

Clariflex® STRONG-ARM

10 TON BODY STRAIGHTENER

Model Nos.
CB10 & CBT10



OPERATING & MAINTENANCE INSTRUCTIONS

Thank you for purchasing this CLARKE STRONGARM 10Ton Body Straightener, which is designed for use by the home mechanic and professionals alike.

Before use, please read this leaflet thoroughly and follow the instructions carefully, in doing so you will ensure the safety of yourself and that of others around you, and you can look forward to the product giving you long and satisfactory service.

GUARANTEE

This CLARKE product is guaranteed against faulty manufacture for a period of 12 months from the date of purchase. Please keep your receipt as proof of purchase. This guarantee is invalid if the product is found to have been abused or tampered with in any way, or not used for the purpose for which it was intended.

Faulty goods should be returned to their place of purchase, no product can be returned to us without prior permission. This guarantee does not effect your statutory rights.

CONTENTS

	Page
General Safety Precautions	2
Features & Specifications	3
How to identify the type of damage	4
How to measure the extent of damage	5
How to repair chassis damage	5
How to repair unitised bodies	7
Parts list & diagrams	10 -11

GENERAL SAFETY PRECAUTIONS

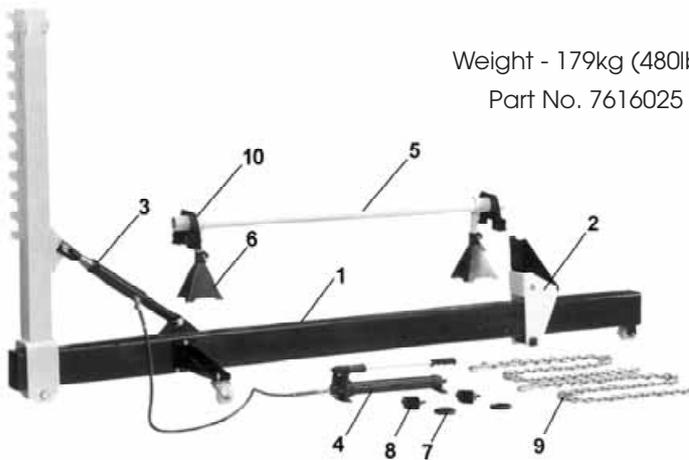
As with all machinery, there are certain hazards involved with their operation and use. Exercising respect and caution will considerably lessen the risk of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator or damage to property may result.

1. READ AND BECOME FAMILIAR with the entire manual. Learn the MACHINES' applications and limitations as well as the specific potential hazards peculiar to it.
2. CHECK DAMAGED PARTS before using the machine. Any damaged component, should be checked to ensure it will operate properly and perform its intended function correctly. Check for breakage of parts, mountings, and any other condition that may affect its operation. A damaged part should be properly repaired or replaced.
3. KEEP WORK AREA CLEAN. Cluttered areas invite accidents.
4. DON'T FORCE MACHINE. It will do a better and safer job at the rate for which it was designed.
5. KEEP VISITORS AWAY. All visitors, particularly children, should be kept a safe distance from the work area, especially whilst operating the unit.
6. Before working on a vehicle, and before making any attachments, ensure the vehicle is well supported and COMPLETELY STABLE.
REMEMBER, that when pulling, there is always the possibility of a fixture slipping, or a body part failing, which could cause the vehicle to jolt suddenly. If the vehicle is not adequately supported it could fall with possible serious consequences.
7. Do not modify the machine in any way.
8. Never use an extension handle to operate the pump.

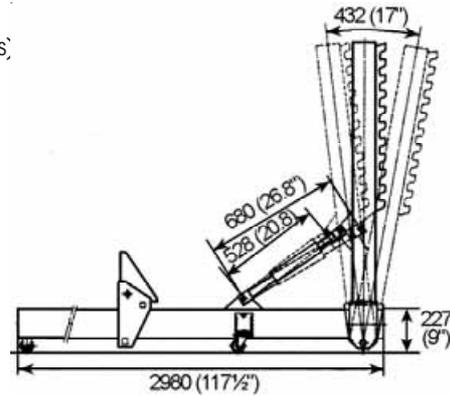
FEATURES and SPECIFICATIONS

Model CB10 comprises the following:

- | | |
|--|------------------------------------|
| 1. Main Frame Assy | 6. 2 pcs Support Stand |
| 2. Multi-position Anchor Post | 7. 2 pcs Pull Ring |
| 3. 6" Stroke Hydraulic Ram (10 Ton capacity) | 8. 2 pcs Pull Clamp |
| 4. Manual Pump | 9. 6Ft Chain with 3/8" Hook |
| 5. Cross Tube | 10. 2 pcs Under Body Support Clamp |

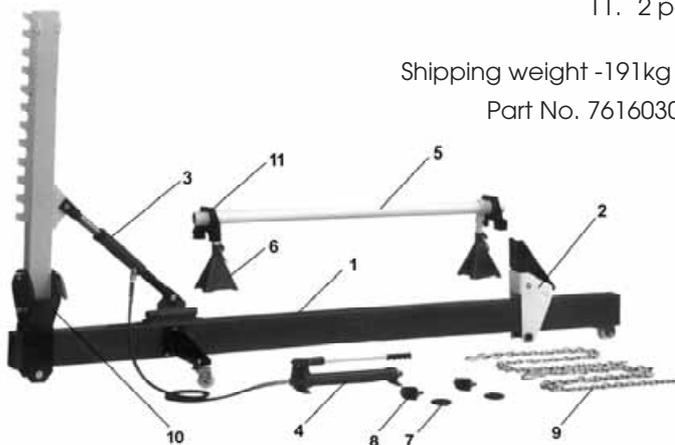


Weight - 179kg (480lbs)
Part No. 7616025

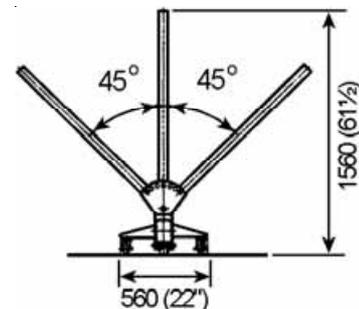


Model CB10T comprises the following:

- | | |
|--|------------------------------------|
| 1. Main Frame Assy | 6. 2 pcs Support Stand |
| 2. Multi-position Anchor Post | 7. 2 pcs Pull Ring |
| 3. 6" Stroke Hydraulic Ram (10 Ton capacity) | 8. 2 pcs Pull Clamp |
| 4. Manual Pump | 9. 6Ft Chain with 3/8" Hook |
| 5. Cross Tube | 10. Tilting Support |
| | 11. 2 pcs Under Body Support Clamp |



Shipping weight -191kg (420lbs)
Part No. 7616030



The Tilting post gives the machine far greater flexibility, in that pulls can be exerted at a variety of angles, without necessarily adjusting the anchor points

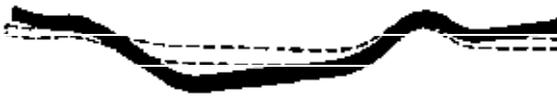
HOW TO IDENTIFY THE TYPE OF THE DAMAGE

Chassis damage can usually be grouped into five basic types of damage, described as SAG, SWAY, KICK-UP, DIAMOND and TWIST,

Even though chassis are made in many ways (such as ladder, offset, X-type etc.), collision impact will distort the chassis, or parts of it, regardless of construction.

1. SAG

When hit from the front or rear, the chassis can sag like a hammock and then look like this:



Side view of sag

2. SWAY

Often when hit from the side, either in the middle or at one end, the chassis may develop sway looking like this:



Top View of Sway

Or like this:



Top View of Sway

Sway in Unitised Bodies doesn't bend the entire body. Instead only one part of the body will be moved out of line.

3. KICK-UP

Quite often with direct front or rear end damage, only a part of the chassis will kick-up like this:



Side View of Kick-up

Kick-up on Unitized Bodies is more like SAG. There is generally only one major bend in the floor pan.

4. DIAMOND

Chassis' built with two parallel side rails may get pushed out of square when hit on one corner. Then they become diamond shaped and look like this:



Top view of Diamond

Hour glass, Unitised, or X-type chassis seldom "go diamond"

5. TWIST

Sometimes the chassis will twist when the car goes into a ditch, over a curb, etc., and will look like this:



Side view of twist

These are the five classifications of chassis damage. But remember, you will often find two or more in the same job such as SAG and KICK-UP. In some cases with front end damage the front cross member or engine mounting will roll under in addition to other types of chassis damage.

NOW that we know the types of chassis damage, how do you determine if the chassis is bent? First, if the car looks as if it has had a hefty jolt, get underneath and LOOK AT THE CHASSIS. Are there any places where the metal is torn? Are there any places where the metals wrinkled? Does the chassis look out of shape or bent? If the answer to ANY or ALL of these questions is yes, the chances are that the chassis is bent.

HOW TO MEASURE THE EXTENT OF THE DAMAGE

Before you begin work with your Body Straightener, it is vital that you determine how extensive the damage is.

To do this, get the car up off the ground, lie under the structure and thoroughly inspect. Measurements should be taken to see how far the damaged sections are out of alignment. These measurements can be made with a Trammel Gauge, or a tape measure.

A simple method is to drop a plumb bob from identical points from either side of the chassis, marking them, in chalk, on the floor below. Measure various points diagonally.

A perfect chassis will produce identical readings, whereas a difference in measurement indicates

the body/chassis has moved in some way.

From these measurements, determine where and how the distortion has occurred.

Remember, it is your job to restore the damaged sections back to the original factory specifications. Therefore, it is important to work from chassis dimension charts, so that you know exactly what the original dimensions were. There is no point in making a pull if you do not know how far you can pull and when to stop. Take time to examine the damage, note the direction of the impact, and then plan your pull. Proper planning will save you time when it comes to actual pulling.

HOW TO REPAIR CHASSIS DAMAGE

CAUTION!

USE ONLY THE HYDRAULIC SET SUPPLIED WITH YOUR BODY STRAIGHTENER.
Use of different Hydraulic Set or handle may damage unit.
In such cases warranty claims will be void.

The idea of straightening chassis damage is to exert a force in the reverse direction to that of the collision impact.

Your work will be made much easier by taking off any interfering parts (wheels, bumpers grills, etc.), so that you can see as well as get at the damage. In cases where parts are unrepairable and must be replaced, they should be removed first! In front end damage it may become necessary to remove upper or lower control arms, anti-roll bars, etc. to eliminate excessive spring back.

Where major body damage occurs, rough out the body metal first. **DON'T REMOVE BODY BOLTS** unless absolutely necessary. Do as much body roughing out as you can whilst working on the chassis.

If possible, correct any body damage in unison with chassis straightening. This will save time and effort and will make it easier to align the body with the chassis.

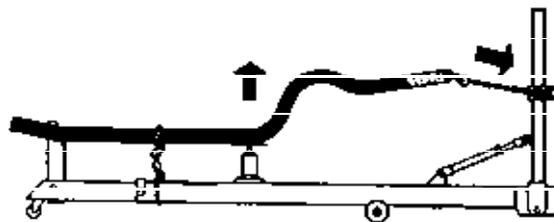
The chassis and body should always be overcorrected to allow for spring-back. Hammering or heating the metal will help relieve the stress and help eliminate excessive springback.

When there is no clearance between the chassis and the body, the floor may be pried up to allow anchoring of the chain or an opening in the floor made that can later be welded shut. A preferred

method is to weld a plate to the chassis from which pulls can be made. The plate may later be removed.

SAG

To repair SAG put the main beam of the Body Straightener under the car and chain the chassis to the beam. Place a Hand Jack between the beam and the chassis at the center of the SAG area and jack upward whilst also pulling as shown in the sketch below:



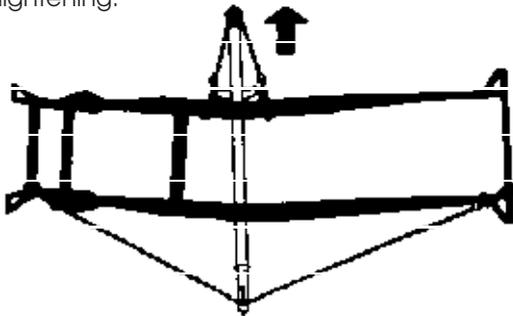
Always use a combination of push AND pull when correcting sag. If you do not, you may end up with one chassis rail shorter than the other. If both rails are sagged, straighten one at a time, then check with gauges to see that the chassis is back in line. If it isn't repeat this process.

Keep the hold-down chains on the chassis as far apart from the jack as you can. This will make straightening easier. Where there are bad buckles, heat the chassis.

Use a steel plate between the jack and the chassis to spread the load, otherwise the jack may collapse the chassis. Blocks may be inserted inside the channel-type chassis to help prevent the bottom flange from being crushed. To keep the jacks stable place a block of wood under the base when jacking from the main beam.

SWAY

To correct SWAY damage, hook up the Body Straightener as shown in the diagram below. Side anchoring from the Anchor Post at either side of the damage is required in center-sway straightening.



In cars with low door sills, it may be necessary to put a block of wood between the chain and floor panel to protect the body metal.

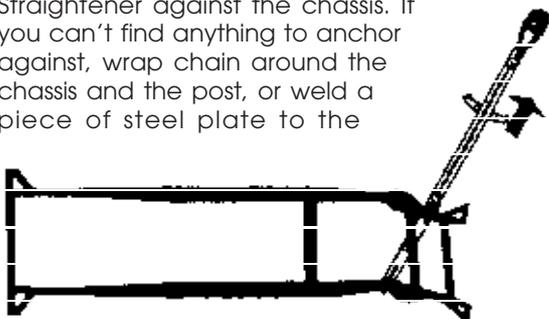
Here is a good time to remember several notes of caution concerning the use of chains.

- Do not pull chains around sharp edges.
- Do not heat chains with the torch.
- Do not bolt links together.
- To be on the safe side, place an old tarpaulin or cover over the chain when pulling, so that if a link does let go, the snap back will be smothered

Keep a continuous check as you proceed. You should pull a little beyond center to allow for spring back in the metal. Make a final check after tension has been released.

For front end SWAY, hook up the Body Straightener in the manner shown below.

Wedge the Anchor Post of the Body Straightener against the chassis. If you can't find anything to anchor against, wrap chain around the chassis and the post, or weld a piece of steel plate to the

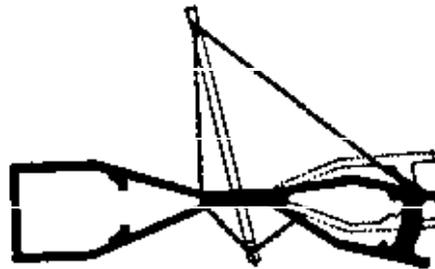


chassis as a temporary support. When you have finished pulling, cut off the plate.

Occasionally on SWAY pulls you may find that the Body Straightener lifts off the floor. Put a block of wood between the beam and the chassis to hold the Body Straightener in position.

Rear end SWAY can be pulled out in the same way.

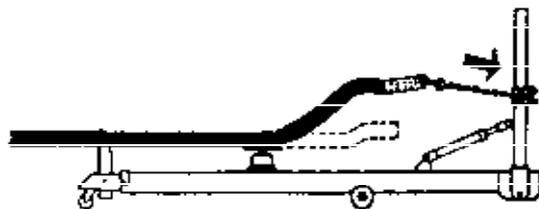
One of the SWAY corrections which may seem puzzling at first is that of the X or "hourglass" chassis. Almost always, these are bent only on one end and the center box tube remains aligned with the other end, as shown in the diagram below. These may be corrected with a hookup similar to the one shown here:



If the car is raised high enough, the chains will slant down and clear the body panels - bumper, valance etc. The drawing shows only one hookup, however, variations of this may be made to suit the particular conditions of damage.

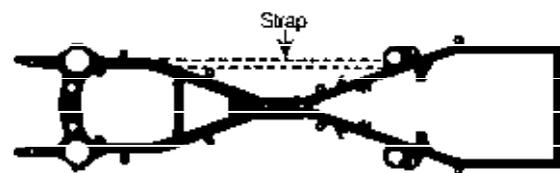
KICK-UP

To repair KICK-UP, or ROLL-UNDER, hook up the Body Straightener as shown below:



Don't forget to measure when you have finished pulling to ensure that the rails have returned to their proper dimension.

When pulling from front to rear as shown in the sketch below, weld a strap on the chassis to keep from stretching one side of the chassis longer than the other. (This applies to the "hourglass type" chassis).



DIAMOND

Diamond chassis' can be straightened by using the same general hook up as for front end sway, except that due to the extra length (pulling diagonally), a chain is connected to the anchor post as shown below.

Chain the I-beam to the frame to prevent it from lifting and slipping.

Chain the high points of the chassis to the I-beam and place bottle jacks as shown in the diagram below.

TWIST

Always remove twist after all other chassis damage is corrected.

Place the machine diagonally under the car, with an 8ft section of heavy I-beam balanced on top of the frame, forming a 'cross' below the car.

Now proceed to jack up the bottle jacks...first one, then the other. DO NOT push the whole way on one rail as you may cause it to SAG. If the damage is simple twist, there should not be any buckles.

HOW TO REPAIR

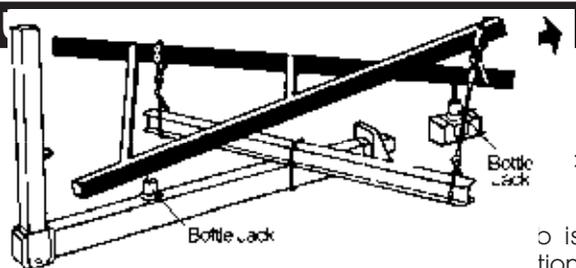
IT IS IMPORTANT TO USE THE PROPER TECHNIQUE.

The repair of unitised bodies follows basic body repair methods and a knowledge of metal working is absolutely essential. A combination of methods is always needed in these repairs, since the, "heat-'n-beat" method alone will not always succeed.

The techniques used are a combination of:

1. Heavy external pulling
2. Use of Hydraulic Rams (such as Clarke's 10Ton Hydraulic Body Repair Kit - CS10TK - see your Clarke dealer)
3. Use of heat
4. Use of hammer and dolly block
5. Cutting out buckled sections or reinforcing members

Heavy external pulls are a must for all severe unitised body damage, because THE IMPACT WILL HAVE COMPRESSED THE BODY METAL - NOW IT HAS TO BE PULLED BACK INTO PLACE.



of work into chassis repair followed by body repair. The complete job is planned as one.

Large stationary machines which are ramp or pit mounted do not offer easy access to the body. A Clarke Body Straightener, with its practical method of mounting the car on low stands, allows easy access to all sections.

When pulling sheet metal, DO NOT APPLY ALL THE FORCE IN ONE PLACE, AT ONE TIME.

Spread the restoring forces, pull at one place and then, without shifting the setup, merely change the attachment point and pull at another.

Hook-ups are fast simple and easy with the Body Straightener as you can easily manoeuvre the equipment around the job.

ROUGH OUT THE WORK

By this we mean the restoring of panels to APPROXIMATE shape and dimension EVEN THOUGH THEY MAY LATER BE REPLACED.

Panels should be roughed out before any cutting is done, otherwise adjacent structures to which the panel is welded may retain their damaged contours after cutting. If this occurs, the replacement panels will not fit and it is a losing battle trying to obtain a proper joint.

To illustrate:

When a wing is badly buckled, the wheel arch generally is also damaged. If the wing is cut loose from the wheel arch before a pull is exerted on it, the wheel arch will remain buckled and distorted. It will then be extremely difficult to straighten this area so that the replacement panel can be welded or bolted to it. Therefore, work the damaged panels back into shape and dimension before attempting any cutting or unbolting operations

CHECK THE WORK

As repairs proceed, keep track of your progress by continually checking dimensions, window and door openings, etc.

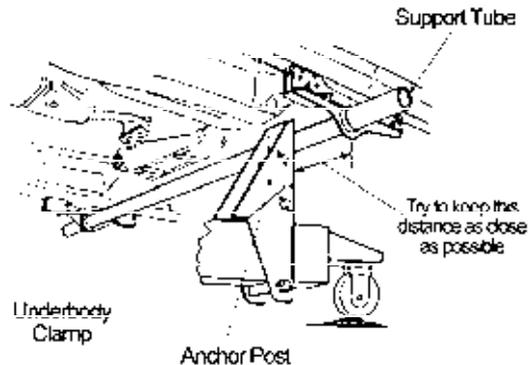
With a unitised body, it is sometimes necessary to overcorrect because of the stiffness of the construction, and a degree of 'spring back', but it is important not to go too far as this can cause further damage.

One of the difficulties often presented in the repair of unitised bodies is that of anchoring the machine to the body. Since there is no longer a heavy chassis against which to anchor or pull, this can be a problem. However, the use of the Underbody Clamps will provide a firm base and will cope with many of the situations generally found.

This Clamp fastens to the under body seam which runs the length of most modern cars, and the cars' jacking points are usually to be found here. The clamp should be fastened in the area of the door pillar. It may be moved forward or backward as required.

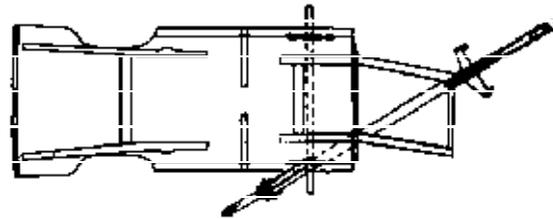
One clamp may be used, although greater holding power may be obtained by using one clamp on each side of the body and placing the Support Tube between them as shown in the following diagram.

The Anchor Post can push against the Underbody Clamp and tube, as shown...



The tube will help stabilise the underbody clamp and avoid twisting the welded seam

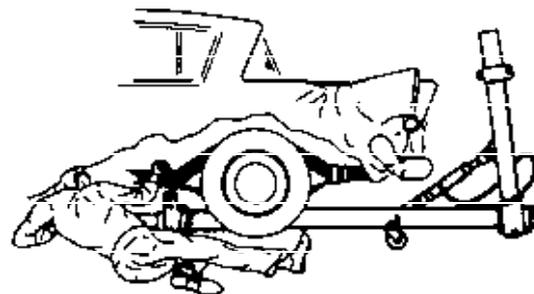
...or a Chain can be used around the tube to attach to the Anchor Post as shown below.



The following illustrations are examples of typical Body Straightener Hook-ups for repairing damaged unitised vehicles.

With all unitised body construction, special attention must be given to certain load-bearing or structural members such as chassis side members, inner wheel arch panels, cross members, the floor pans that form a part of the cross members or box sections. These must be brought back to the equivalent of their original condition, which means returned to original shape without wrinkles or excess thinning of the metal.

The first step in making any hook-up is to anchor the Body Straightener securely to the chassis...

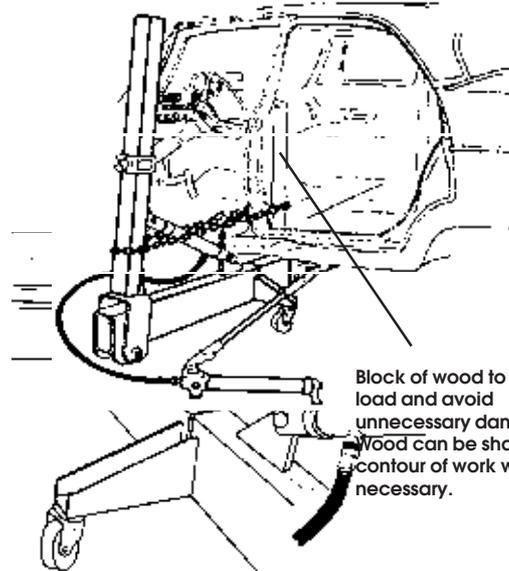
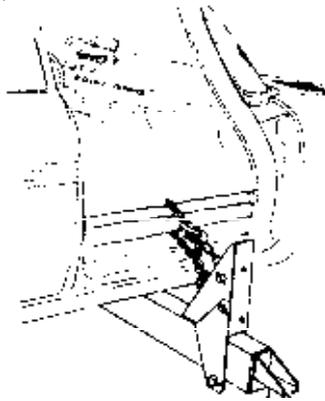
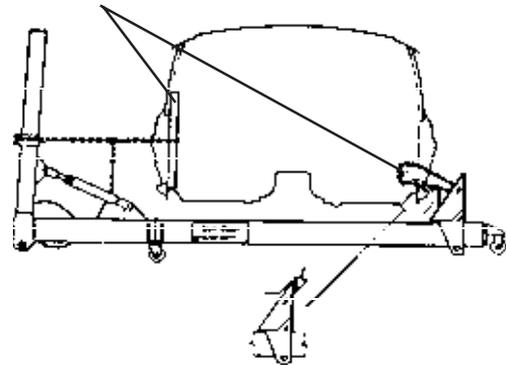
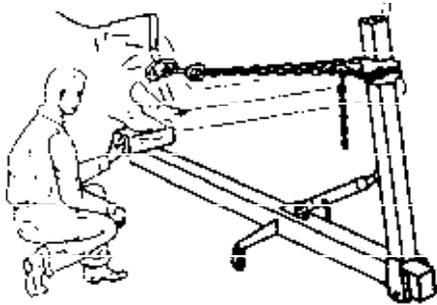


...or to the body using Underbody Clamps as previously shown.

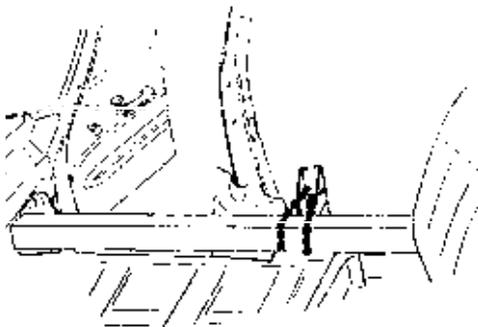
Other typical 'hook ups' are illustrated below.

Next, a pulling attachment is secured to the damaged part as shown below.

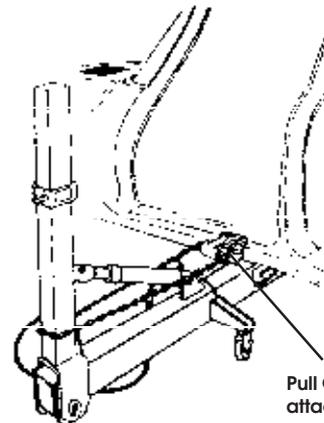
Blocks of wood to spread load and avoid unnecessary damage.



Block of wood to spread load and avoid unnecessary damage. Wood can be shaped to contour of work where necessary.



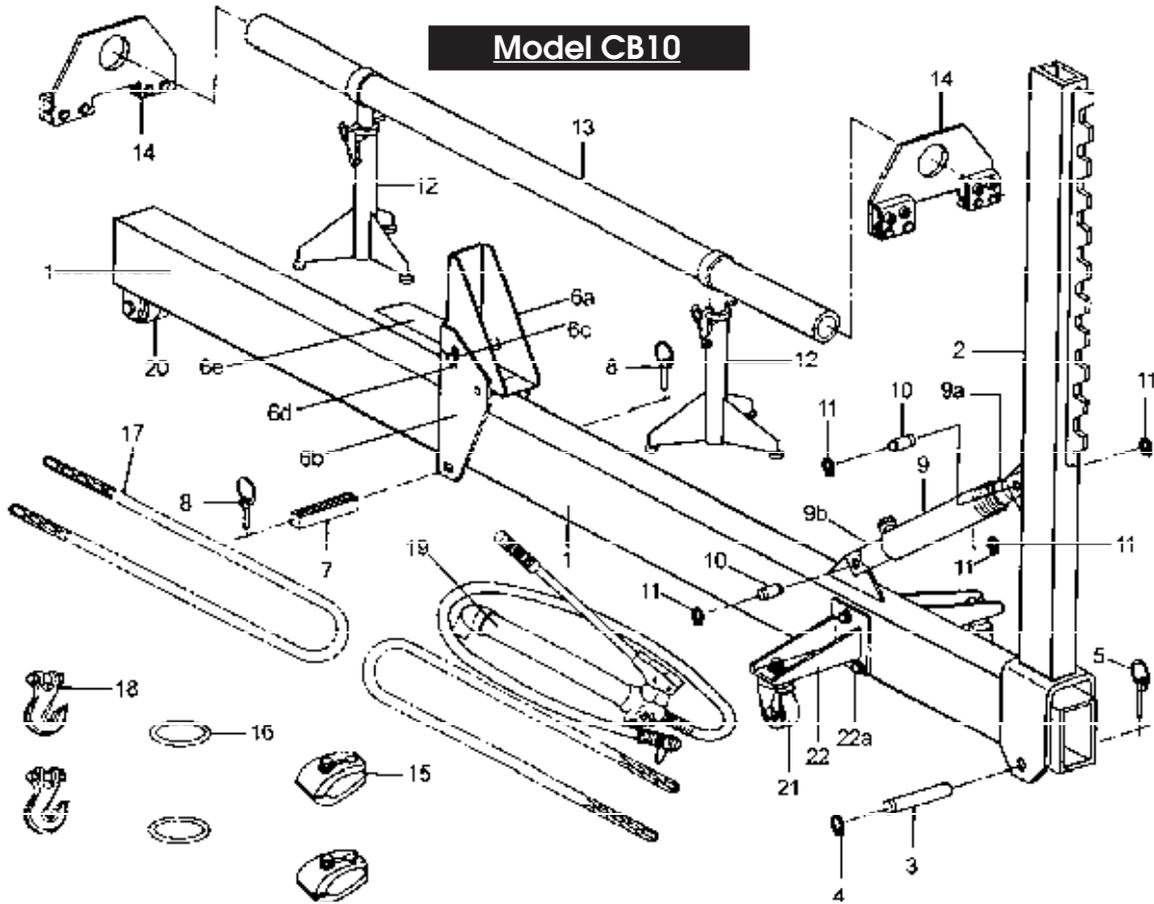
Flap, cut in door sill so that chain or insert may be entered. The insert is connected to the mast and a pull exerted.



Pull Clamp attached to door sill

PARTS LIST & DIAGRAM

Model CB10

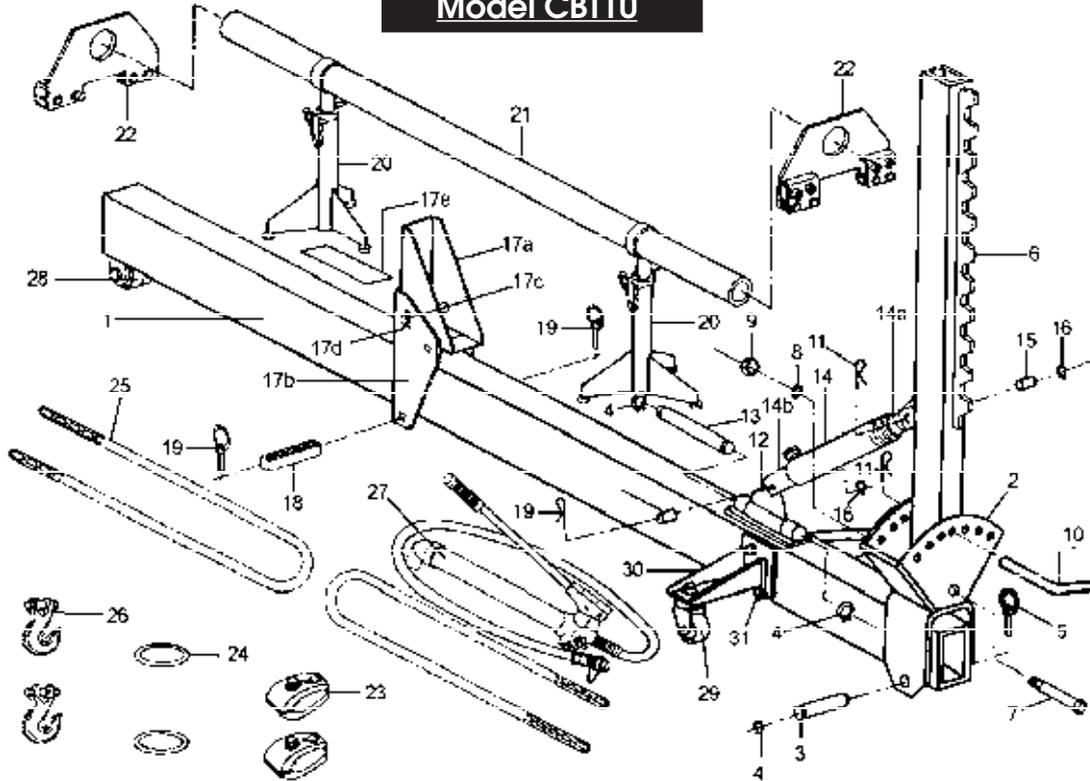


No.	Description	Qty	Part No.
1	Main Beam	1	CB1001
2	Mast	1	CB1002
3	Main Beam Locating Pin	1	CB1003
4	Circlip	1	CB1004
5	Locking Pin	1	CB1005
6a	Anchor Post Upper Bracket	1	CB1006A
6b	Anchor Post Lower Bracket	1	CB1006B
6c	Anchor Post Locating Pin	1	CB1006C
6d	Locating Pin Clip	2	CB1006D
6e	Plate Spring	1	CB1006E
7	Stop Block	1	CB1007
8	Locking Pin	2	CB1008
9	10 Ton Ram	1	CB1009
9a	Ram End Piece (Female)	1	CB1009A
9	Ram End (Male)	1	CB1009B

No.	Description	Qty	Part No.
10	Ram Locating Pin	2	CB1010
11	Circlip	4	CB1011
12	Support Stand	2	CB1012
13	Cross Tube	1	CB1013
14	Underbody Support Clamps	2	CB1014
15	Pull Calmps	2	CB15
16	Pull Ring	2	CB1016
17	6ft x 3/8" chain	2	CB1017
18	3/8" hook	2	CB1018
19	10 Ton Hydraulic Pump	1	CB1019
20	Fixed Wheel Assy.	1	CB1020
21	Castor Assy.	2	CB1021
22	OutRigger	2	CB1022
22a	Outrigger Bolt	6	CB1022A

PARTS LIST & DIAGRAM

Model CBT10



No.	Description	Qty	Part No.	No.	Description	Qty	Part No.
1	Main Beam	1	CBT1001	17b	Anchor Post Lower Bracket	1	CBT1017B
2	Tilting Support	1	CBT1002	17c	Anchor Post Locating Pin	1	CBT1017C
3	Main Beam Locating Pin	1	CBT1003	17d	Locating Pin Clip	2	CBT1017D
4	Circlip	3	CBT1004	17e	Plate Spring	1	CBT1017E
5	Locking Pin	1	CBT1005	18	Stop Block	1	CBT1018
6	Mast	1	CBT1006	19	Pin	2	CBT1019
7	Bolt 3/4" x 7"	1	CBT1007	20	Support Stand	2	CBT1020
8	Spring Washer	1	CBT1008	21	Cross Tube	1	CBT1021
9	Nut 3/4"	1	CBT1009	22	Underbody Support Clamps	2	CBT1022
10	Mast Locking Pin	1	CBT1010	23	Pull Clamps	2	CBT1023
11	'R' Clip	3	CBT1011	24	Pull Ring	2	CBT1024
12	Lower Ram Bracket	1	CBT1012	25	6ft x 3/8" Chain	2	CBT1025
13	Lower Ram Bracket Pin	1	CBT1013	26	3/8" Hook	2	CBT1026
14	10 Ton Ram	1	CBT1014	27	10 Ton Hydraulic Pump	1	CBT1027
14a	Ram End (Female)	1	CBT1014A	28	Fixed Wheel Assy	1	CBT1028
14b	Ram End (Male)	1	CBT1014B	29	Outrigger Castor Assy	2	CBT1029
15	Pin	2	CBT1015	30	Outrigger	2	CBT1030
16	Circlip	2	CBT1016	31	Outrigger Bolt	6	CBT1031
17a	Anchor Post Upper Bracket	1	CBT1017A				