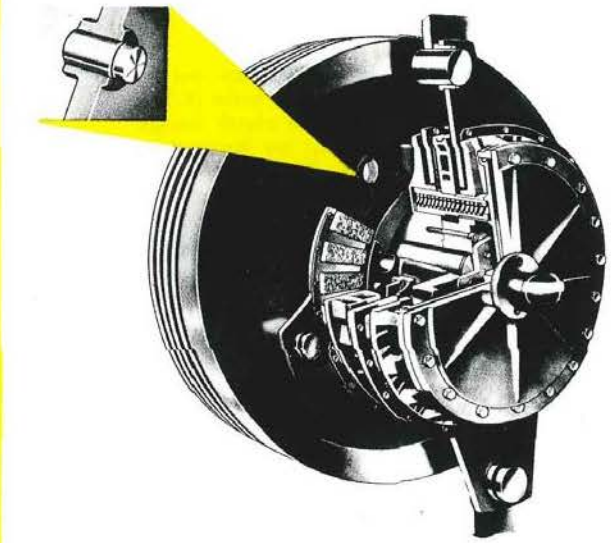
"CKU" SINGLE DISC FRICTION CLUTCH



SERVICE MANUAL A-136-F

BLISS E.W. Bliss Company
"Since 1857"

1004 E. STATE ST., HASTINGS, MICHIGAN 49058 • (616) 948-3300

BLISS TYPE "CKU" SINGLE DISC CLUTCH

The Bliss "CKU" clutch is a combination pneumatic friction clutch and spring-loaded disc brake. Compressed air is used to engage the clutch. When the air pressure is released, the springs set the brake.

OPERATION

The unit consists of two friction discs, one for the clutch (K-24), and one for the brake (K-17), Figures 1 and 2. Brake and clutch linings (K-5) and (K-7), respectively, are fastened on each side of these discs. (K-5) and (K-7) are furnished as assemblies. Other major parts consist of one driving disc (K-38), eight driving pins (K-45), two clutch friction disc pins (K-30), two brake friction disc pins (K-11), eight clutch springs (K-8), piston (K-9) with one packing (K-3), clutch body (K-1), air cylinder (K-46), clutch cylinder head (K-25), and the brake bracket (165A and 165B).

The clutch friction disc revolves with the flywheel while the brake friction disc is stationary. The clutch friction disc is held to the flywheel by clutch friction disc pins (K-30). The brake friction disc is held to the brake brackets by the brake friction disc pins (K-11). Both clutch and brake friction discs float on their respective pins. The clutch friction disc is guided on the pins by disc bushings (K-23), and the brake friction disc by disc bushings (K-16).

The clutch and brake friction discs are separated by the driving disc (K-38) which rotates with the crankshaft, the clutch body (K-1), and the air cylinder (K-46). The driving disc is moved by air pressure to engage the clutch, and by spring pressure to set the brake.

NO ADJUSTMENT FOR WEAR IS REQUIRED

To engage the clutch, compressed air enters the air cylinder (K-46) through the swivel shaft (AS-1). As pressure moves piston (K-9), it compresses springs (K-8), moving the clutch driving disc (K-38) away from the brake disc (K-17) toward the clutch disc (K-24). This action forces the rotating clutch friction disc (K-24) between the driving disc (K-38) and the clutch body (K-1). As a result, the crankshaft starts rotating and transfers flywheel energy to the crankshaft. Air pressure must then be maintained to the air cylinder (K-46) during the operation of the press.

When air pressure is released, the brake springs move the driving disc away from the clutch disc and toward the brake disc. This grips the motionless brake disc, disengaging the clutch and creating the friction necessary to stop the crankshaft.

An air pressure failure will disengage the clutch and automatically set the brake.

NOTE: See Page 7, Figure 4 for clutch lining replacement.

BLISS TYPE "CKU" SINGLE DISC CLUTCH

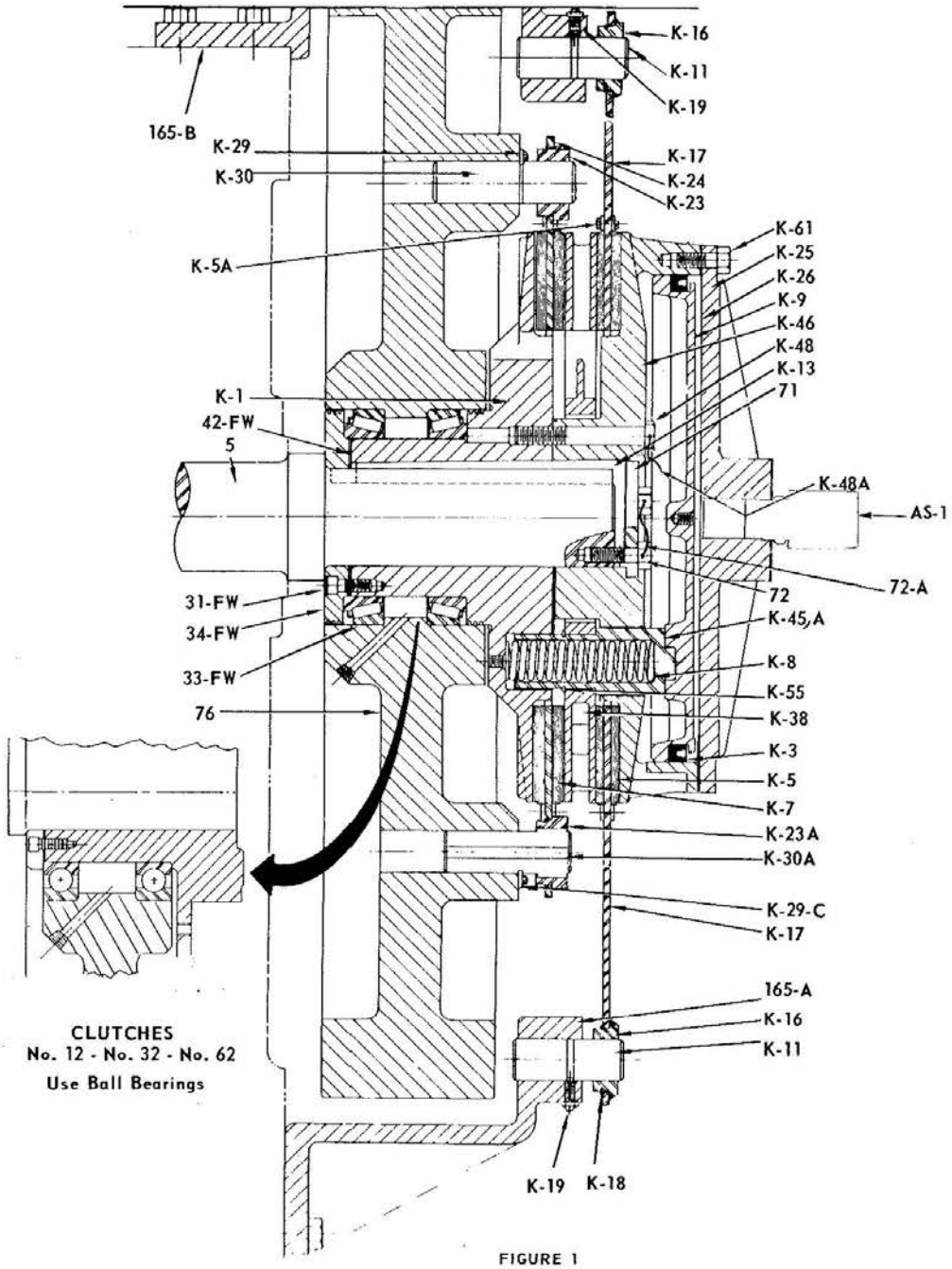


FIGURE 1

BLISS TYPE "CKU" DOUBLE DISC CLUTCH

MULTIPLE DISC CLUTCH

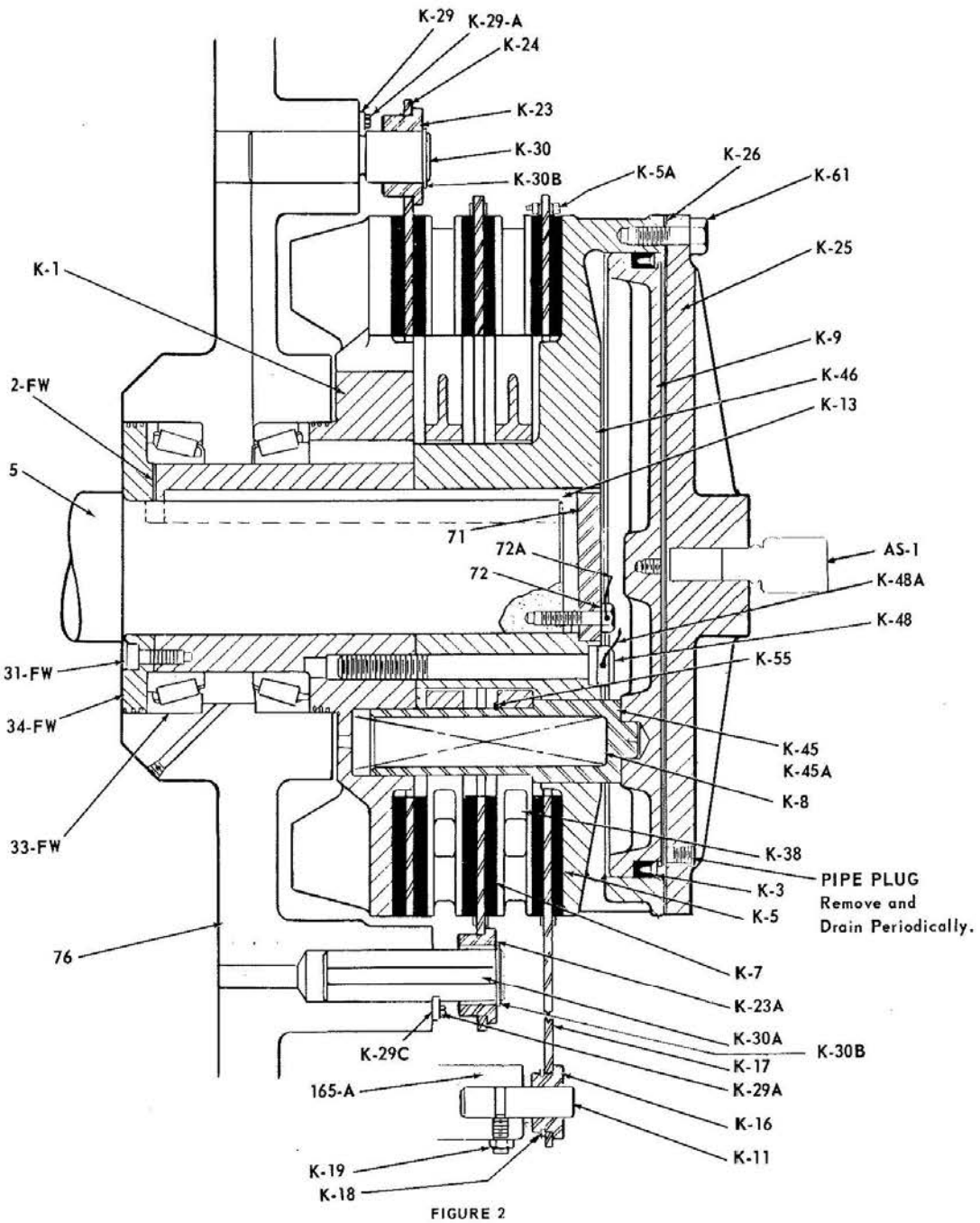


FIGURE 2

BLISS TYPE "CKU" SINGLE DISC CLUTCH

PARTS LIST

76	Flywheel
K-1	Clutch body
K-3	Piston packing, large
K-5	Brake lining, 1 inner, 1 outer
K-5A	Brake lining, bolt & locknut
K-7	Clutch lining, 1 inner, 1 outer
K-8	Brake spring
K-9	Piston
K-11	Brake friction disc pin
K-13	Clutch and shaft key
K-16	Brake friction disc bushing
K-17	Brake friction disc
K-18	Snap ringtion disc pin retainer screw
K-19	Brake friction disc pin retainer screw
K-23	Clutch friction disc bushing
K-23A	Clutch friction disc bushing with flats
K-24	Clutch friction disc
K-25	Clutch cylinder head
K-26	Clutch cylinder head gasket
K-29	Locking plate – (half circle)
K-29C	Locking plate – (rectangular)
K-30B	Snap ring
K-29A	Retainer screws
K-29B	Retainer wire
K-30	Clutch friction disc pin
K-30A	Clutch friction disc pin with flats
K-38	Driving disc
K-45	Driving pin-plain
K-45A	Driving pin-w/lug
K-46	Air cylinder
K-48	Clutch body screws
K-48A	Locking wire
K-55	Outer retaining ring (snap ring)
K-61	Clutch cylinder cover screws
31-FW	Flywheel bearing retainer screw
33-FW	Flywheel bearing
34-FW	Flywheel bearing retainer
42-FW	Flywheel bearing adjusting shims
AS-1	Air swivel assembly
165-A	Brake bracket (lower)
165-B	Brake bracket (upper)
71	End Plate
72	Cap screw
72A	Locking wire

When ordering spare parts or replacements, give the PRESS NUMBER, the SERIAL NUMBER, the NUMBER and NAME of the part wanted, and the PAGE NUMBER of this service manual.

On clutch sizes #12, #32 and #62 ball bearings are used. On clutch sizes #122 and #252 and up roller bearings are used.

WARNING: If it is necessary to disassemble clutch, remove two (K-48) clutch body screws and add two longer screws or studs. This is to prevent cylinder (K-46) from coming off shaft as spring (K-8) has tendency to separate cylinder and clutch body.

INSTRUCTIONS FOR REMOVING THE FLYWHEEL AND CLUTCH ASSEMBLY FROM THE CRANKSHAFT

1. Disconnect hose from AS-1 swivel.
2. Remove K-61 cap screws which will allow K-25 cylinder head to be removed. Be careful not to destroy K-26 gasket.
3. Remove K-9 piston.
4. Remove 72A and 72 cap screws and wire.
5. Remove 71 end plate.
6. Remove K-13 tapered key by use of jack screw and pry bar. Bottom jack screw before using pry bar.

BLISS TYPE "CKU" SINGLE DISC CLUTCH

Air service must be provided to operate the clutch. A single air line inlet is usually provided on the press, to which the shop air line must be connected. Piping is arranged so that all compressed air passes through a common filter or separator. Branch lines leave the outlet side of the filter to the clutch and other air devices, when furnished. An air pressure regulator in each branch line maintains proper operating pressure for these devices. See Figure 3.

Recommended maximum operating air pressure is 70 P.S.I.

Actual requirement for each press is shown on an instruction plate attached to press frame, Figure A.

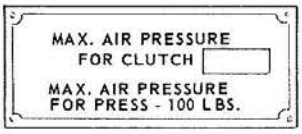


FIGURE A

An air line lubricator is provided in the branch line to the clutch, and is installed between the clutch pressure regulator and clutch operating valve. The lubricator should be adjusted to a fine mist on every clutch engagement. Use a high grade straight mineral lubricating oil with a viscosity of 145-165 SSU @ 100° F. SAE No. 10.

An air tank is required in the clutch line to reduce the pressure drop at each clutch engagement.

The air line filter bowl must be drained regularly for effective performance. There is a "drain cock" at lower end of bowl for this purpose. Never permit moisture to fill bowl above baffle or up to filter element, otherwise, collected moisture and emulsion may be carried into the air line.

Note that the air tank is also provided with drain cock to remove accumulated moisture.

– WARNING –

Moisture in the air carried to the clutch will create rust and stickiness of the piston in the cylinder that can result in a dangerous condition in the clutch and valve. Moisture must be kept out of the air lines.

An air swivel and hose provide a flexible connection between the clutch operating valve and the crank shaft.

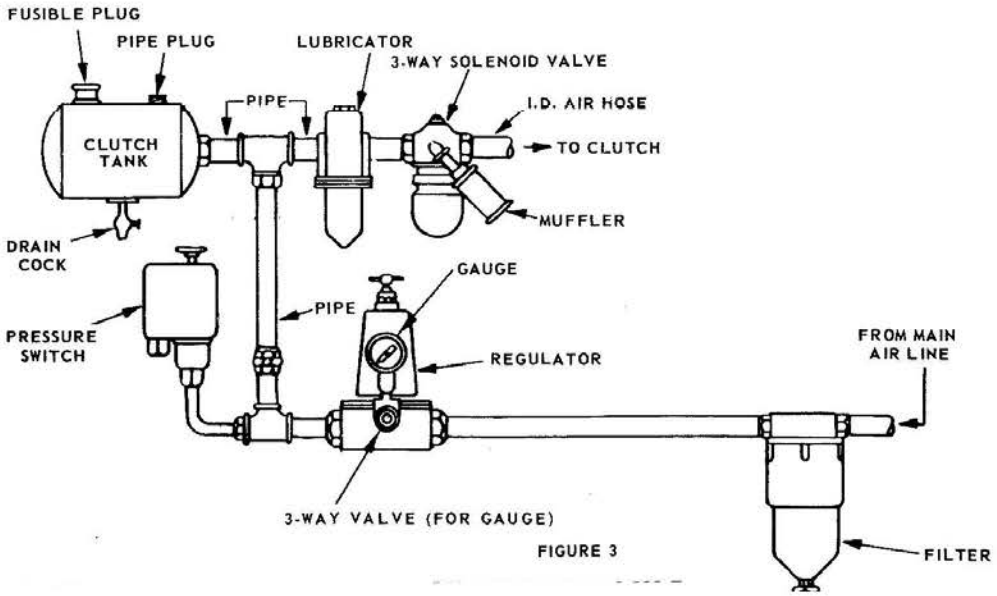


FIGURE 3

BLISS TYPE "CKU" SINGLE DISC CLUTCH

(Furnished in one unit friction block & plate assembly)

K-5A	Brake lining plate bolt and nut
K-7A	Clutch lining plate nut and bolt
K-5	Brake lining– 1 inner, 1 outer
K-7	Clutch lining– 1 inner, 1 outer
K-23	Clutch friction disc bushing
K-16	Brake friction disc bushing
K-11	Brake friction disc pin
K-30	Clutch friction disc pin
K-24	Clutch friction disc
K-17	Brake friction disc

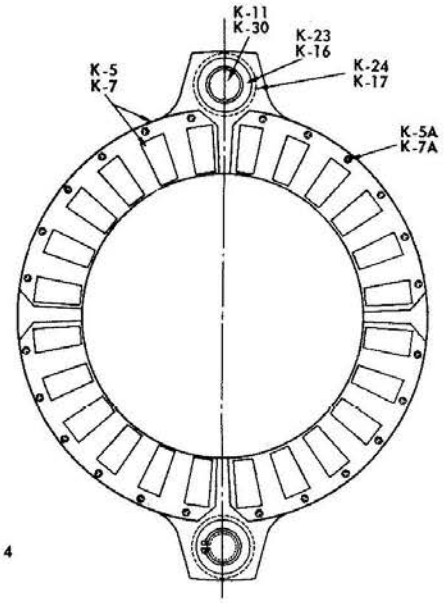


FIGURE 4

CLUTCH LINING REPLACEMENT

The clutch and brake require no adjustment during the life of the friction blocks, except as noted below, as the movement of the air piston increases to compensate for the wear. The replacement of the clutch and brake linings can be made without dismantling the clutch. The clutch friction block assemblies are made in quadrants requiring four per friction face or or eight for each friction disc. See Figure 4.

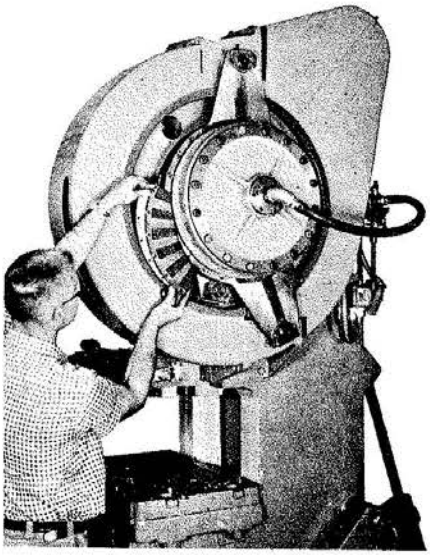


FIGURE 5

This illustration indicates the ease with which the clutch friction plates can be replaced. This is accomplished without disassembling the clutch and with a minimum of down time.

The lining assemblies can be removed by, first, removing the bolts and nuts (K-7A) and then withdrawing the friction lining assemblies. New lining assemblies can be installed by reversing this procedure.

BRAKE LINING REPLACEMENT

This is the same as mentioned above for the clutch except that air pressure must first be applied to release the brake disc.

Be sure stroke is down when changing linings.

NOTE:

When Brake lining and its backing plate measure approximately .330", replace it with new linings and backing plate. On the clutch lining, the above procedure can be used when the lining and its backing plate wear 1/32".

BLISS CLUTCH WITH UNSTICKER

PROCEDURE FOR USING THE "BUMPER" ON THE CLUTCH

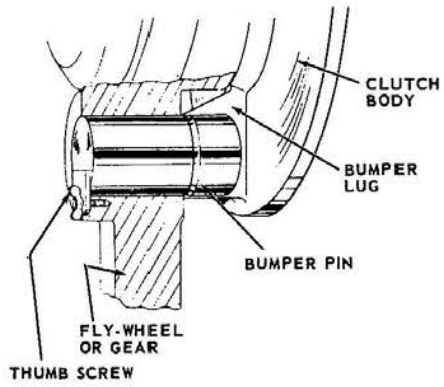


Figure 1

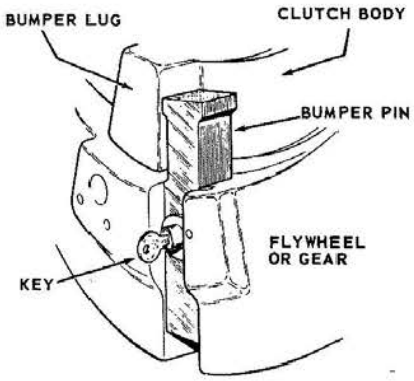


Figure 2

The Bliss unsticker is an impact device using a special bumper pin locked in the flywheel or gear as an interference between the clutch body and the flywheel or gear. When not in use the bumper pin is stored in a receptacle on the electric control enclosure.

To insure maximum safety and efficiency when unsticking a press, follow the procedure exactly as outlined below.

1. Stop Motor — Depress motor stop button, dropping out motor starter thereby signalling the motor and flywheel to stop. WARNING: Be sure both motor and flywheel have come to a complete stop before proceeding further.

2. Turn Bumper Selector Switch To "Bumper On". Do not remove bumper pin from control panel at this time.

3. Remove Cover Over Clutch Guard Utility Opening. (For Figure 2 only.)
Remove Front Cover of "C" Press. (For Figure 1 only.)

4. Rotate The Flywheel. Using a spring-loaded bar in the holes in the rim of the flywheel, rotate the flywheel so that the bumper pin space or hole in the flywheel or gear can be seen and/or reached.

NOTE: LEAVE PRESS SELECTOR SWITCH IN "RUN" POSITION.

5. Remove Bumper Pin. Remove bumper pin from receptacle on control enclosure and insert it into the bumper pin space or hole in the flywheel or gear mounted on the crankshaft and secure it. A thumb screw is provided for this purpose on the round pin, while the rectangular pin has a key lock.

CAUTION– The special bumper pin is designed for unsticking. Do not use any other material or device in lieu of the special bumper pin supplied with your press.

6. Determine Desired Rotation. If the slide is stuck before bottom dead center (BDC), arrange to rotate the crankshaft in a direction opposite to the normal shaft rotation. The bumping action will then cause the slide to move up and away from the die rather than down and into it.

   If the slide is stuck at or a little after BDC, the crankshaft can be bumped to rotate in its normal direction.

7. Select Proper Rotation. If the press is arranged with a reversing starter, set the selector switch to "forward" or "reverse" as required.

   If the press is arranged with a non-reversing starter and a reverse direction is desired to unstick the press, it will be necessary to interchange any two of the three motor leads so that the motor rotation will be reversed.

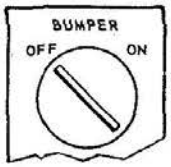
8. Back Up Bumper Pin. Manually rotate the flywheel in the direction opposite to the direction required to unstick the press until the bumper pin is in contact with the lug on the clutch hub that is opposite to the one that is to be bumped. There are two lugs on the clutch body so that only 180 degrees rotation of the flywheel or gear can be made to unstick the press.

9. Start Motor. Depress motor "start" button momentarily. This action will cause the motor and flywheel to rotate and they will rotate only as long as the "Start" button is held depressed. Releasing the "Start" button will drop out the motor starter. It is not necessary to depress the motor "Stop" button. Hold the "Start" button depressed only long enough to have the pin bump the clutch lug.

   If the slide does not come unstuck after one blow, it may be necessary to repeat this action. Back up the rotating member until the bumper pin is in contact with one of the lugs and then depress motor start button again.

   CAUTION– Immediately after bumping occurs, be sure to release the motor start button.

10. Turn Selector Switch to "Bumper Off"– After the slide is unstuck, turn the "bumper off-on" selector switch to the "off" position.



11. Remove Bumper Pin– Rotate the flywheel with a bar until the bumper pin can be reached. Remove the bumper pin from the rotating element of the press.

    Do not replace Bumper Pin in the receptacle until motor starter has been checked out.

    Be sure to replace cover on press or on guard.

12. Check Motor Starter. If press is arranged with a reversing starter, check to see that the selector switch has been set to "forward"

    If a non-reversing starter was in use and the rotation had been reversed for the unsticking operation by changing motor leads, make sure that the leads are returned to their original positions.

13. Restore Bumper Pin. Replace bumper pin in the receptacle on the press control panel.

    With the pin back in the receptacle, the motor starter can now be actuated to put the press back into operation.

This size model clutch....	Generally fits on this model Bliss press...	And generally this type of press uses flywheel type or single gear type.
12-CKU	C-22, 19-1/2-B	Flywheel Type
32-CKU	C-35, 20-B,21	Flywheel Type
62-CKU	C-35, 20-B, 21 C-45, C-60, 21-S, 21-B, 21-1/2, 21-1/2-B	Single Gear Type Flywheel Type
122-CKU	C-45, C-60, 21-S, 21-B, 21-1/2, 21-1/2-B C-75, 23	Single Gear Type Flywheel Type
222-CKU	C-75, 23 28, 28-1/2	Single Gear Type Flywheel Type
252-CKU	C-75, 23 C-110, 28, 28-1/2, C-150	Single Gear Type Flywheel Type
372-CKU	C-110, 28, 28-1/2	Single Gear Type
422-CKU	C-110, 28, 28-1/2	Single Gear Type
442-CKU	28-1/2	Single Gear Type
552-CKU	C-150, C-200-(thru 6" stroke)	Single Gear Type
922-CKU	C-200, (8" stroke) C-250-(8" thru 12" stroke)	Single Gear Type