



Operating Instructions and Parts Manual Box and Pan Brake

Model BB-4816E



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2.0 Safety Instructions

WARNING

Failure to follow these rules may result in serious personal injury:

1. FOR YOUR OWN SAFETY, READ INSTRUCTION MANUAL BEFORE OPERATING THE MACHINE. Learn the machine's application and limitations as well as the specific hazards.
2. Only trained and qualified personnel can operate this machine.
3. Make sure guards are in place and in proper working order before operating machinery.
4. Remove any adjusting tools. Before operating the machine, make sure any adjusting tools have been removed.
5. Keep work area clean. Cluttered areas invite injuries.
6. Overloading machine. By overloading the machine, you may cause injury from flying parts. DO NOT exceed the specified machine capacities.
7. Machine usage. DO NOT use the brake as a press or crushing tool.
8. Dressing material edges. Always chamfer and deburr all sharp edges.
9. Do not force tool. Your machine will do a better and safer job if used as intended. DO NOT use inappropriate attachments in an attempt to exceed the machine's rated capacity.
10. Use the right tool for the job. DO NOT attempt to force a small tool or attachment to do the work of a large industrial tool. DO NOT use a tool for a purpose for which it was not intended.
11. Dress appropriately. DO NOT wear loose fitting clothing or jewelry as they can be caught in moving machine parts. Protective clothing and steel toe shoes are recommended when using machinery. Wear a restrictive hair covering to contain long hair.
12. Use eye protection. Always wear ISO approved protective eye wear when operating machinery. Wear a full-face shield if you are producing metal filings. Eye wear shall be impact resistant, protective safety glasses with side shields which comply with ANSI Z87.1 specification. Use of eye wear which does not comply with ANSI Z87.1 specification could result in severe injury from breakage of eye protection.
13. Do not overreach. Maintain proper footing and balance at all times. DO NOT reach over or across a running machine.
14. Stay alert. Watch what you are doing and use common sense. DO NOT operate any tool or machine when you are tired.
15. Check for damaged parts. Before using any tool or machine, carefully check any part that appears damaged. Check for alignment and binding of moving parts that may affect proper machine operation.
16. Observe work area conditions. DO NOT use machines or power tools in damp or wet locations. Do not expose to rain. Keep work area well lighted.
17. Keep children away. Children must never be allowed in the work area. DO NOT let them handle machines, tools, or extension cords.
18. Store idle equipment. When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep them out of reach of children.
19. DO NOT operate machine if under the influence of alcohol or drugs. Read warning labels on prescriptions. If there is any doubt, DO NOT operate the machine.
20. Keep visitors a safe distance from the work area.

Familiarize yourself with the following safety notices used in this manual:

CAUTION

This means that if precautions are not heeded, it may result in minor injury and/or machine damage.

WARNING

This means that if precautions are not heeded, it may result in serious, or fatal, injury.

DANGER

This means that if precautions are not heeded, it will result in serious or fatal, injury.

Save the Instructions

3.0 About This Manual

This manual is provided by Baileigh Industrial, covering the safe operation and maintenance procedures for a Baileigh Model BB-4816E Box and Pan Brake. This manual contains instructions on installation, safety precautions, general operating procedures, maintenance instructions and parts breakdown. Your machine has been designed and constructed to provide consistent, long-term operation if used in accordance with the instructions as set forth in this document.

Technical Support handles questions on setup, operation, schematics, warranty issues, and individual parts needed. Our Technical Support department can be reached at 920-684-4990.

If there are questions or comments, please contact your local supplier or Baileigh Industrial. We can also be reached at our web site: www.baileigh.com.

Retain this manual for future reference. If the machine transfers ownership, the manual should accompany it.

⚠ WARNING

Read and understand the entire contents of this manual before attempting assembly or operation! Failure to comply may cause serious injury!

Register your product online -

<https://baileigh.com/product-registration>



4.0 Product Identification

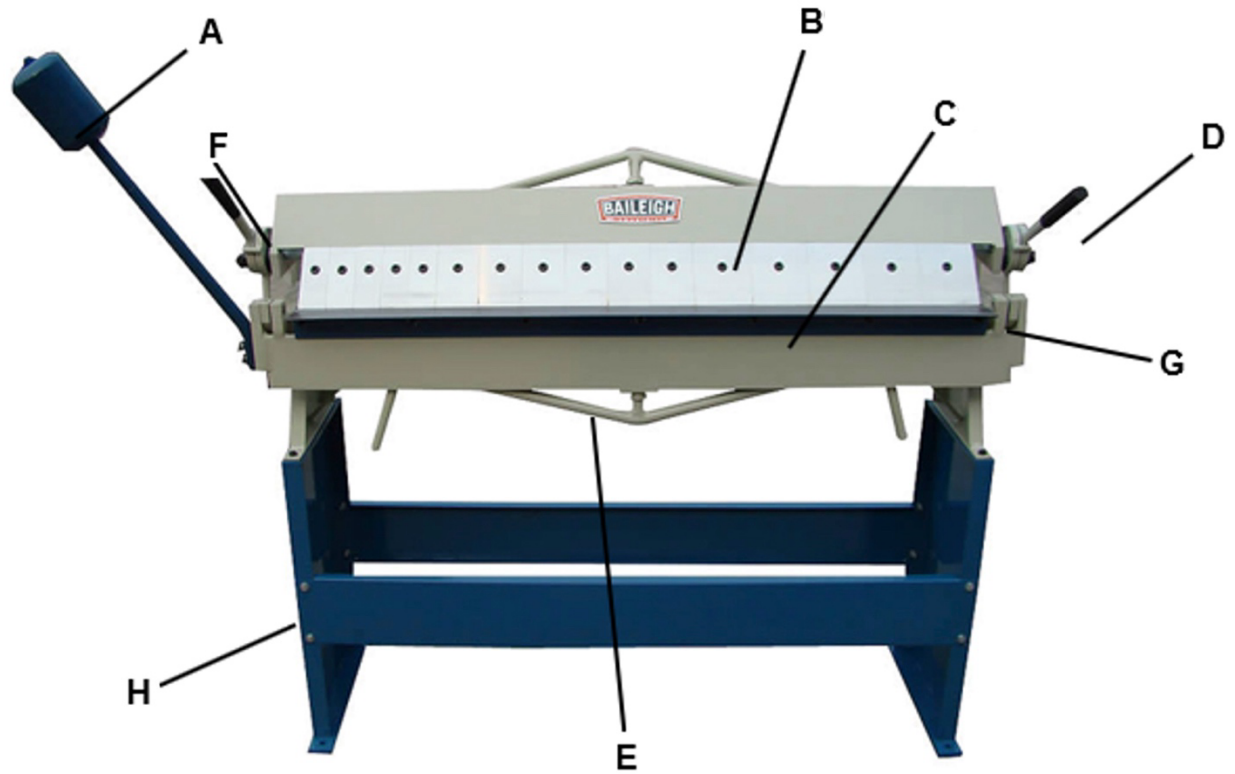


Figure 4-1

Item	Description	Function
A	Counterweight	Used to assist in raising the bending leaf.
B	Clamping Leaf	Holds the fingers and secures the material in position.
C	Finger Blocks	Movable dies that the material is bent against.
D	Clamping Handle	Used to raise, lower, and lock the clamp assembly.
E	Bending Leaf w/Handles	Raised by the operator to make the bend.
F	Finger Offset Adjustment	Rotate eccentric shaft to change finger setback adjustment.
G	Clamp Pressure Turnbuckle	Used to change clamping pressure for thickness variance.
H	Mounting Stand	Heavy duty stand to support the brake.

4.1 Overall Dimensions

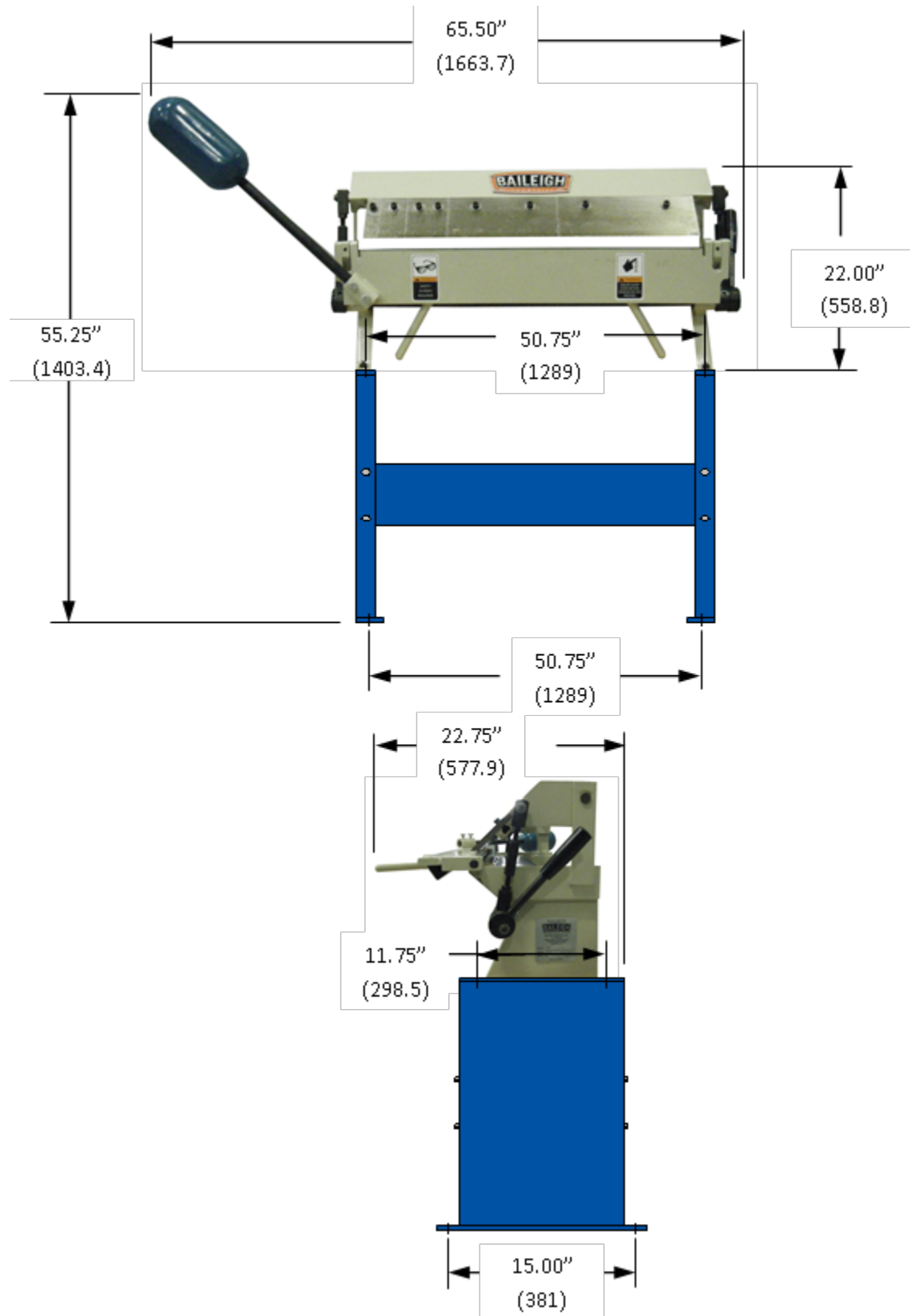


Figure 4-2

5.0 Specifications

Table 5-1

Model number	BB-4816E
General Specifications	
Bend Length	48" (1219mm)
Bend Material Thickness	16ga. (1.52mm) mild steel* 20ga. (0.912mm) stainless steel**
Bend Angle	0 – 135 degrees
Minimum Reverse Bend	.625" (16mm)
Box Depth	1.57" (39.88mm)
Floor Stand	Yes
Weights and Dimensions	
Shipping Dimensions (L x W x H)	62" x 22" x 25" (1575 x 559 x 635mm)
Shipping Weight	540 lbs.
Based on a material tensile strength of *64000 PSI – mild steel **100000 PSI – stainless steel	

⚠ WARNING

Read and understand the entire contents of this manual before attempting assembly or operation. Failure to comply may cause serious injury.

6.0 Setup and Assembly

6.1 Unpacking and Checking Contents

Your Baileigh machine is shipped complete. Separate all parts from the packing material and check each item carefully. Make certain all items are accounted for before discarding any packing material.

⚠ WARNING

SUFFOCATION HAZARD! Immediately discard any plastic bags and packing materials to eliminate choking and suffocation hazards to children and animals.

⚠ WARNING

If any parts are missing, **DO NOT** place the machine into service until the missing parts are obtained and installed correctly.

6.2 Cleanup

⚠ WARNING

DO NOT USE gasoline or other petroleum products to clean the machine. They have low flash points and can explode or cause fire.

⚠ CAUTION

When using cleaning solvents work in a well-ventilated area. Many cleaning solvents are toxic if inhaled.

Your machine may be shipped with a rustproof waxy coating and/or grease on the exposed unpainted metal surfaces. Fully and completely remove this protective coating using a degreaser or solvent cleaner. Moving items will need to be moved along their travel path to allow for cleaning the entire surface. For a more thorough cleaning, some parts will occasionally have to be removed. **DO NOT USE** acetone or brake cleaner as they may damage painted surfaces.

Follow manufacturer's label instructions when using any type of cleaning product. After cleaning, wipe unpainted metal surfaces with a light coating of quality oil or grease for protection.

IMPORTANT: This waxy coating is **NOT** a lubricant and will cause the machine to stick and lose performance as the coating continues to dry.

6.3 Shipping Contents

Item	Description	Quantity
1	Brake Main Body	1
2	Counterweight	1
3	Support Stand Ends	2
4	Support Stand Braces	2
5	Hardware Bag Hex Bolt M8 x 18mm 8 Hex Nut M8 8 Flatwasher M8 16 Lockwasher M8 8	1

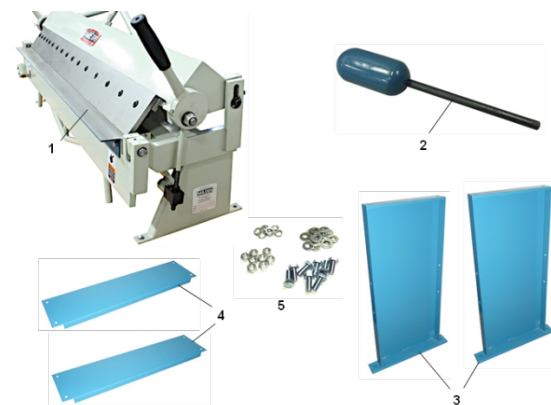


Figure 6-1

6.4 Transporting and Lifting

NOTICE

Lifting and carrying operations should be carried out by skilled workers, such as a truck operator, crane operator, etc. If a crane is used to lift the machine, attach the lifting chain carefully, making sure the machine is well balanced.

Follow these guidelines when lifting with truck or trolley:

- The lift truck must be able to lift at least 1.5 – 2 times the machines gross weight.
- Make sure the machine is balanced. While transporting, avoid rough or jerky motion, and maintain a safe clearance zone around the transport area.



Figure 6-1

- Use a fork lift with sufficient lifting capacity and forks that are long enough to reach the complete width of the machine.
- Remove the securing bolts that attach the machine to the pallet.
- Approaching the machine from the side, lift the machine on the frame taking care that there are no cables or pipes in the area of the forks.
- Move the machine to the required position and lower gently to the floor.
- Level the machine so that all the supporting feet are taking the weight of the machine and no rocking is taking place.

6.5 Installation

IMPORTANT:

Consider the following when looking for a suitable location to place the machine:

- Overall weight of the machine.
- Weight of material being processed.
- Sizes of material to be processed through the machine.
- Space needed for auxiliary stands, worktables, or other machinery.
- Clearance from walls and other obstacles.
- Maintain an adequate working area around the machine for safety.
- Have the work area well illuminated with proper lighting.
- Keep the floor free of oil and make sure it is not slippery.
- Remove scrap and waste materials regularly, and make sure the work area is free from obstructing objects.
- If long lengths of material are to be fed into the machine, make sure that they will not extend into any aisles.
- **LEVELING:** The machine should be sited on a level, concrete floor. Provisions for securing it should be in position prior to placing the machine. The accuracy of any machine depends on the precise placement of it to the mounting surface.

- **FLOOR:** This machine distributes a large amount of weight over a small area. Make certain that the floor is capable of supporting the weight of the machine, work stock, and the operator. The floor should also be a level surface. If the unit wobbles or rocks once in place, be sure to eliminate by using shims.
- **WORKING CLEARANCES:** Take into consideration the size of the material to be processed. Make sure that you allow enough space for you to operate the machine freely.

6.6 Anchoring the Machine

- Once positioned, anchor the machine to the floor, as shown in the diagram. Use bolts and expansion plugs or sunken tie rods that connect through and are sized for the holes in the base of the stand.
- This machine requires a solid floor such as concrete at a minimum of 4" (102mm) thick. 6" (153mm) minimum is preferred

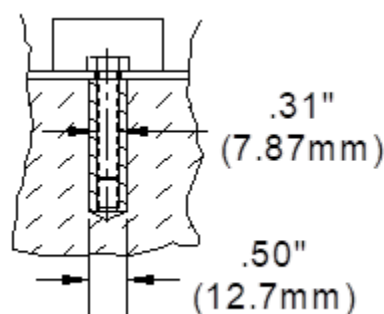


Figure 6-2

6.7 Assembly

1. Assemble stand as shown using supplied bag of hardware.
2. Lightly tighten the bolts.
3. Install the brake onto the stand using the hardware used to secure the brake to the shipping pallet.
4. Take time to square the brake to the stand.
5. Fully tighten all the bolts for the stand and the brake to the stand.
6. Place the brake and stand in the desired location following the installation guidelines.

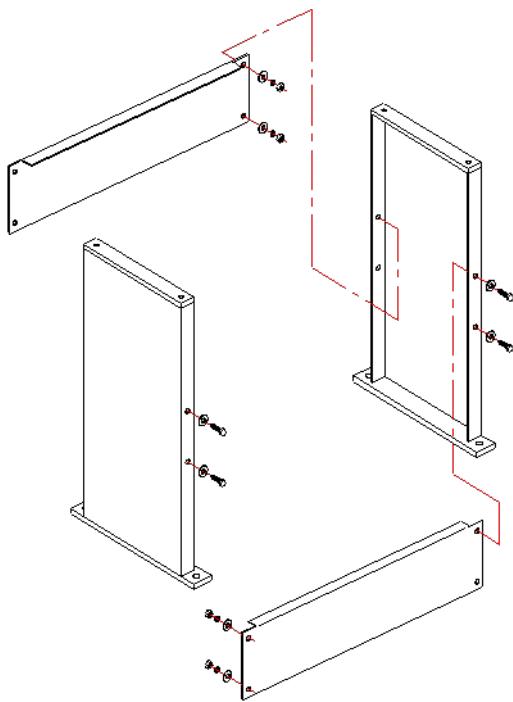


Figure 7-1

7.0 Adjustments

7.1 Attaching the Counterweight

1. Have a helper hold the counterweight.
2. Back off the two hex bolts and slide the counterweight rod into the receiver pipe.
3. When the rod is flush with the bottom of the receiver, tighten the hex bolts.

Note: DO NOT use the counterweight handle to raise the bending leaf. You may damage the hinges or the bending leaf.



Figure 7-2

7.2 Aligning the Fingers

⚠ CAUTION

Always wear proper safety equipment. The fingers are heavy with sharp edges. Wear safety footwear, and leather gloves to protect from burrs and sharp edges.

1. Place both clamping handles (A) in a forward position so that the finger just contact the bed with only the weight of the clamping leaf on the fingers. Do not pull the handles forward to the cammed over locked position.
2. Loosen the socket capscrews on the fingers 1 – 1.5 turns.
3. Starting at the center and working outward on each side, push the fingers upward and inward to be tight against the back of the clamping leaf and tighten the capscrews.

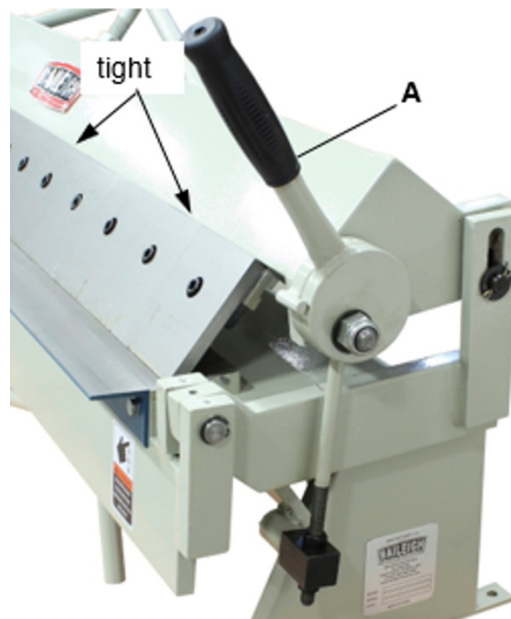


Figure 7-1

7.3 Adjusting the Setback

Setback is the distance from the front edge of the finger to the front edge of the clamp block. This distance is determined by the gauge (thickness) of the piece part and inside radius of the bend. The setback is typically 1-1/2 - 2 times the material thickness.

1. To adjust, make sure all the fingers are properly aligned to each other.
2. Place both clamping handles in a forward position so that the finger just contact the bed with only the weight of the clamping leaf on the fingers. Do not pull the handles forward to the cammed over locked position.
3. Loosen the locking screws (A) at the back of the hold down assembly.

4. Insert a tool, such as an allen wrench, into one of the spoked holes (B) of the eccentric hub and rotate the hub. This moves the clamping leaf assembly either forward or back. When the fingers are at the correct setback distance and parallel to the clamp block edge, tighten the locking screws.

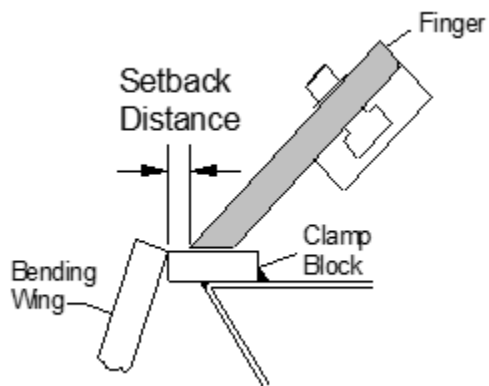


Figure 7-2

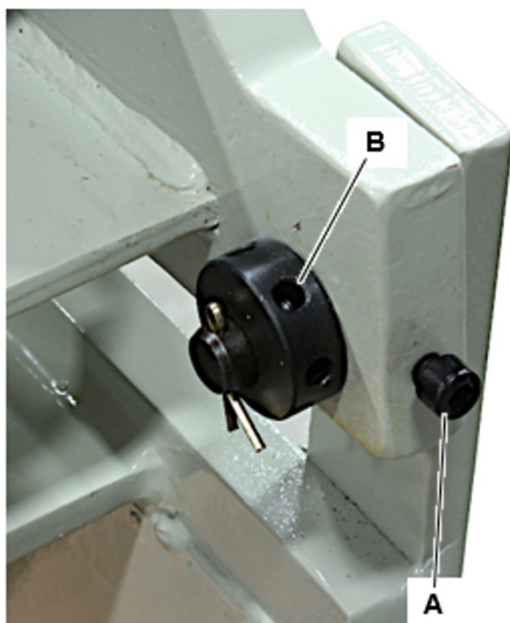


Figure 7-3

Important: Typically, the setback is set so that the setback distance is exactly the same distance from end to end as well as parallel to the seam between the bending wing and the clamping block.

Having the setback distance different from end to end can produce creative bending results, however, it can also introduce excess load on the pivot and clamping joint causing damage to the machine.

7.4 Adjusting the Clamping Pressure

The clamping pressure should hold the material under the finger just enough to prevent movement during bending. The clamping pressure may have to be adjusted as the thickness of the piece part changes.

A suitable pressure should have a medium resistance when pulling forward on the hold down handle. At the end of the stroke there should be a definite locking (camming over) of the piece part under the hold down assembly.

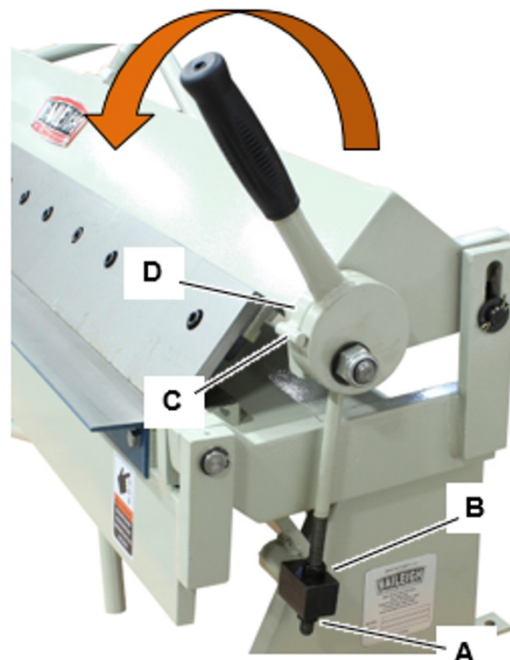


Figure 7-4

7.5 Initial Setup

1. Remove any shipping ties or straps securing the handle in a downward position for shipping.
2. Loosen the lower jam nut (A) to the end of the threaded rod but do not remove.
3. Rotate the upper jam nut (B) at least halfway to the end of the threads.
4. Rotate the handle to the clamping handles around from the back of the brake toward the front and allow the handle to set on the handle stop pin (C).
5. Working with each end of the clamping leaf evenly, lift the clamping handle and hold the gap (D) between the stop pin and the handle at .75" (19mm) while adjusting the lower jam nut (A) up until it just contacts the bottom of the pivot block. Again, be sure both ends are even.
6. Adjust the upper jam nut (B) down until it just touches the pivot block.
7. Test the clamping with No material. The handles work with a cam action. There should be a light cam action and the handle is rotated forward over the cam center. When material is placed under the fingers the cam over force should increase slightly.

7.6 Regular Adjustment

1. Once the clamping handle have been setup, adjustment for changes in material thickness or to fine tune the clamping pressure may be needed to increase or decrease the clamping force.
2. To increase the clamping force, Turn the upper jam nut (B) upward one turn at a time and then turn the lower jam nut (A) up the same turns to hold the pivot block snug between the jam nuts. Test the results.
3. To decrease the clamping force, Turn the lower jam nut (A) downward one turn at a time and then turn the upper jam nut (B) down the same one turn to hold the pivot block snug between the jam nuts. Test the results.

8.0 Operation

When performing basic bending operations, it is important that the fingers of the brake are parallel with the edge of the clamping block. Also make sure you have the proper setback and clamping pressure set for the thickness material being bent.

CAUTION

Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges.

CAUTION

Keep hands and fingers clear of the clamping beam. Stand off to the side of the machine to avoid getting hit with the bending apron as it comes up to bend.

CAUTION

When handling large heavy sheets make sure they are properly supported.

8.1 Bending Sheet Metal

1. Lift and rotate the clamping handle (**cw**) clockwise to raise the clamping assembly.
2. Insert the piece part between the clamp block and the brake fingers.
3. Align the fingers of the hold down assembly to the scribed bend line of the piece part and clamp in place by pulling the clamp handle back.

Note: DO NOT force the clamping pedal. The holding pressure only needs to be tight enough to hold the sheet metal from moving when bending.

4. Pull up on the bending leaf handles until the piece part has reached the desired bend angle.

5. Lower the bending leaf, raise the hold down assembly, and remove the bent piece part.
6. If you are doing box and pan bending, choose fingers that closely match the dimensions of the finished piece.

9.0 Bending Allowance

In order to bend sheet metal accurately, you will need to consider the total length of each bend. This is referred to as bend allowance. Subtract the bend allowance from the sum of the outside dimensions of the piece part to obtain the actual overall length or width of the piece. Because of differences in sheet metal hardness, and whether the bend is made with the grain or against it, exact allowances must sometimes be made by trial and error. However, bend allowances for general use can be obtained from metal working books or from the Internet.

10.0 Understanding Springback

Springback, also known as elastic recovery, is the result of the metal wanting to return to its original shape after undergoing compression and stretch. After the bending leaf is removed from the metal and the load is released, the piece part relaxes, forcing the bent portion of the metal to return slightly to its original shape. The key to obtaining the correct bend angle is to over bend the metal a little and allow it to spring back to the desired angle. All metals exhibit a certain amount of spring back.

11.0 Material Selection

CAUTION

It must be determined by the customer that materials being processed through the machine are NOT potentially hazardous to operator or personnel working nearby.

When selecting materials keep these instructions in mind:

- Material must be clean and dry. (without oil)
- Material should have a smooth surface, so it processes easily.
- Dimensional properties of material must be consistent and not exceed the machine capacity values.
- Chemical structure of material must be consistent.
- Buy certificated steel from the same vendor when possible.

12.0 Maintenance

⚠ WARNING

Maintenance should be performed on a regular basis by qualified personnel.

⚠ WARNING

Always follow proper safety precautions when working on or around any machinery.

- Check daily for any unsafe conditions and fix immediately.
- Check that all nuts and bolts are properly tightened.
- On a weekly basis clean the machine and the area around it.
- Lubricate threaded components and sliding devices.
- Apply rust inhibitive lubricant to all non-painted surfaces.

12.1 Lubrication Points

Using an oil can with a good quality #30W oil, apply 5-6 drops to all of the pivot points on both ends of the machine. Repeat weekly or more often depending on usage. Wipe off any excess oil.

Grease the fittings on each end of the machine weekly or more often depending on usage. Wipe off any excess grease.



Figure 12-1

Note: Proper maintenance can increase the life expectancy of your machine.

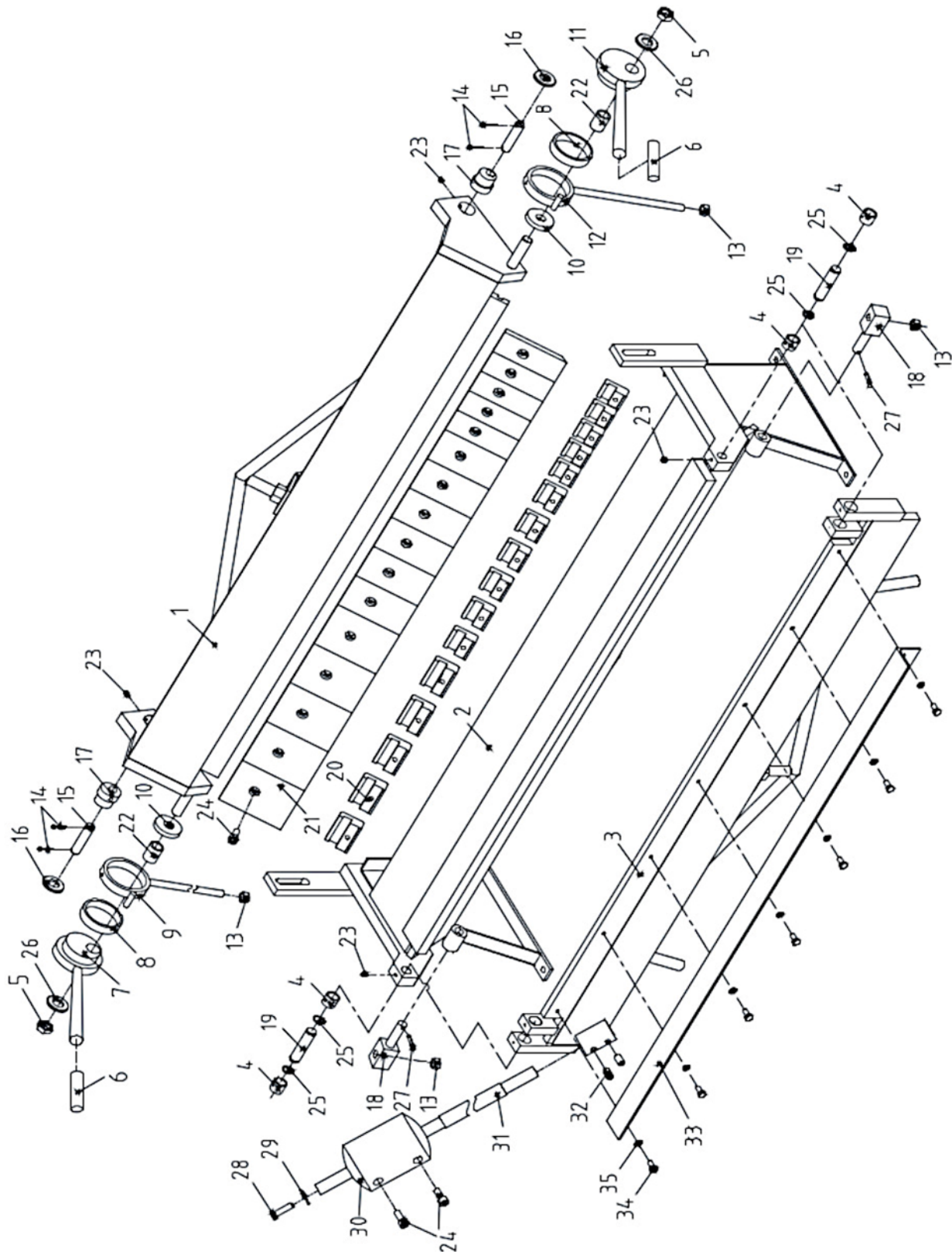
13.0 Troubleshooting

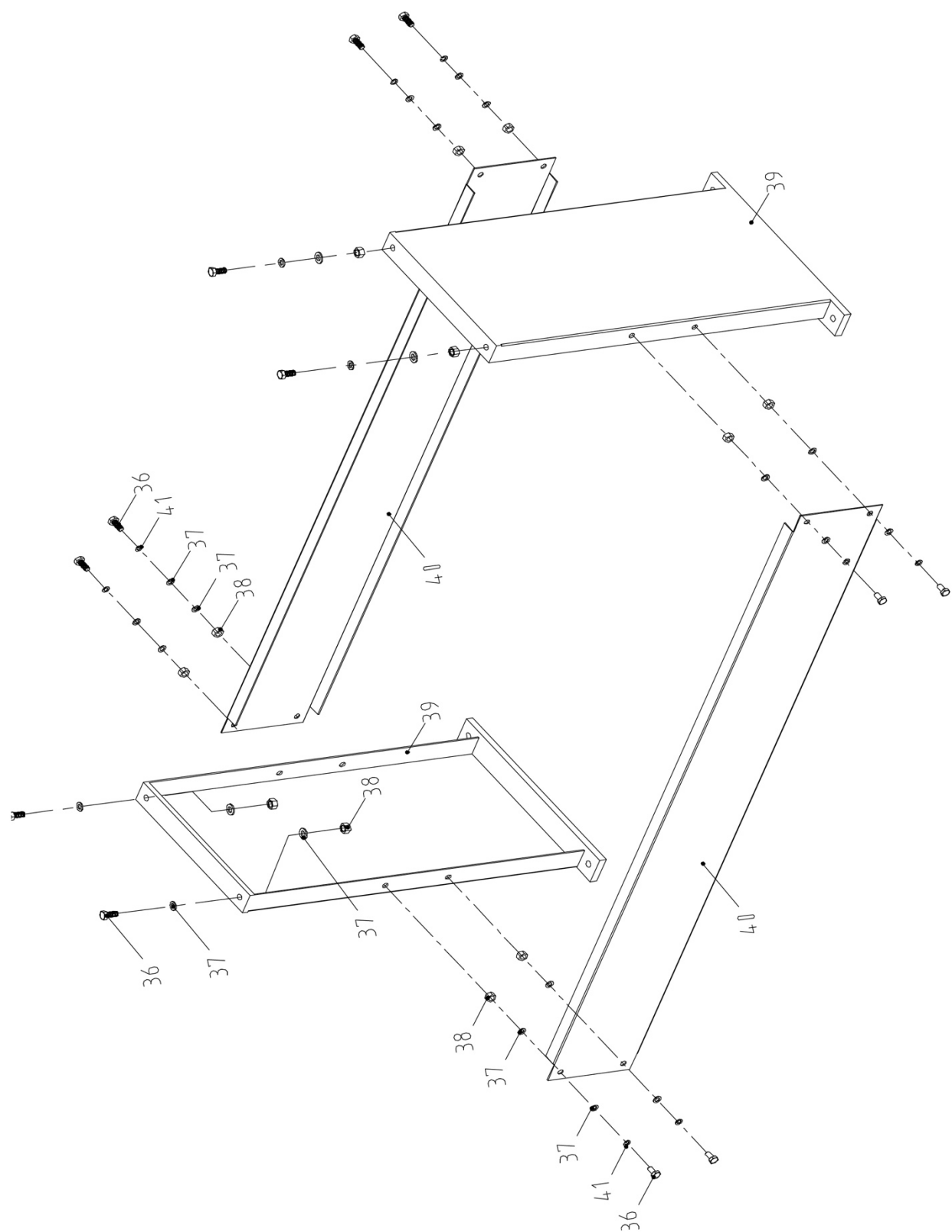
Table 13-1

Fault	Possible Cause	Remedy
INACCURATE BENDS	Fingers are not aligned	Follow proper finger alignment procedure.
	Setback distance is not equal from one side to the other	Accurately measure distance and set accordingly.
	Clamping assembly is not holding piece part securely.	Re-adjust the clamping pressure.
BENDING LEAF HARD TO LIFT AND BEND	Exceeding the bending limits of the brake.	Do not bend material thicker than the machine was designed for.
	Counterweight is not on leaf.	Attach the counterweight to lessen force needed to lift bending leaf.

14.0 Replacement Parts

14.1.1 Box and Pan Brake Assembly – Exploded View





14.1.2 Box and Pan Brake Assembly – Parts List

Index No	Part No	Description	Size	Qty
1	**	Upper Die Framework		1
	BB4816E-1,2,3	Complete Frame Assembly (not shown)		1
2	**	Frame		1
	BB4816E-2-1	Angle Iron (not shown)		1
3	BB4816E-3	Bending Leaf		1
4	**	Case Bearing		4
5	**	Nut	M18	2
6	BB4816E-6	Handle Grip		2
7	BB4816E-7	Left Eccentric Handle		1
8	BB4816E-8	Steel Bushing	66.7 x 75 x 15mm	2
9	BB4816E-9	Left Connecting Rod		1
10	**	Washer		2
11	BB4816E-11	Right Eccentric Handle		1
12	BB4816E-12	Right Connecting Rod		1
13	BB4816E-13	Nut	M12-1.75	4
14	BB4816E-14	Cotter Pin	φ4X25	4
15	BB4816E-15	Pin	φ16X70	2
16	**	Flat Washer	Φ16	2
17	**	Set Back Eccentric Shaft		2
18	BB4816E-18	Position Fixing Shaft		2
19	BB4816E-19	Shaft	15.8 x 61mm	2
20	BB4816E-20	Clamp Plate (Specify Size)		1
21	BB4816E-21	Brake Dies (Specify Size)		1
22	**	Spacer Bush		2
23	**	Nut	M8X8	4
24	**	Nut	M10X25	18
25	**	Shaft Ring		4
26	**	Flat Washer		2
27	**	Cotter Pin	φ5X25	2
28	**	Hex. Bolt	M10X35	1
29	**	Flat Gasket	Φ10	1
30	**	Counterweight		1
31	**	Counterweight Rod		1
32	**	Set Screw	M12X20	2
33	**	Limit Angle plate		1
34	**	Hex. Bolt	M8X16	7
35	**	Flat Gasket	Φ8	72
36	**	Hex Cap Screw	M8x16	12
37	**	Flat Washer	M8	24
38	**	Hex Nut	M8	12
39	**	Stand		2
40	**	Connection Plate		2

** These parts are shown for reference only and are not available for order individually. Non-proprietary parts, such as fasteners, can usually be found at local hardware stores.