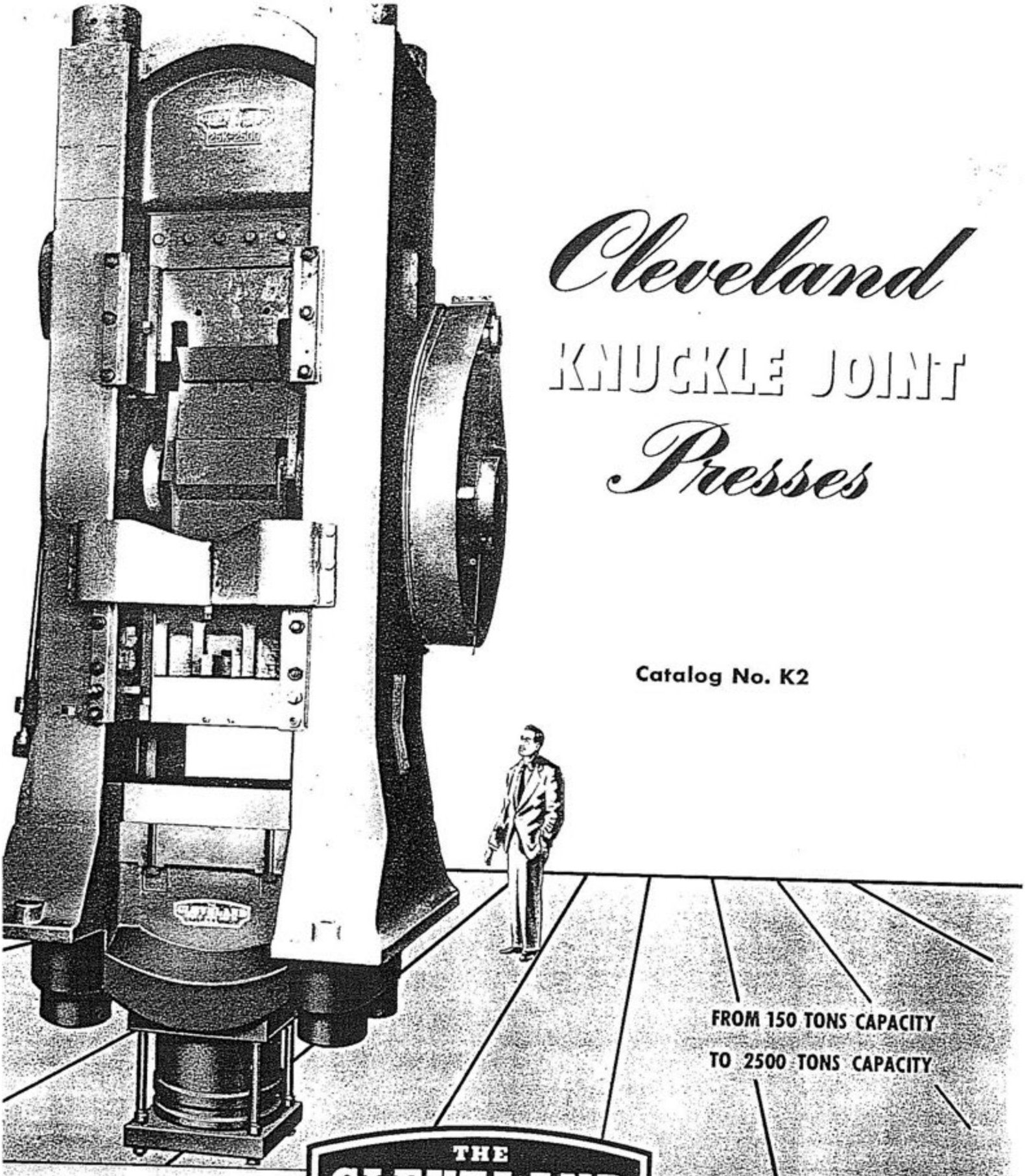


Cleveland

KNUCKLE JOINT

Presses

Catalog No. K2

FROM 150 TONS CAPACITY

TO 2500 TONS CAPACITY

THE
CLEVELAND
PUNCH & SHEAR WORKS CO.
U.S.A.

Established 1880

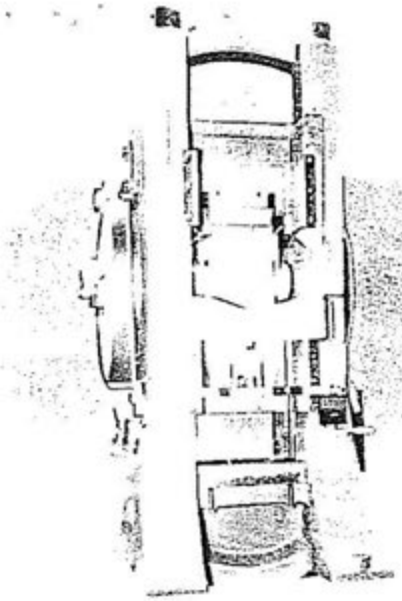
UNCHING TOOLS & DIES

FABRICATING TOOLS

POWER PRESSES

OFFICES AT:
EW YORK...CHICAGO
ETROIT...PHILADELPHIA
E. LANSING

CLEVELAND 14, OHIO



Introduction

CLEVELAND Knuckle Joint Presses are adapted for a great variety of operations in the field of embossing, coining, sizing, heavy stamping, extruding and heading. They are ruggedly and accurately constructed throughout and embody all of the latest and best features which our wide experience has shown to be essential to economical production and low upkeep.

Two of the outstanding features of CLEVELAND design are, the long bearing surfaces for the slide and the massing of material at points of greatest stress. These two features contribute greatly to the accuracy with which parts are produced on these Presses by insuring ample bearing surface even when the slide is at the extreme end of its stroke and by reducing the spring or deflection on the frame when the Press is taking its maximum load.

This type of Press exerts a short but extremely powerful squeeze on the metal through massive and carefully fitted knuckles.

On all sizes, the load is carried directly on four massive tie rods and this construction relieves the tension load on the side members; consequently, the dies are guided with greater accuracy.

Adjustment to the slide is accomplished by means of a taper wedge which runs from right to left giving maximum support to the entire knuckle. On the smaller sizes of Presses, a hand wheel is provided for making this adjustment while on the larger Presses a ratchet lever, conveniently located at the side of the Press, is employed.

CLEVELAND Knuckle Joint Presses can be furnished in a wide range of standard sizes as shown in table on page 7.

General Data

CLEVELAND Knuckle Joint Presses embody all of the latest and best ideas in Power Press construction. All sizes are made from high strength semi-steel. In designing CLEVELAND Presses, the proper distribution of metal has been given careful consideration and ample safety factors have been used to provide for all stresses and shocks to which these Presses are subjected, and to assure maximum rigidity and minimum deflection under the rated capacity.

BODIES OR PRESS FRAMES

All sizes are of the four piece type of construction which consists of a crown, a bed and two uprights, all rigidly held together by four massive steel tie-rods shrunk into place. Opposing keys keep the frame in alignment under maximum load.

KNUCKLE

The Knuckle links are of heavy construction and maximum width using large diameter knuckle pins in order to lower bearing pressures. The links are held in assembly by heavy side plates and are operated from crankshaft by heavy casting connection with liberal bearing surface.

KNUCKLE PIN LUBRICATION

Oil is forced into two points on the top side of the upper and middle knuckle pins, and runs by gravity through traps which control the oil level, and is caught in a reservoir in the slide. This reservoir has an overflow level control so that the lower pin runs in oil. The overflow oil from the slide returns to a sump in the bed of the Press and is repumped to the pins.

SHAFTS

Hammered steel forgings are used on all sizes of CLEVELAND Knuckle Point Presses, with bearings accurately and carefully fitted.

BEARINGS

All gibs are extra long and are carefully fitted to provide smooth operation. The connection and main frame bearings are bronze bushed. The geared presses are equipped with anti-friction bearings on the drive shaft.

MAIN GEAR

Gears on the smaller sizes of CLEVELAND Knuckle Joint Presses are high grade semi-steel with cut teeth. On the larger sizes, they are steel. Main pinions on all sizes are forged steel.

GUARDS

Periphery of the gears is guarded but, when desired, totally enclosed guards can be furnished. Furthermore, we can also furnish these Presses with totally enclosed gears running in oil.

SLIDES

Special attention is directed to the long bearing surfaces for the sliding head which insure accurate guidance and longer life to the dies. The gibs are oil grooved for thorough lubrication and provision is made for take-up on the gibs.

A slide with a dovetail, or a stem hole, will be supplied on special order, if desired.

ADJUSTMENT WEDGE

Adjustment to the slide is accomplished by means of a taper wedge which runs from right to left giving maximum support to the entire knuckle.

CLUTCHES

The CLEVELAND Pin Type Clutch, which is powerful yet simple in construction, is usually furnished with the smaller sizes. The larger Presses are equipped with either a Jaw Clutch, which is simple, durable, non-hammering, and absolutely safe in its operation, or with an electrically controlled CLEVELAND (patented) Drum Type friction Clutch with spring loaded brake which provides instantaneous starts and stops, continuous close control and proven troublefree operation.

POSITIVE STOPS

Presses equipped with Pin Type or Jaw Type Clutches can be arranged with a single-trip device to prevent a second stroke on the slide until the treadle or the electrical control, as the case may be, has been released and again depressed. Presses which are equipped with an air friction Clutch, can be operated continuously or intermittently as desired, through electrical controls.

FLYWHEEL

Flywheel type non-geared Presses arranged with pin or jaw Clutch are provided with extra long shaft bearings equipped with bronze bushings having ample provision for lubrication.

The flywheel bearing on non-geared Presses is also bronze bushed but, when desired, anti-friction bearings can be furnished.

The shafts on Geared type Presses are bronze bushed and the flywheel bearings are anti-friction.

BRAKE

The Brake used on all CLEVELAND Clutches is an improved type of extra large diameter and width, assuring ample friction surface to stop the slide at the top of its stroke.

With the Pin and Jaw Clutches, it is standard practice to provide a Brake which is constantly applied. However, when desired, we can furnish a Brake which is released when the Clutch is engaged.

On the Air Friction Clutches, the Brake is always released when the Clutch is engaged.

POSITIVE KNOCKOUTS

Provision is made for adjustable knockout on all CLEVELAND Knuckle Joint Presses. These knockouts are operated by positive stops with screw adjustment and are illustrated by photograph of the 25K on page 15 of this folder.

BOLSTER PLATES

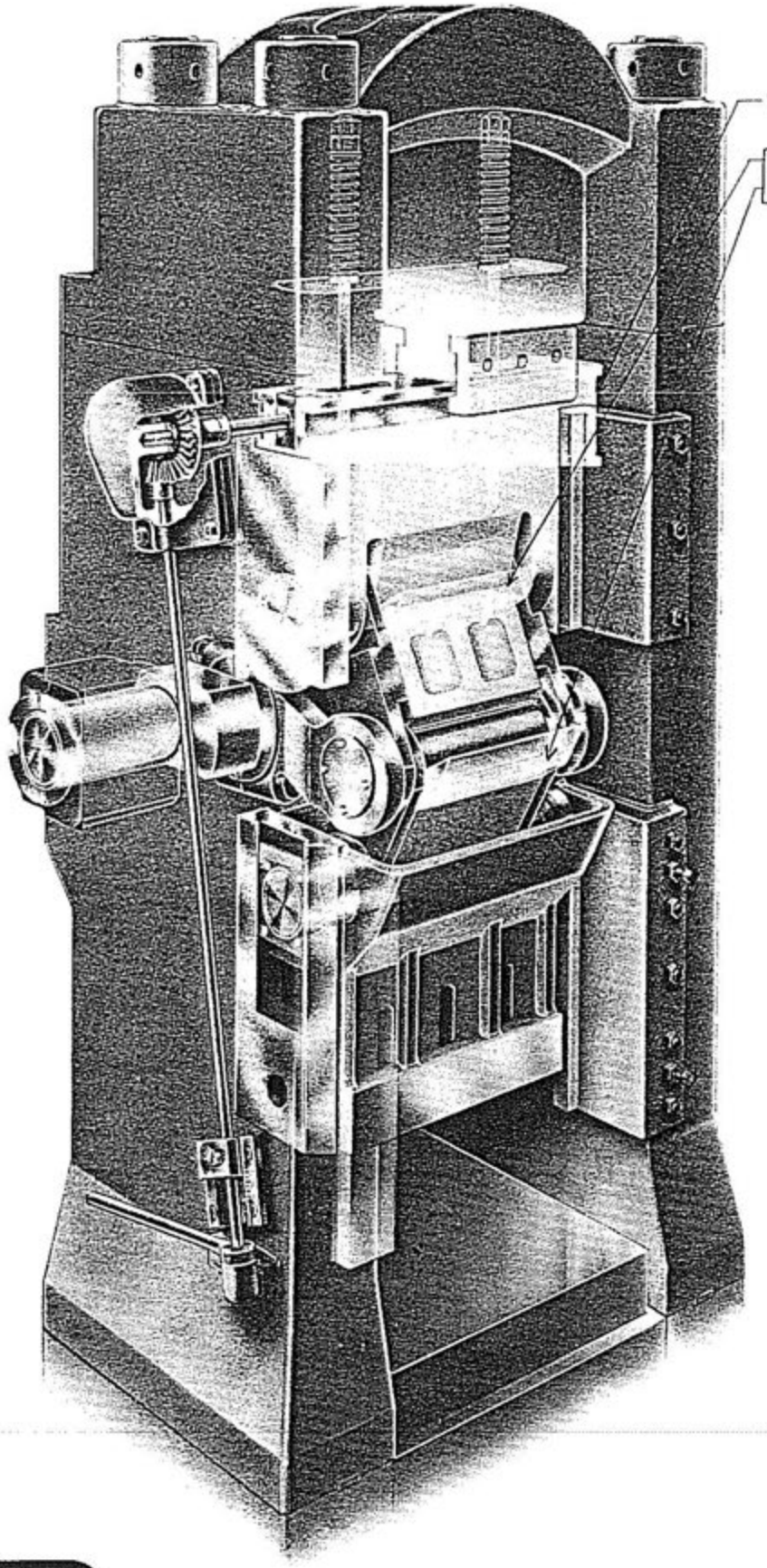
A plain bolster is part of the standard equipment and this may be furnished either solid or with an opening, as desired.

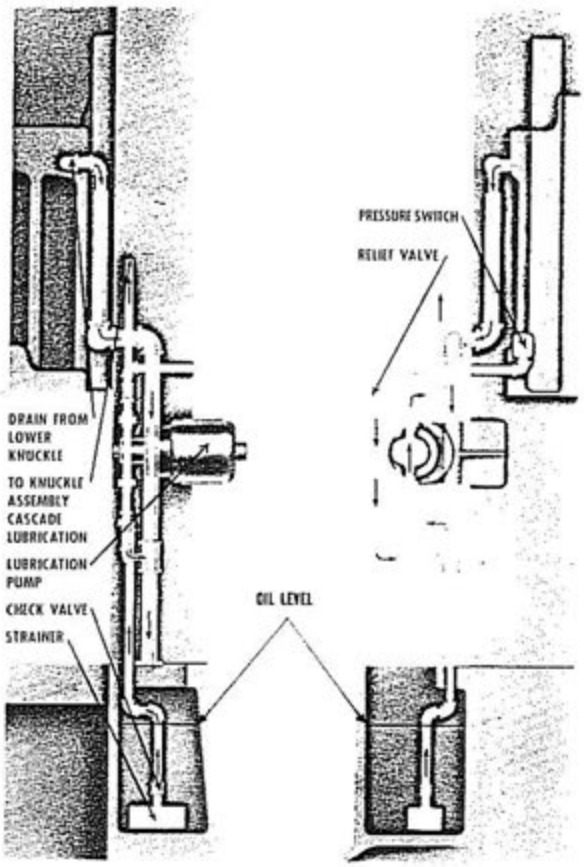
LUBRICATION

All bearings and moving parts are provided with ample taps for lubrication. Knuckle pins are lubricated by a continuously operating pumped oiling system. Other bearings are lubricated individually or by the installation of a centralized lubrication system.

CUSHIONS

The beds of CLEVELAND Knuckle Joint Presses can be arranged to receive CLEVELAND pneumatic Cushions.





KNUCKLE ASSEMBLY LUBRICATION SYSTEM

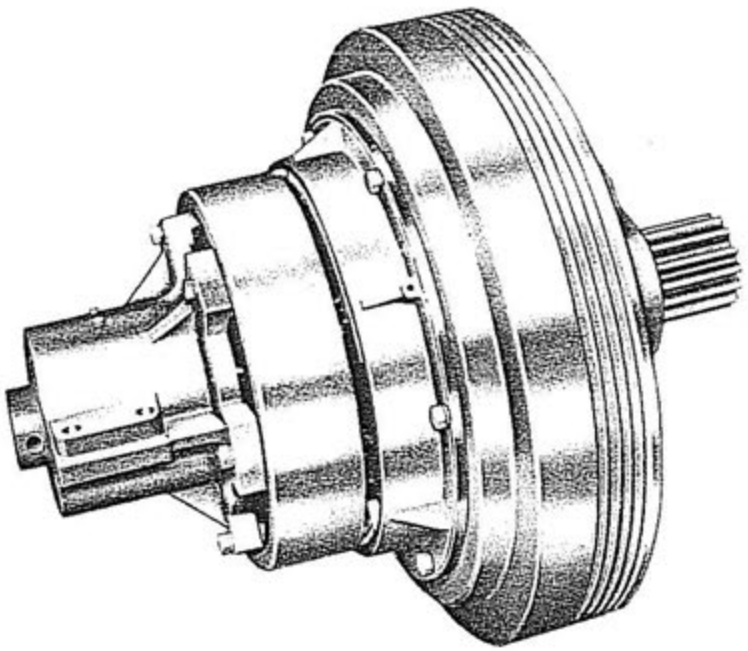
Phantom view of CLEVELAND Knuckle Joint Press illustrating slide adjustment and lubrication system.

Adjustment of the slide is accomplished by means of a taper wedge which runs from right to left, giving maximum support to the entire knuckle.

Specifications ON CLEVELAND KNUCKLE JOINT PRESSES . . . . . .

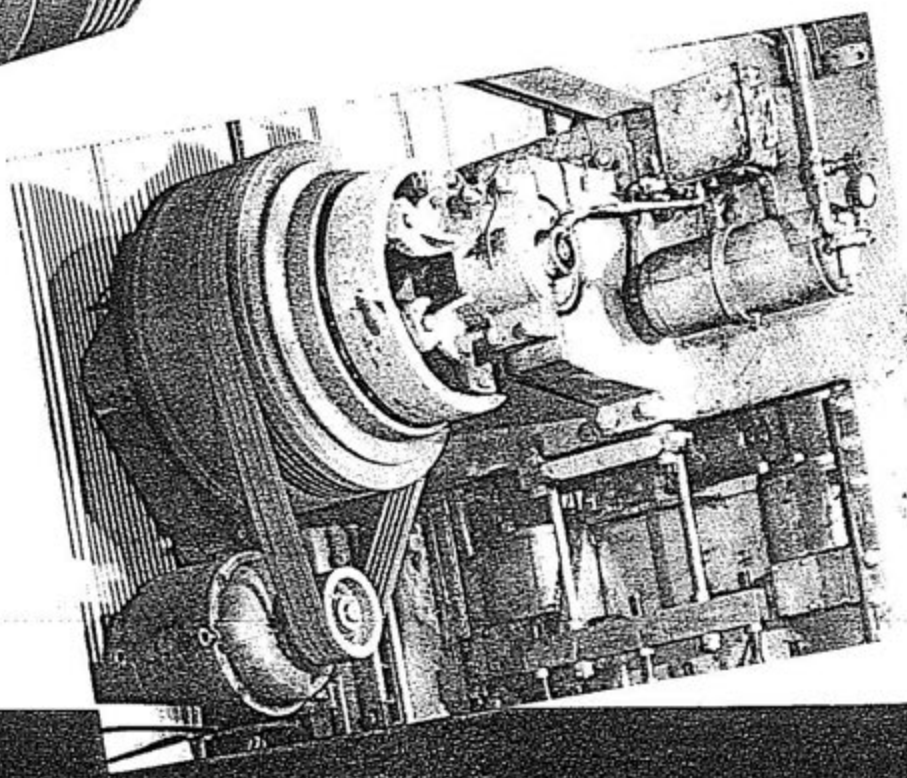
NUMBER OF PRESS	1½ K	2½ K	4 K		6 K	8 K	10 K	12 K	15 K	20 K	25 K
			A	B							
Capacity (tons)	150	250	400	400	600	800	1000	1200	1500	2000	2500
Diameters of Crankshaft at Bearings & Pin (inches)	4 - 5	4½ - 5¾	5 - 7	5 - 7	6 - 8	7 - 9	8 - 10	9 - 11	10 - 12¼	11½ - 14	12½-15½
Standard Stroke (inches)	2	2	3	5	5	6	8	10	12	12	12
Adjustment of Slide (inches)	½	½	½	½	½	½	½	½	½	½	½
Distance Bed to Slide Stroke Down—Adj. up (inches)	9	11	14	17	17	20	26	26	34	34	34
Distance between Uprights—To clear (inches)	18	20	20	30	36	40	42	42	52	52	54
Area of Slide Face F to B X R to L (inches)	12 x 14	12 x 15	21 x 15	21 x 25	24 x 28	28 x 33	28 x 34	28 x 33	30 x 42	30 x 40	30 x 42
Area of Bed F to B X R to L (inches)	18 x 18	20 x 20	30 x 20	30 x 30	36 x 36	36 x 40	40 x 42	40 x 42	42 x 52	46 x 52	50 x 54
Thickness of Bolster (inches)	3	3½	4	4	4½	5	6	7	8	9	10
Opening in Bed (Dia. inches)	2	3	6	6	7	9	10	11	12	14	16
Strokes per Minute	45	40	50	30	25	22	20	20	18	16	14
Motor Size & Speed (HP-RPM)	5-1800	7½-1800	15-1800	15-1200	20-1200	25-1800	40-1800	40-1800	50-1800	75-1200	75-1200
Floor Space of Legs F to B X R to L (inches)	48 x 39	53 x 44	60 x 48	60 x 58	78 x 68	78 x 76	97 x 87	101 x 89	113 x 104	126 x 110	140 x 118
Floor Space Overall (inches)	60 x 47	69 x 52	72 x 54	74 x 65	100 x 76	91 x 87	134 x 96	118 x 101	151 x 117	170 x 127	158 x 142
Height Overall from Floor (inches)	118	143	140	167	178	188	220	235	242	263	300
Weight of Press (approx.) (lbs.)	13,000	20,000	26,500	35,000	55,000	83,000	110,000	139,000	185,000	250,000	370,000

Cleveland (patented) DRUM TYPE AIR WITH SPRING

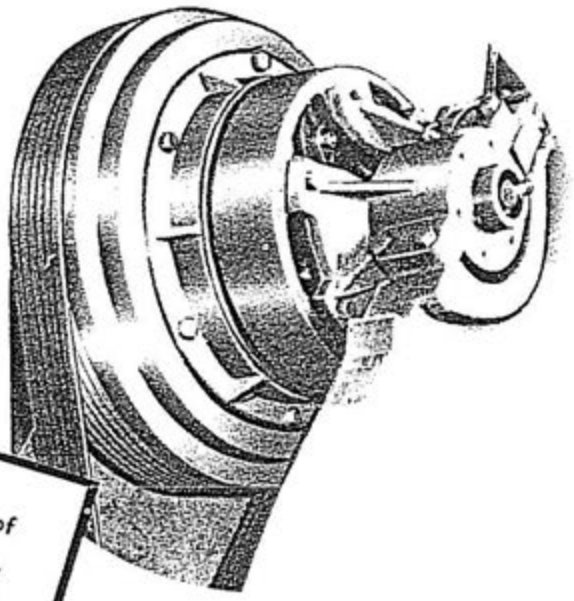


11 OUTSTANDING DESIGN ADVANTAGES

- Clutch and Brake cannot engage simultaneously . . . always FULL Clutch or FULL Brake.
- Simplified maintenance . . . less down-time for there is a minimum number of parts.
- Less power is required for clutch operation due to lightweight construction.
- Drum type design assures quicker starts and stops.
- Longer friction life is assured . . . as all idle friction surfaces are completely disengaged eliminating drag, unnecessary wear and destructive heat.
- Clutch and Brake adjustments are easily made.
- Entire unit can be serviced without removal from press.
- Air cylinders provide maximum performance with minimum amount of air.
- Spring-loaded Brake brings slide to immediate stop in event of current or air supply failure.
- Clutch temperature remains relatively cool—no wear from excessive heating.
- So designed that it can be installed on most CLEVELAND presses, new or old.



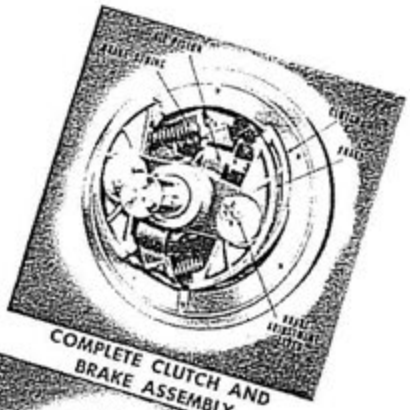
FRICTION CLUTCH LOADED BRAKE



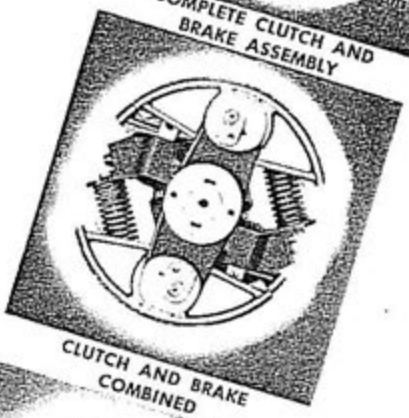
CLEVELAND engineers, after years of study, research and experimentation, designed the radically new, combined Drum Type Friction Clutch and Brake. Featuring positive, foolproof operation, this new unit revolutionizes press production. Instantaneous starts and stops, continuous close control, and proven troublefree operation, are now reality.

In exhaustive tests, this CLEVELAND Clutch has been subjected to extreme punishment—punishment far beyond anything that would ever be experienced in normal operation. Hundreds of these new CLEVELAND Clutches have already proven their value in actual operation. In every instance they have lived up to expectations.

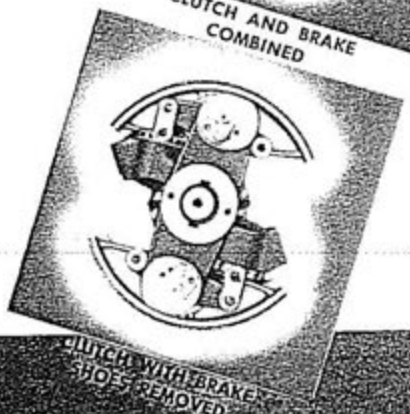
For more efficient press operation and uninterrupted production, investigate the many advantages of using CLEVELAND Presses equipped with the CLEVELAND Drum Type Friction Clutch. It can be installed on most CLEVELAND Presses new or old. Complete information is available upon request.



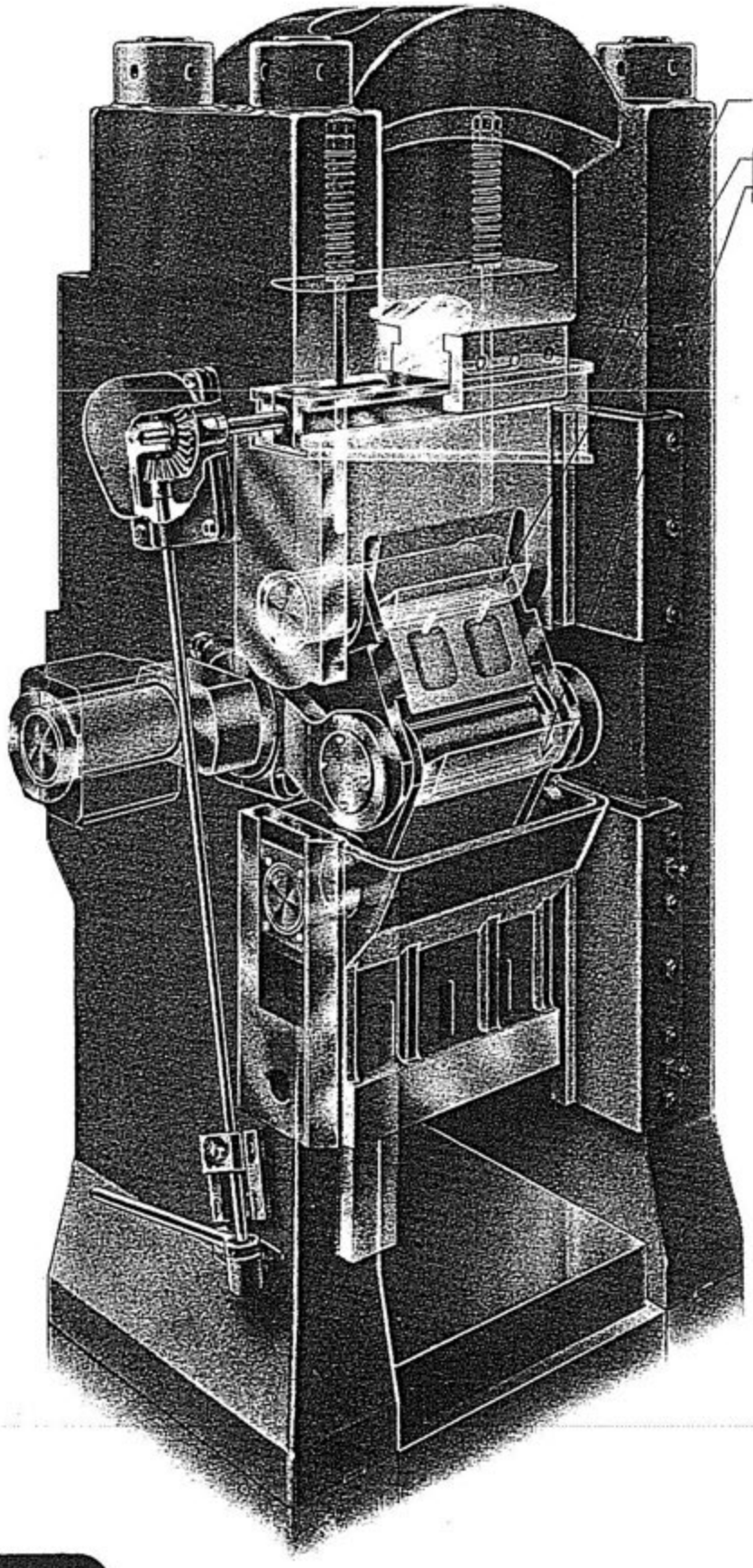
COMPLETE CLUTCH AND BRAKE ASSEMBLY

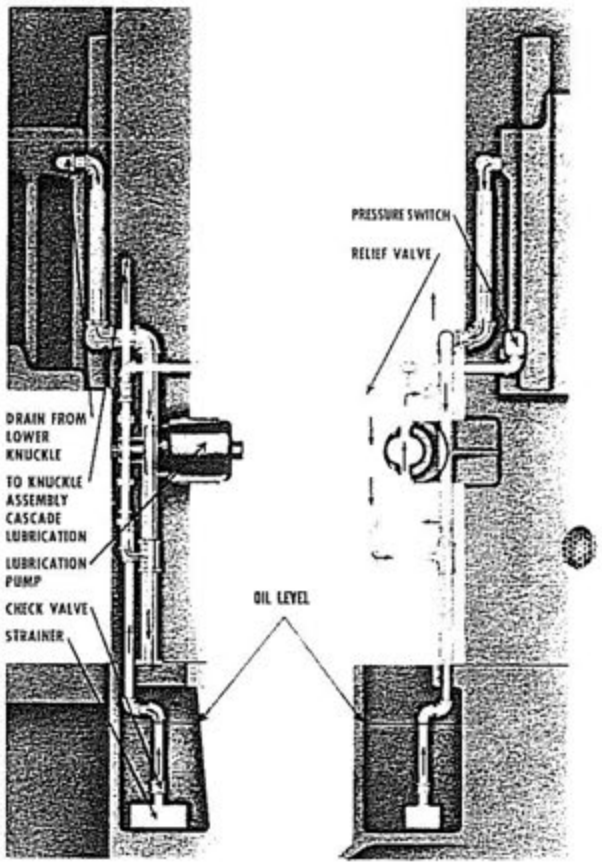


CLUTCH AND BRAKE COMBINED



CLUTCH WITH BRAKE SHOES REMOVED





KNUCKLE ASSEMBLY LUBRICATION SYSTEM

Phantom view of CLEVELAND Knuckle Joint Press illustrating slide adjustment and lubrication system.

Adjustment of the slide is accomplished by means of a taper wedge which runs from right to left, giving maximum support to the entire knuckle.

Specifications ON CLEVELAND KNUCKLE JOINT PRESSES

NUMBER OF PRESS	1½ K	2½ K	4 K		6 K	8 K	10 K	12 K	15 K	20 K	25 K
			A	B							
Capacity (tons)	150	250	400	400	600	800	1000	1200	1500	2000	2500
Diameters of Crankshaft at Bearings & Pin (inches)	4 - 5	4½ - 5¾	5 - 7	5 - 7	6 - 8	7 - 9	8 - 10	9 - 11	10 - 12¼	11½ - 14	12½-15½
Standard Stroke (inches)	2	2	3	5	5	6	8	10	12	12	12
Adjustment of Slide (inches)	½	½	½	½	½	½	½	½	½	½	½
Distance Bed to Slide Stroke Down—Adj. up (inches)	9	11	14	17	17	20	26	26	34	34	34
Distance between Uprights—To clear (inches)	18	20	20	30	36	40	42	42	52	52	54
Area of Slide Face F to B X R to L (inches)	12 x 14	12 x 15	21 x 15	21 x 25	24 x 28	28 x 33	28 x 34	28 x 33	30 x 42	30 x 40	30 x 42
Area of Bed F to B X R to L (inches)	18 x 18	20 x 20	30 x 20	30 x 30	36 x 36	36 x 40	40 x 42	40 x 42	42 x 52	46 x 52	50 x 54
Thickness of Bolster (inches)	3	3½	4	4	4½	5	6	7	8	9	10
Opening in Bed (Dia. inches)	2	3	6	6	7	9	10	11	12	14	16
Strokes per Minute	45	40	50	30	25	22	20	20	18	16	14
Motor Size & Speed (HP-RPM)	5-1800	7½-1800	15-1800	15-1200	20-1200	25-1800	40-1800	40-1800	50-1800	75-1200	75-1200
Floor Space of Legs F to B X R to L (inches)	48 x 39	53 x 44	60 x 48	60 x 58	78 x 68	78 x 76	97 x 87	101 x 89	113 x 104	126 x 110	140 x 118
Floor Space Overall (inches)	60 x 47	69 x 52	72 x 54	74 x 65	100 x 76	91 x 87	134 x 96	118 x 101	151 x 117	170 x 127	158 x 142
Height Overall from Floor (inches)	118	143	140	167	178	188	220	235	242	263	300
Weight of Press (approx.) (lbs.)	13,000	20,000	26,500	35,000	55,000	83,000	110,000	139,000	185,000	250,000	370,000