remaining has sufficient strength to withstand the bending pressure to which it will be subjected. The bottom side of this bar can also be slotted to accept previously formed edges or projections.

For extremely narrow channels in heavy materials, a bar shaped according to the sketch in Figure D at left can be employed.

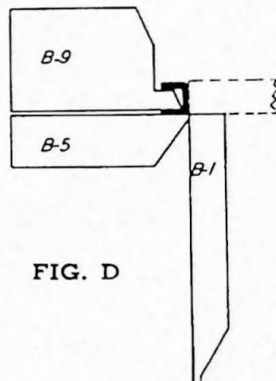


FIG. D

The angularity obtainable with the standard Top Forming Bar is 125°, however other bars can be made having any angularity required although it is necessary that sufficient strength be retained in the forming edge to withstand the bending strain. (See Figure F below.) A special Top Forming Bar for sharp angles is available from your dealer or the factory.

To form a narrow edge to an extremely acute angle, a thin bar can be prepared and its back edge bolted to the Bottom Plate, B-5 in a manner similar to the usual mounting of this part on a Standard Bar Folder. This will give the required rigidity over the entire length assuring an equally sharp bend at all points.

If a sharp angle is required in heavy material, it can be obtained in two operations by first forming a 125° bend with the standard Top Forming Bar and then completing the bend with a special bar having a sharper angle since this operation would not exert a strong upward pressure against the thin edge of the Top Forming Bar as it would if the complete bend were performed in one operation.

## CONVERSION OF FOLDING BLADE

The Folding Blade, B-1, which is delivered with the DI-ACRO Brake, is adaptable to the major portion of your forming requirements. It is provided with two forming edges as explained in the paragraph above covering the forming of reverse bends.

Whenever required, a narrower, wider, or thicker folding

blade may be prepared and bolted to the Brake Arms, A-5. In preparing special Folding Blades, it is suggested that the standard Folding Blade be used as a jig to properly locate the bolt and dowell pin holes in the special blade.

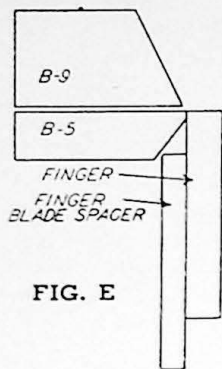


FIG. E

The center photograph on Page 11 illustrates the manner in which fingers can be mounted on the DI-ACRO Brake for special forming operations. (See Figure E at left.) When arranging the DI-ACRO Brake for finger forming, prepare a Finger Blade Spacer 3/8" thick for the DI-ACRO Brake No. 1 and No. 2 and 1/2" thick for the No. 3 and No. 4 size. The length of the spacer should be the same as the standard Folding Blade but the width should be approximately 3/4" less so that the Finger Blade Spacer will not strike the Bottom Plate, B-5, when mounted on the Brake Arms. One or several fingers of the required size can

be bolted to this Spacer. Finger Blade Spacers are available from your dealer or the factory.

### CONVERSION OF BOTTOM PLATE

The Bottom Plate, B-5, of the DI-ACRO Brake is securely bolted to the Base Casting and is the bed on which the material rests during the forming operation.

Occasionally there is interference between this plate and previously formed edges of a part which protrude downward. This interference can usually be eliminated by grooving or cutting away an entire section of the Bottom Plate and can be done without injury to the machine or loss of accuracy.

It is also sometimes desirable to mount special forming bars or other fixtures on the bottom plate and the necessary holes can be drilled and tapped for that purpose.

### FORMING SINGLE AND DOUBLE HEMS

A single hem can be obtained in two operations with the DI-ACRO Brake by first forming an acute angle and then crimping the material together in a second operation. In light materials these operations can be performed with the Standard Top Forming Bar delivered with the DI-ACRO Brake.

When forming a hem in heavy materials, it is generally necessary to make the first bend greater than the 125° obtainable with the Standard Top Forming Bar as a greater angle eases the crimping operation. The two operations mentioned above are illustrated below in Figures F and G and in the top photographs on Page 11. In Figure G note that the front edge of the Top Forming Bar has been moved back from the center line of forming approximately twice

the thickness of the material to provide a space for the material between that bar and the edge of the Folding Blade as it is being crimped.

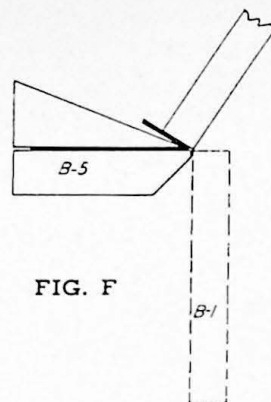


FIG. F

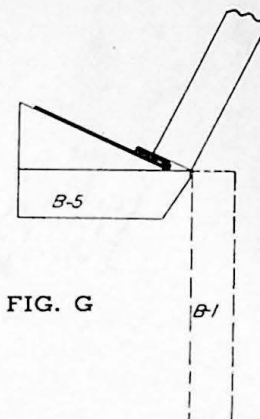


FIG. G

In heavy materials, it is sometimes necessary to use the Standard Top Forming Bar for the crimping operation rather than the special sharp Angle Bar shown in Figure F since the angle of that bar provides a greater space for the material as it is being crimped. When crimping, the Top Forming Bar should always be locked against the Bottom Plate.

If an open hem is desired for later insertion of flat materials, it is merely necessary to follow the above procedure except that a sheet of metal should be inserted in the angle before the crimping operation, and removed after the hem is completed. Materials which are to be inserted can then be locked in the hem by an additional crimping operation.

A double hem can be obtained by first forming a single hem as described above and then duplicating the operation. In crimping the second hem, it is especially important to provide sufficient material clearance between the top edge of the Forming Bar and the Folding Blade.

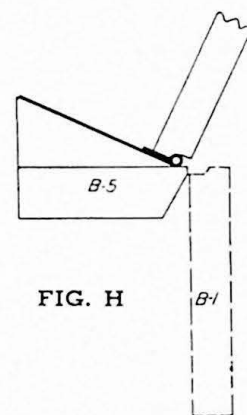


FIG. H

The DI-ACRO Brake can also be arranged for folding the edge of a sheet around a length of wire by cutting a radius groove along the inner edge of the Folding Blade as illustrated in Figure H, at left.

The first operation in this sequence is the forming of an acute angle with a natural radius. This radius can be obtained by merely moving the Top Forming Bar back from the center line of forming.

The second operation is similar to the crimping of a hem although the groove in the Folding Blade would provide clearance for the wire and allow the material to be closed around the wire.

### DI-ACRO ENGINEERING SERVICE

If you have a forming problem not covered by these instructions, our Engineering Department will be glad to assist you in solving it. Just send us blueprints, sketches or samples of your parts together with a few pieces of material for testing purposes, if possible, and we will promptly give you our suggestions.

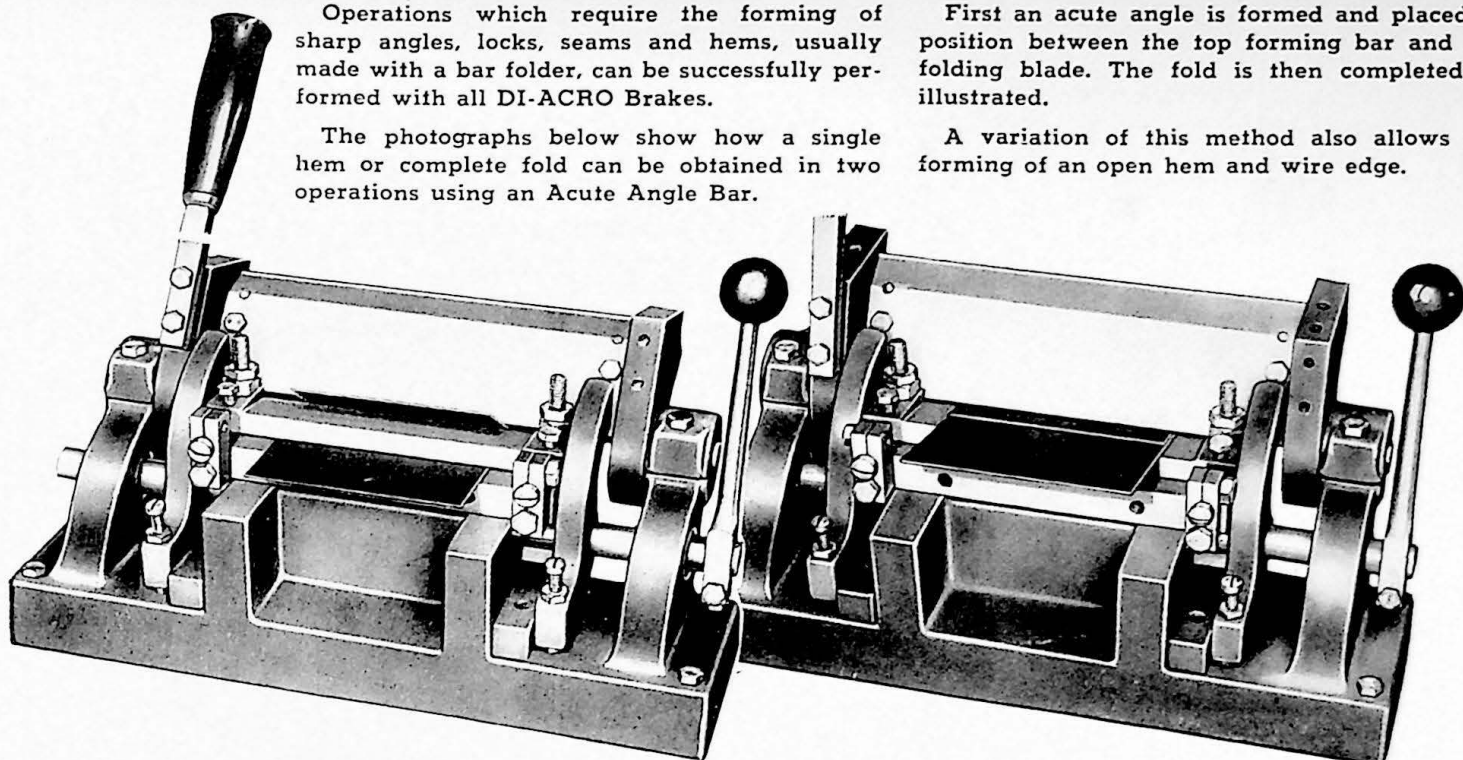
## DI-ACRO Brake, Also a Bar Folder

Operations which require the forming of sharp angles, locks, seams and hems, usually made with a bar folder, can be successfully performed with all DI-ACRO Brakes.

The photographs below show how a single hem or complete fold can be obtained in two operations using an Acute Angle Bar.

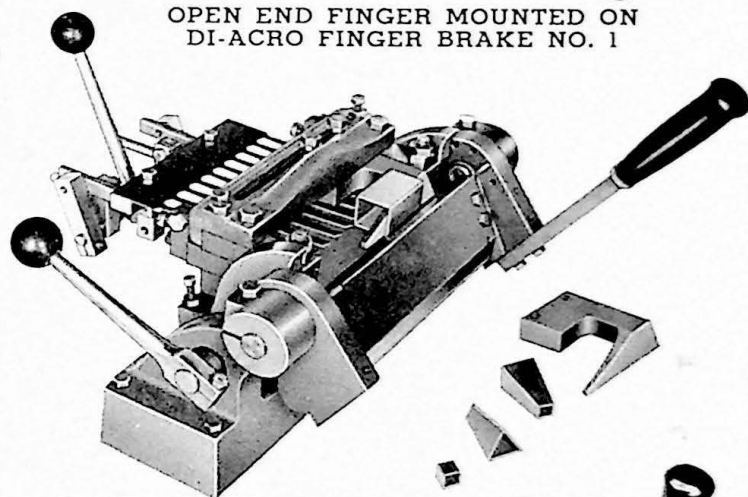
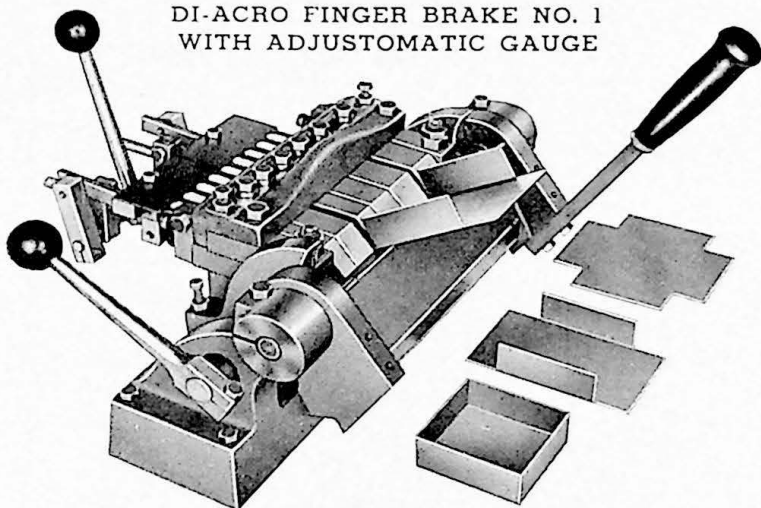
First an acute angle is formed and placed in position between the top forming bar and the folding blade. The fold is then completed as illustrated.

A variation of this method also allows the forming of an open hem and wire edge.



DI-ACRO FINGER BRAKE NO. 1  
WITH ADJUSTOMATIC GAUGE

OPEN END FINGER MOUNTED ON  
DI-ACRO FINGER BRAKE NO. 1



### BOX FORMING

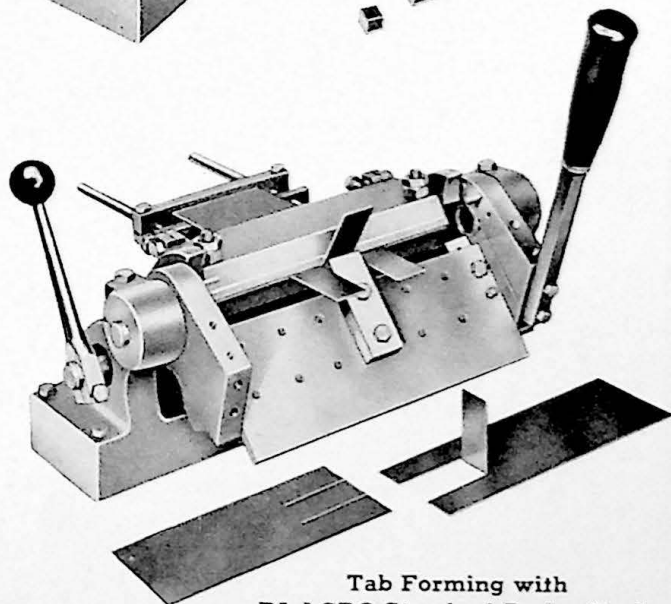
The above photograph illustrates the sequence of operations for producing a box with the DI-ACRO Brake. From the shape blanked with the DI-ACRO Notcher, two sides of the box can be readily formed. The fingers can then be adjusted to allow the previously formed sides to enter.

### BENDING BLOCKS ALLOW TAB FORMING

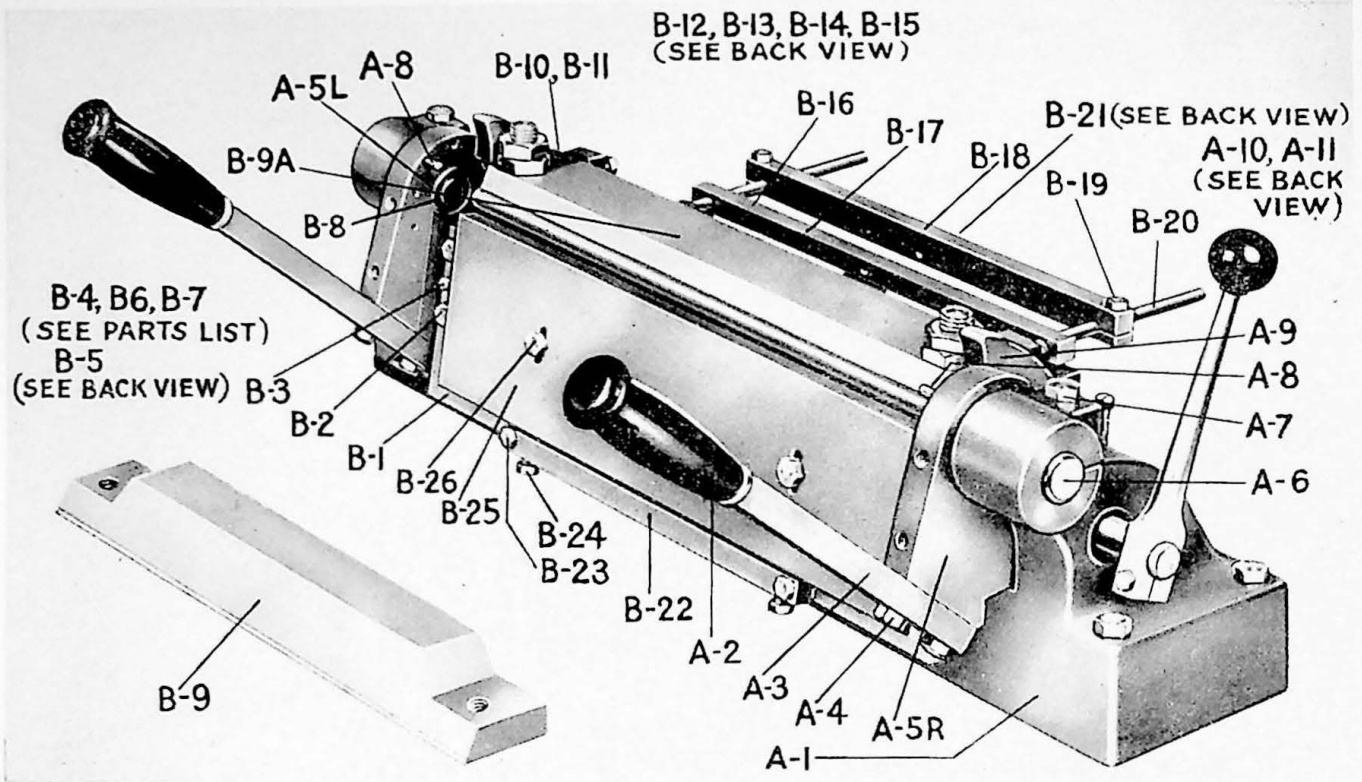
The extra versatility of DI-ACRO Brakes, which allows them to duplicate an unlimited variety of parts, is graphically illustrated at right. Here the center section of a part has been formed to a right angle without disturbing the flat material on either side.

A Block Mounting Bar is available for all DI-ACRO Brakes and the numerous tapped holes provided in this part allow one or a series of bending blocks to be mounted for production of special parts.

The Block Mounting Bar can be equipped with the proper size Bending Blocks, at the factory from your specifications or these blocks can be easily prepared in your own plant from standard stock materials.

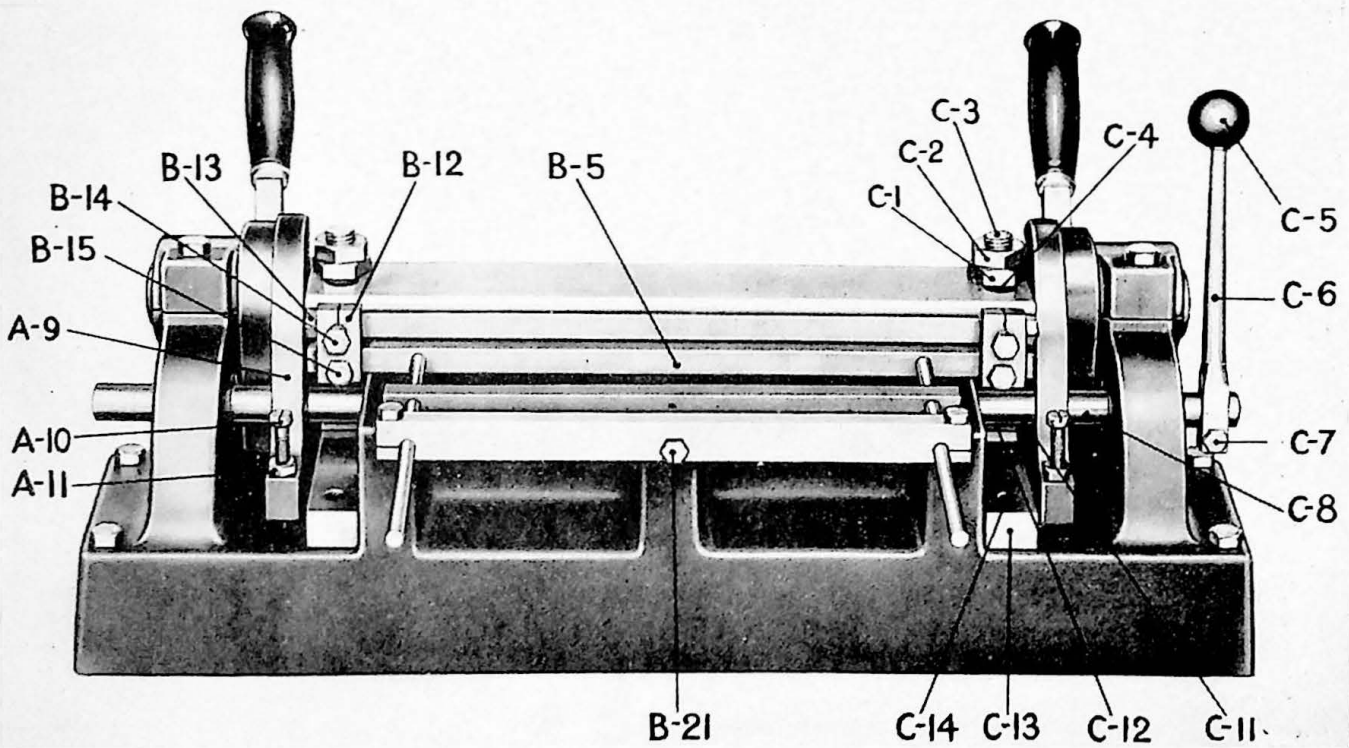


Tab Forming with  
DI-ACRO Standard Brake No. 1



Front View No. 300

## THE DI-ACRO RADIUS BRAKE



Back View No. 301

## PARTS LIST—DI-ACRO RADIUS BRAKES

When ordering parts for DI-ACRO Radius Brakes, always give model and serial number as shown on the nameplate as well as the part number and name.

FOR EXAMPLE: Part No. A-3—Handle Shaft—DI-ACRO Radius Brake—Serial Number. E1143.

PART NO.	PART NAME	NO. PER MACHINE
A-1	Base Casting .....	1
A-2	Wooden Handle .....	2
A-3	Handle Shaft .....	2
A-4	Handle Bolt .....	4
A-5-R	Right Arm .....	1
A-5-L	Left Arm .....	1
A-6	Bearing Pin .....	2
A-7	Bearing Pin Bolt .....	2
A-8	Angle Stop Pin .....	2
A-9	Angle Stop Casting .....	2
A-10	Angle Adjustment Screw .....	2
A-11	Adjustment Screw Lock Nut .....	2
B-1	Stationary Folding Blade .....	1
B-2	Blade Bolt .....	4
B-3	Blade Pin .....	2
B-4	1/32" Blade Spacer .....	2
B-4A	1/16" Blade Spacer .....	1
B-4B	1/8" Blade Spacer, (located below Bottom Plate B-5) .....	1
B-5	Bottom Plate .....	1
B-6	Plate Pin, (located in Bottom Plate B-5) .....	2
B-7	Plate Bolt, (located in Bottom Plate B-5) .....	2
B-8	Torrington Roller Bearing .....	2
B-9	Top Forming Bar .....	1
B-9A	Radius Top Forming Bar, 1/16" and 3/32" Radius .....	1
B-9B	Radius Top Forming Bar, 1/8" and 5/32" Radius .....	1
B-9C	Radius Top Forming Bar, 3/16" and 7/32" Radius .....	1
B-10	Bar Heel Bolt .....	2
B-11	Bolt Lock Nut .....	2
B-12	Bar Stop Block .....	2
B-13	Block Clamping Bolt .....	2
B-14	Bar Adjustment Bolt .....	2
B-15	Block Mounting Bolt .....	2
B-16	Material Support Bar .....	1
B-17	Support Bar Screw .....	2
B-18	Material Gauge .....	1
B-19	Gauge Clamping Bolt .....	2
B-20	Gauge Rod .....	2
B-21	Gauge and Bar Bolt .....	1
B-22	Blade Adjustment Bar .....	1
B-23	Bar Mounting Bolt .....	2
B-24	Bar Adjustment Bolt .....	2
B-25	Adjustable Folding Blade .....	1
B-26	Blade Mounting Bolt .....	2
C-1	Bar Adjustment Nut .....	2
C-2	Lock Nut .....	2
C-3	Bar Clamping Bolt .....	2
C-4	Return Spring .....	2
	(located on Clamping Bolt below Top Forming Bar B-9)	
C-5	Handle Ball .....	1
C-6	Handle Shaft .....	1
C-7	Handle Bolt .....	1
C-8	Clamping Shaft .....	1
C-9	Shaft Clamp Stop .....	1
	(located on Clamping Shaft, No. 4 Radius Brake only)	
C-10	Stop Clamp Bolt .....	1
C-11	Diamond Retaining Pin .....	2
C-12	ROK-LOK Diamond .....	2
C-13	Rocker Bar .....	2
C-14	Bar Locating Pin .....	2

# OPERATING INSTRUCTIONS - DI-ACRO RADIUS BRAKE

(For parts numbers, see illustrations on page 12)

The DI-ACRO Radius Brake has been designed for forming duraluminum, chrome molybdenum, and other low ductile materials which would fracture if formed to a sharp "no radius" bend. It is also very practical for forming a true centerline radius in all ductile materials when a definite radius is required.

The radius forming bars available for the DI-ACRO Radius Brake offer the radii necessary to effectively form various thicknesses of low ductile materials without fracture in accordance with the standards recommended by the U. S. Army Air Corps for aircraft construction.

The Di-ACRO Radius Brake is similar in construction and operation to the standard Di-ACRO Brake and can perform all operations possible with the standard Brake in addition to its specialized function of forming radii. For detailed operating instructions, refer to Pages 8 to 11 of this booklet.

Standard equipment supplied with the DI-ACRO Radius Brake includes a Top Forming Bar, B-9, for sharp "no radius" bends and a choice of any one of the radius forming bars listed below which each contain two radius forming edges. Additional radius bars are available as extra equipment.

Radius Forming Bar A, 1/16" and 3/32" radii, Part No. B-9A  
Radius Forming Bar B, 1/8" and 5/32" radii, Part No. B-9B  
Radius Forming Bar C, 3/16" and 7/32" radii, Part No. B-9C

## FORMING SHARP "NO RADIUS" BENDS

When the DI-ACRO Radius Brake is delivered, it is set up for forming sharp "no radius" bends. Note that the four spacers shown in Figure A, at left, are all in position below the Bottom Plate, B-5. This is necessary to bring the top surface of the Bottom Plate to the exact center line of forming. (These spacers can be removed or replaced by first removing Parts B-9 and B-5.)

For forming sharp "no radius" bends, the Adjustable Folding Blade, B-25, should be located so that its top edge is exactly level with the top surface of the Bottom Plate, B-5.

This adjustment is obtained by loosening Blade Mounting Bolts, B-26, adjusting Bar Adjusting Bolts, B-24, and tightening Bolts, B-26.

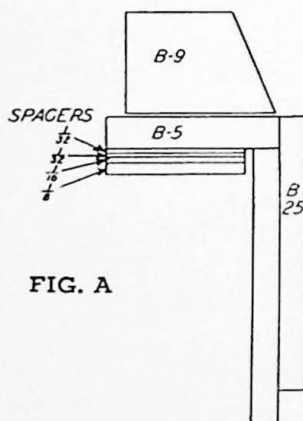


FIG. A

## FORMING RADIUS BENDS

To arrange the DI-ACRO Radius Brake for forming radius bends, first remove spacers as shown in Figure A equivalent to the radius which is to be formed plus the thickness of the material and replace Bottom Plate, B-5.

To illustrate: To form a 1/8" radius in 1/16" material, remove the 1/8" and two 1/32" spacers as this will lower Bottom Plate, B-5, 3/16" which is the required distance. (See Figure B at left.)

Mount the desired Radius Forming Bar, B-9B on the Bar Clamping Bolts, C-3, with the radius edge at the forming centerline.

Adjust Folding Blade, B-25, so that its top edge is exactly level with the top surface of the Bottom Plate, B-5.

This adjustment is obtained by loosening Blade Mounting Bolts, B-26, adjusting Bar Adjusting Bolts, B-24, and tightening Bolts, B-26.

Raise Folding Blade, B-25, to a 90 degree angle and adjust the Radius Forming Bar horizontally so that the material to be formed will fit snugly between the radius edge of the Forming Bar and the top edge of the Folding Blade as shown in Figure C at left.

Further adjustment of the DI-ACRO Radius Brake can now be made by following the instructions for the Standard DI-ACRO Brake given on Pages 4 to 7 of this booklet.

It is possible to form any desired radius up to 1/2" with the DI-ACRO Radius Brake and this can be accomplished by preparing radius forming bars having the required radius and replacing the Bottom Plate, B-5, with a plate of thinner dimension.

To illustrate: To form a 1/2" radius in 1/16" material, the four spacers supplied which total 1/4" in thickness, should be removed and the 1/2" thick Bottom Plate, B-5, should be replaced with a 3/16" thick Bottom Plate. The bed of the Brake will then have been lowered sufficiently for the above described operation.

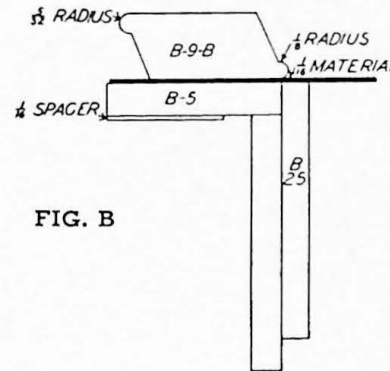


FIG. B

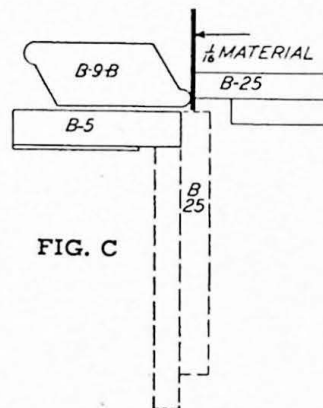


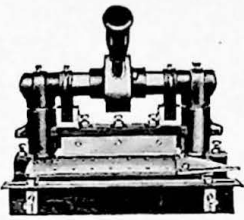
FIG. C



# DI-ACRO MACHINES ARE OFFERED IN THESE SIZES

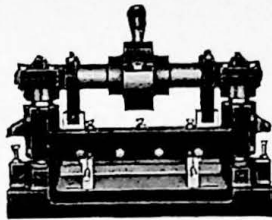
## DI-ACRO SHEARS

No. 1



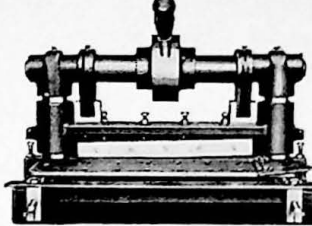
Maximum Shearing Width... 6"  
Material Capacity... 16 gauge  
steel plate (.062")  
Net Weight 35 lbs.

No. 2



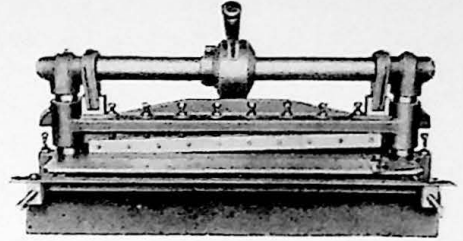
Maximum Shearing Width... 9"  
Material Capacity... 16 gauge  
steel plate (.062")  
Net Weight 80 lbs.

No. 3



Maximum Shearing Width... 12"  
Material Capacity... 16 gauge  
steel plate (.062")  
Net Weight 150 lbs.

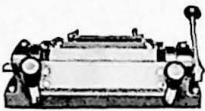
No. 4



Maximum Shearing Width... 24"  
Material Capacity... 16 gauge  
steel plate (.062")  
Net Weight 275 lbs.

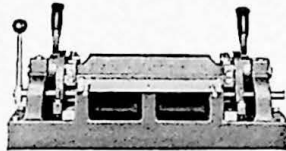
## DI-ACRO BRAKES

No. 1



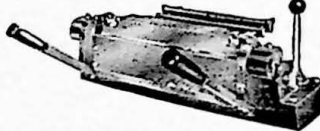
Maximum Forming Width... 6"  
Material Capacity... 16 gauge  
steel plate (.062")  
Net Weight 45 lbs.

No. 2



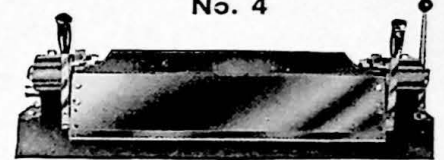
Maximum Forming Width... 12"  
Material Capacity... 16 gauge  
steel plate (.062")  
Net Weight 105 lbs.

No. 3



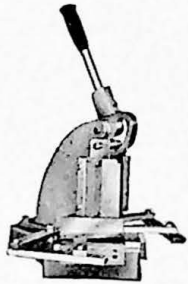
Maximum Forming Width... 18"  
Material Capacity... 16 gauge  
steel plate (.062")  
Net Weight 190 lbs.

No. 4



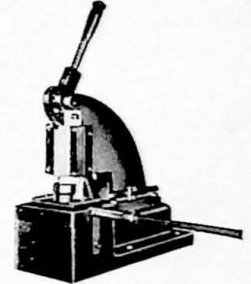
Maximum Forming Width... 24"  
Material Capacity... 16 gauge  
steel plate (.062")  
Net Weight 275 lbs.

## DI-ACRO NOTCHER



Material Capacity... 16 gauge  
steel plate (.062")  
Maximum 90 degree notch... 6" x 6"  
Net Weight 100 lbs.

## DI-ACRO PUNCH



Maximum Capacity... 4" Diameter in 16 gauge  
steel plate (.062"). Larger sizes in proportion  
to 4".  
Depth of Throat... 6 1/4"  
Net Weight 175 lbs.

## DI-ACRO ROD PARTERS

No. 1

Material Capacity... 1/16" to 3/8"  
Material Holes in Cutting  
Head... 11  
graduated in steps of 1/32"  
Net Weight 30 lbs.

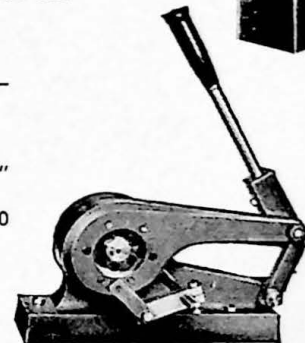
No. 2

Material Capacity... 1/16" to 5/8"  
Material Holes in Cutting  
Head... 10  
graduated in steps of 1/16"  
Net Weight 50 lbs.

Equipped With  
Torrington  
Roller Bearings

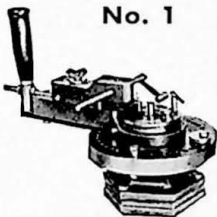


Equipped With  
Torrington  
Roller Bearings



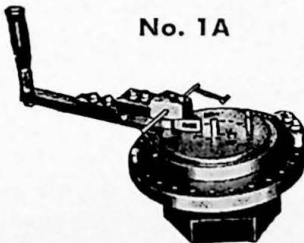
## DI-ACRO BENDERS

No. 1



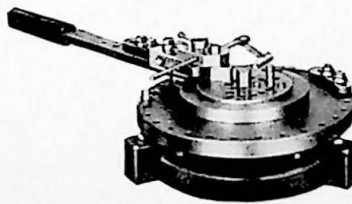
Radius capacity... 2"  
Material capacity... 3/16"  
round steel bar or equivalent.  
Height of forming nose... 1/2"  
Net Weight 22 lbs.

No. 1A



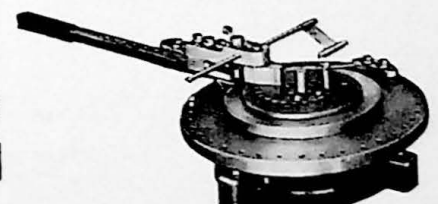
Radius capacity... 6"  
Material capacity... 5/16"  
round steel bar or equivalent.  
Height of forming nose... 3/4"  
Net Weight 55 lbs.

No. 2



Radius capacity... 9"  
Material capacity... 1/2"  
round steel bar or equivalent.  
Height of forming nose... 1"  
Net Weight 150 lbs.

No. 3



Radius capacity... 12"  
Material capacity... 5/8"  
round steel bar or equivalent.  
Height of forming nose... 1 1/2"  
Net Weight 210 lbs.



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**DIE OPERATION**  
 DIE BENDERS

1. A blank sheet of paper is fed into the machine. The sheet is held in place by a clamp.

2. The sheet is moved into the forming area. The forming area is a curved surface that shapes the paper.

3. Forming force is applied to the sheet. The sheet is curved to form the desired shape.

5. An accurately formed eye is formed. The eye is held in place by a clamp.

6. The eye is removed from the machine. The eye is ready for use.



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