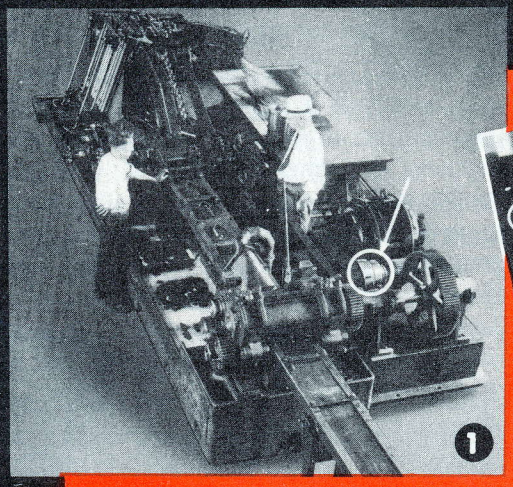
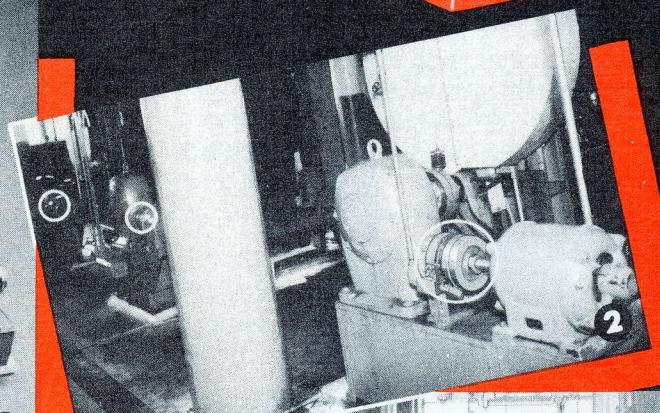
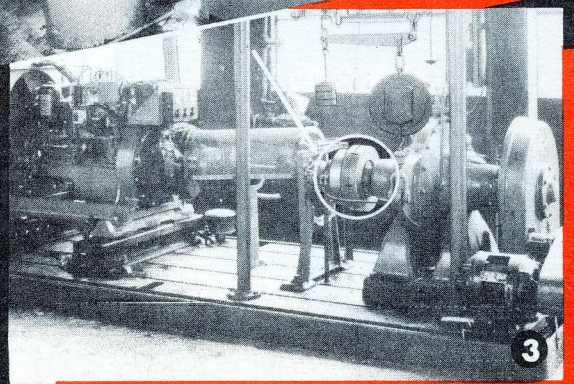
STEARNS

HIGH DUTY MAGNETIC CLUTCHES AND COMBINATION CLUTCH-BRAKES







(1) Stearns Magnetic clutch controlling operation of intricate lath making machine.

(2) Clutch-brake unit operates paper cup press.

(3) Controlling dynamometer.

STEARNS MAGNETIC MFG. CO.

MILWAUKEE, WIS., U. S. A.

LARGEST EXCLUSIVE BUILDERS OF MAGNETIC EQUIPMENT

BULLETIN 225

"STEARNS HIGH DUTY" SINGLE DISC MAGNETIC CLUTCH

General Description

The "Stearns High Duty" Single Disc Magnetic Clutch is a simple friction device, electrically operated. Unlike the mechanical friction clutch, there are no toggles, pins, yokes, shifters, etc. to wear and shorten its active life. It incorporates all of the important modern developments, it is smooth, positive and powerful in operation, and its performance is the standard of excellence.

A careful analysis of the descriptive matter, illustrations, etc., will not only clarify, but destinctly set forth the marked difference, as well as simplicity of application and operation. Another and more important consideration, which recommends the "Stearns" clutch, is the matter of maintenance, which materially effects production. Comparable data, secured by a survey in a plant where "Stearns" clutches replaced mechanical clutches, showed a saving of 76%. If further consideration were given to convenience in operation, in this survey, doubtless, many other advantages would be reflected in the operations.

The "Stearns High Duty" Magnetic Clutch is not limited in service to the ordinary application of coupling one machine or part to another machine or part, transmitting power from its source to the object to be moved, but also where accurate timing of such parts, accuracy of the off and on periods, etc. are required. For such problems they are indispensable, especially so on machine tool applications where there is a marked difference in timing required to complete an operation.

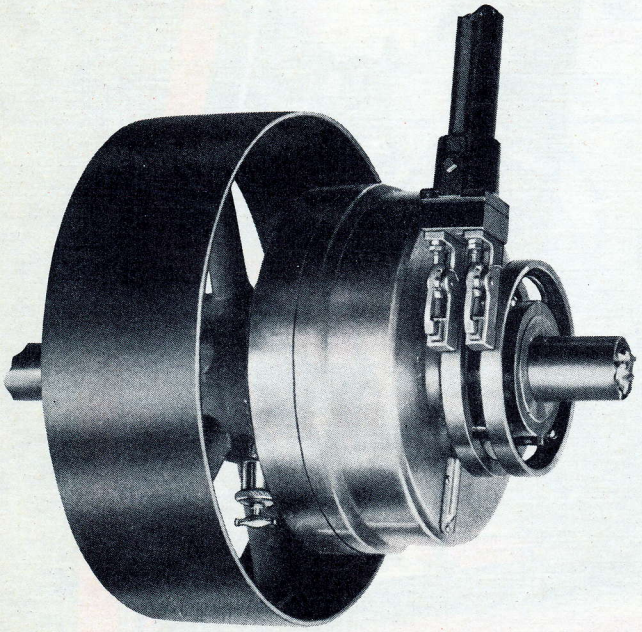


FIG. 205. A typical loose pulley application of a "Stearns High Duty" Magnetic Clutch. Drive pulley keyed to hub of armature which is either bronze bushed or equipped with antifriction bearings, Magnet body being keyed to line shaft.

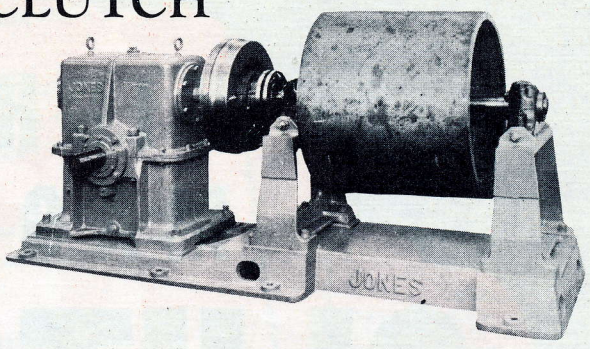


FIG. 276. An application of "Stearns High Duty" Magnetic Clutch showing one of a battery supplied on large paper mill drive.

Design Features

Engineering details have been carefully considered with respect to the development of definite horsepower requirements.

(1) ELEMENTS—The prime elements are the field and armature members which are made of selected steel, noted for its excellent magnetic qualities. To obtain uniformity and precision in operation, the large sizes are cast in the same heat, while the small sizes are forged from the same stock.

(2) MAGNET—The magnet member has a machined cavity of a definite size in which the windings are carefully fitted and securely anchored against any movement whatever, due to operating conditions. The steel, which surrounds the winding, is of equal cross section, which provides a uniform flux path for the magnetic lines of force, thereby creating a magnetic field of maximum density and of uniform pressure, equally distributed over the entire friction surface.

(3) ARMATURE—The armature member is proportioned with an equal amount of steel to provide a uniform and unrestricted path for the magnetic lines of force, thereby eliminating magnetic leak and premature wear on friction linings, caused by flexing, dishing or other distortion.

(4) WINDINGS—The coil windings are made of carefully selected magnet wire, layer wound on accurately machined forms, well insulated to meet not only A.I.E.E. standards, but also the most exacting of present day industrial requirements.

(5) COIL COVER—The coil cover is a heavy cast bronze ring, machined all over and accurately

fitted to ledges machined in magnet body, thus protecting the coil against the pressure exerted by the magnet. The heat resisting action of the friction ring offers ample protection to the windings, thoroughly insulating the same under maximum operating conditions.

(6) FRICTION ELEMENTS—The friction materials used are noted for their great mechanical strength and uniform frictional qualities. They are also capable of withstanding high temperatures, combining the qualities of heat resistance and strength to a remarkable degree. The adjustable pressure ring is machine fitted into recess in the armature, the surface contacting the friction ring is highly polished, so that complete surface contact is obtained.

(7) CONTROL—Push button stations, conveniently located, provides instant and positive control of machines actuated by "Stearns High Duty" Magnetic Clutches. When the electric circuit is closed, the pull of the magnet attracts the armature, the adjustable and friction rings meet and the pressure between these elements is built up smoothly, without jerk or jar to the parts coupled, thus a smooth even pick up is obtained. The frictional forces, developed in this manner, cause the driven member to be accelerated. When the electric circuit is opened, the magnetic field subsides and the pressure between the friction members is instantly disengaged.

(8) ADJUSTMENTS—Interlocking adjusting plugs and lock screws are tapped into armature and adjustable ring, which provides a simple and positive means of adjustment when lining becomes worn. Wear on the linings in a magnetic clutch (*there are no other wearing parts*) shortens the air gap, which increases the pull of the magnet on the armature, thus increasing the torque, periods of adjustment of the clutch are thus reduced to a minimum. In the mechanical clutch wear on the friction linings, toggles, pins, yokes, shifters, etc. reduces the torque making frequent adjustment and replacement of parts necessary.

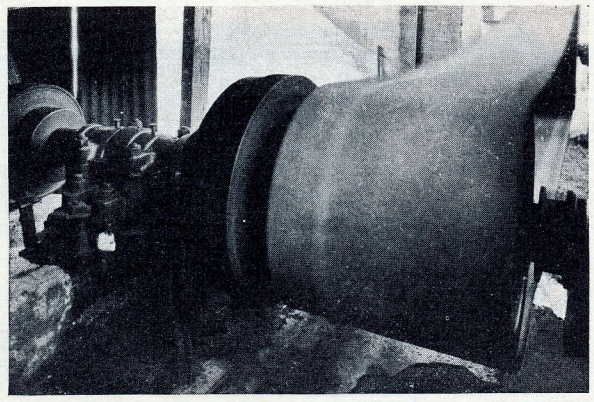


FIG 277 A Special application of "Stearns High Duty" Magnetic Clutch driving a 36" x 54" Buchanan Jaw Crusher having two 7' x 10" flywheels, weighing 10,000 lbs. (Crushing blast furnace slag). A drive pulley for 20" belt is mounted on special hub extension of armature member.

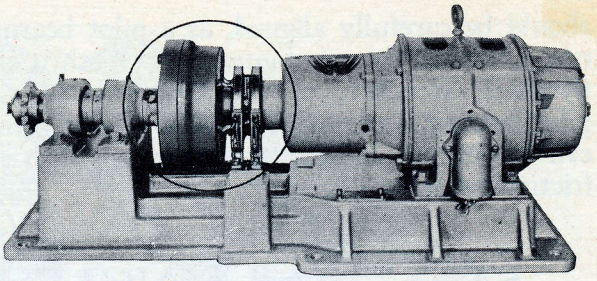


FIG 279 "Stearns High Duty" Magnetic Clutch mounted on Special Gyro Pilot Automatic Steering Equipment.

(9) SPRING PLATE—The spring plate is selected for its strength and flexibility and is machine fitted into recess in armature and to a snug fit on driven hub and securely attached to these members by an ample number of bolts to withstand maximum stress in service.

(10) ASSEMBLED RELATION—In assembled relation the magnet and armature members stand a short distance apart and can be easily aligned, as they are machined to the same diameter. The air gap between these members is always visible while running or standing still, thus a check on the alignment and adjustment is always present without the use of sounding pins or other devices or the necessity of making periodical inspections.

(11) COLLECTOR RINGS—The collector rings are cast to pattern of high grade bronze, very rugged and of an approved design. For the large sizes they are of the split type, easily dismounted by removing two bolts.

(12) BRUSH HOLDERS—Bronze brush holders are supplied with each clutch, fitted with high grade carbon brushes; where service requires, double brush holders are supplied.

(13) TORQUE RATINGS—Torque ratings given in the data section are maximum beyond which the clutch will slip or pull out. In selecting a clutch for a certain drive, the maximum conditions must be considered as well as frequent and long starting periods which must be provided for and also suitable allowance must be made for factors not subject to direct calculation.

(14) APPLICATION—"Stearns High Duty" Magnetic Clutches are neat and attractive in appearance, machined all over and will add much to the value and utility of any equipment on which they are applied. Shafts on which the clutch is mounted, when used as a coupling,

should be carefully aligned, as a pilot bearing is not a cure-all for misalignment. On thru shaft, flywheel, sprocket, or sheave applications, no pilot bearing is required, hubs on driven member can be bronze bushed or equipped with anti-friction bearings.

(15) INSTALLATIONS — Power Presses, power shears, forging machines, paper mill drives, steel mill applications, and machine tools are but a few of the many drives which have been successfully coupled with "STEARNS HIGH DUTY" Magnetic Clutches.

STYLE "A" SINGLE DISC MAGNETIC CLUTCH

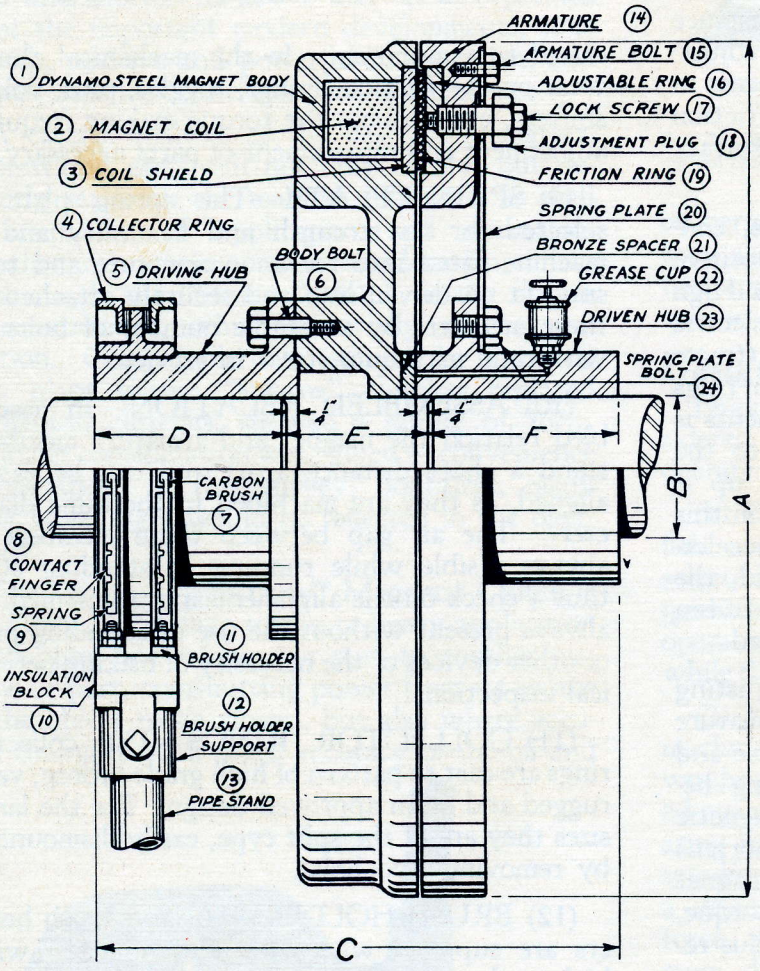


FIG 203

Information Required When Selecting a Clutch

(To be supplied by customer)

1—Normal horsepower.

2—Peak horsepower.

3—Nature of load. (Give complete information, sketch or drawing of machine clutch is to be mounted on.)

4—Number of starting periods per hour.

5—R.P.M. of clutch shaft.

6—Maximum load to be started. (Are there any unusual conditions, such as, fan duty, heavy flywheels or high inertia parts to be started? State size and weight.)

7—Shaft diameters (drive and driven) in thousandth of an inch, also keyways.

8—Direct current voltage.

To obtain satisfactory performance, consideration must be given to the various factors which the clutch must control; it is, therefore, essential that the above questions be answered as well as to give such other information as directly applies to the problem.

Size	Max. Torque Lbs. Ft.	H.P. at 100 R.P.M.	Lining Area Sq. In.	D.C. Watts	Approx. Shipping Weight, Pounds	Dimensions in Inches					
						A	B**	C	D	E	F
2	.4	.007	.....	5	5	*	*	*	*	*	*
3	1.6	.03	.....	13	8	3	5/8	3	*	*	*
4	3.3	.06	.....	20	10	*	*	*	*	*	*
5	10	.2	.....	28	15	5	1	4 5/8	*	*	*
7	21	.4	16	50	50	7	1 3/8	7 7/8	3 1/2	7/8	3 1/2
8	53	1	24	65	60	8	1 3/8	8 3/8	3 3/4	1/8	3 3/4
10	105	2	38	100	105	10	1 15/16	8 7/8	4	7/8	4
12	184	3.5	55	115	150	12	1 15/16	9 3/16	4 1/16	7/8	4 1/4
14	315	6	73	154	195	14	2 7/16	10 1/8	4 5/8	7/8	4 5/8
16	787	15	93	175	300	16	3 3/16	14 1/8	5 1/8	3 7/8	5 1/8
20	1575	30	138	225	455	20	4 7/16	14 1/2	5 3/8	3 3/4	5 3/8
24	2625	50	178	300	630	24	5 1/4	15 1/4	5 1/2	4 1/4	5 1/2
28	4200	80	251	360	910	28	5 7/8	16 3/4	6 1/4	4 1/4	6 1/4
32	6300	120	300	400	1380	32	6 3/8	19 1/8	7 1/4	4 5/8	7 1/4
36	8400	160	347	530	1550	36	6 3/4	21	8 1/4	4 1/2	8 1/4

*Owing to structural variations, these dimensions will be supplied upon request.

**B dimensions are for standard maximum bores, for special applications refer to factory for recommendations.

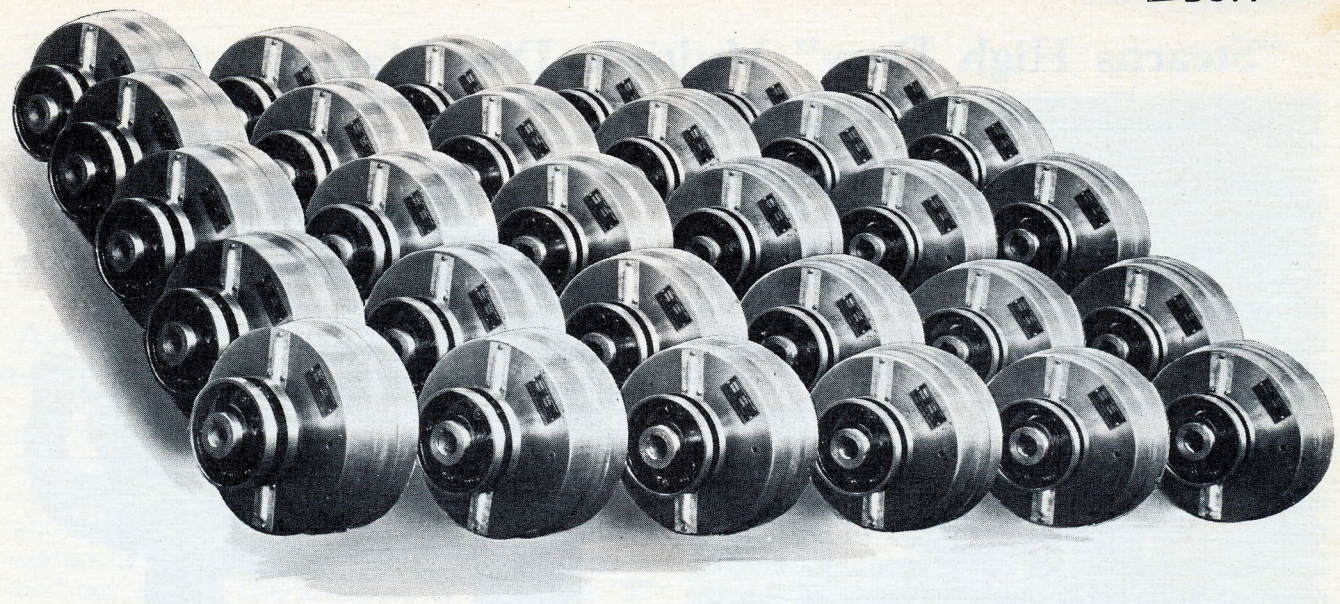


FIG. 232 — A battery of 30 "Stearns High Duty" Magnetic Clutches driving packaging machinery. These clutches are operating on and off seventy times per minute.

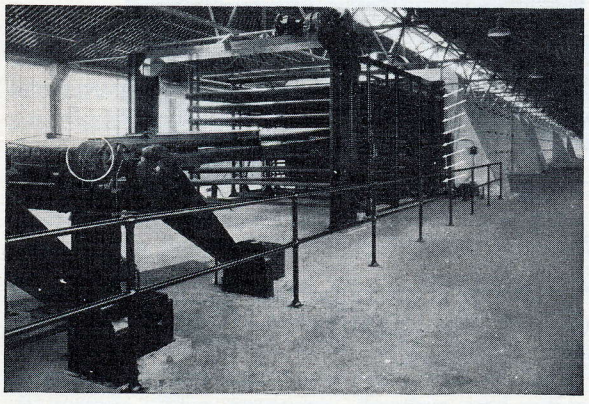


FIG. 282 — An installation of 9 "Stearns High Duty" Magnetic Clutches on wet board sawing machines, two-speed tipple and two-speed dryers.

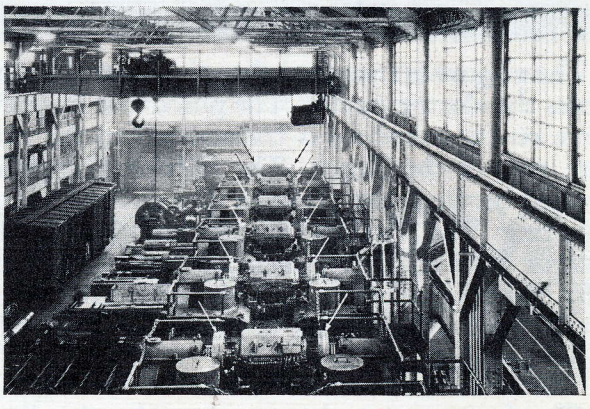


FIG. 281 — A Steel Mill application of 12 "Stearns High Duty" Magnetic Clutches mounted on 32" Cold Strip Screw Down Rolls.

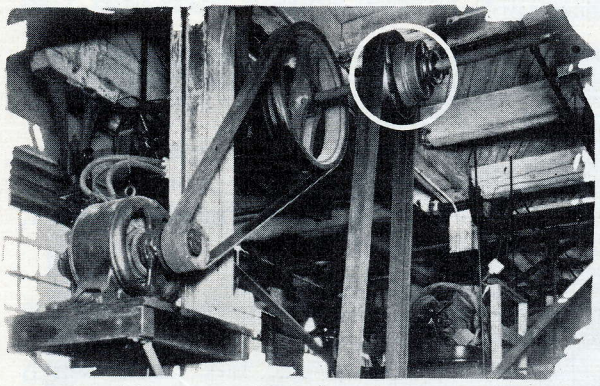


FIG. 233 — An installation of "Stearns High Duty" Magnetic Clutches controlling operations of textile machines, which, for obvious reasons, require very definite performance.

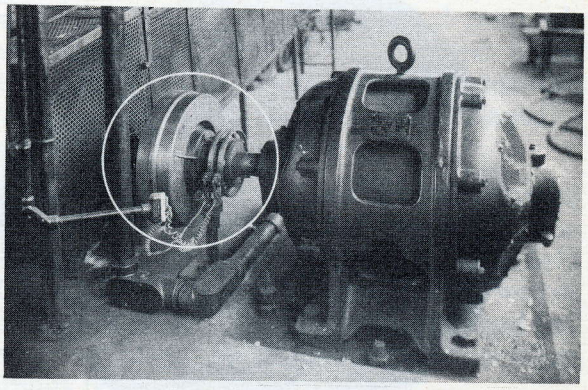


FIG. 278. "Stearns High Duty" Magnetic Clutch provides smooth acceleration for this wood planer.

"Stearns High Duty" Multiple Disc Magnetic Clutch

General Description

The "Stearns High Duty" Multiple Disc Magnetic Clutch is essentially a multiple disc friction clutch, actuated by a powerful electro magnet, thru a system of control, operated by push button stations conveniently located, which permit its use on almost any type of machinery. There is a marked difference between the magnetic and mechanical friction clutch. Wear on the linings increases the torque on one and decreases the torque on the other. It is a known fact that the magnetic force increases as the air gap decreases, thus a greater pressure is brought to bear on the linings as the armature moves closer to the magnet, resulting in higher torque. Lining wear, plus the wear on toggles, pins, yokes, shifters, etc., in the mechanical clutch, make frequent adjustment necessary to maintain their normal torque rating. The life and usefulness of the magnetic clutch is, therefore, incomparable as a means for connecting machinery to its source of power.

The magnet is energized thru the control, which closes the electric circuit. The pull of the magnetic force on the armature is transmitted to the pressure ring of the clutch. The friction linings are pressed between the pressure ring and the adjustable ring. The frictional forces developed in this manner cause the driven member to be accelerated. The clutching action is smooth and even, picking up the load without jerk or jar to the machinery to be coupled.

The forces required to operate the clutch are balanced within the driving member and, therefore, no end thrust is transmitted to the shaft during its engagement or disengagement. When

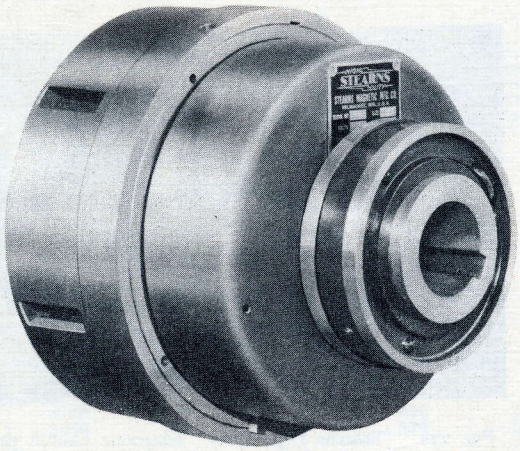


Fig. 406. "Stearns High Duty" Multiple Disc Style "E" Magnetic Clutch.

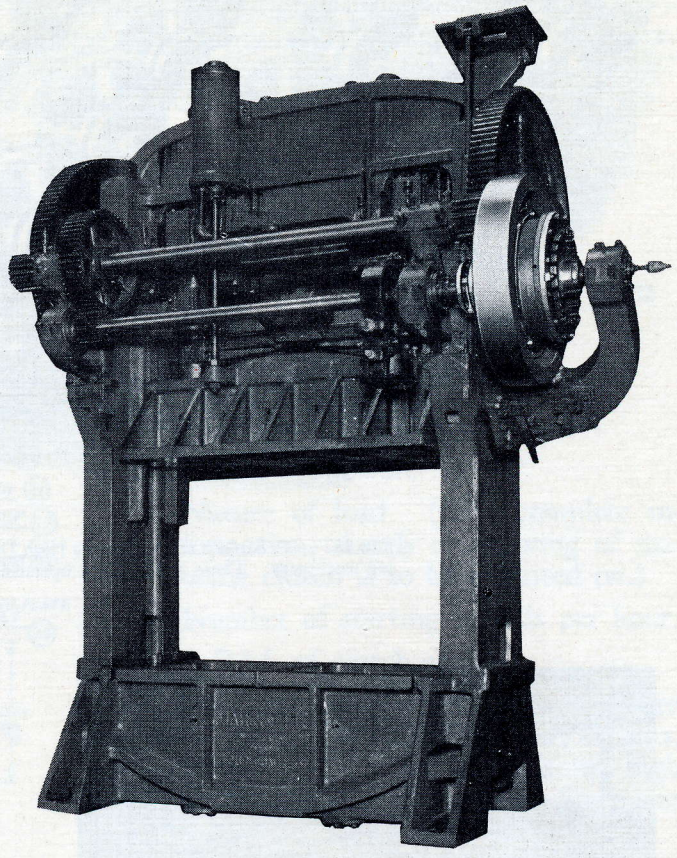


Fig. 308. One of a series of 46 "Stearns High Duty" Multiple Disc Magnetic Clutches installed on large power press.

electric current is disconnected, the magnetic field subsides and the armature and pressure ring are instantly disengaged.

The complete clutch assembly is very compact, the features of design making high torque ratings and smooth acceleration possible. They are neat in appearance, machined all over, and the low operating and maintenance cost have made many duplicate applications possible.

Design Features

The "Stearns High Duty" Multiple Disc Magnetic Clutch consists of three prime elements: the field or magnet member, the armature member, and the friction member.

The field member is cast to pattern of low carbon dynamo steel, noted for its excellent magnetic qualities. The magnetic flux path, which surrounds the windings, is of equal cross sectional area, reducing the flux leakage to a minimum and creating a field of uniform density, also eliminating

all possibility of flexing, dishing, or other distortion. The coil windings are made of carefully selected magnet wire, layer wound on accurately machined forms, well insulated to meet not only A. I. E. E. standards, but also the most exacting of present day industrial requirements.

Armature

The armature member is cast in the same heat and paired with the magnet member, providing uniform magnetic permeability. The even, uniform pull of magnet, on armature, exerts an equal and well distributed pressure against the friction surfaces, assuring smooth power transmission, without shock. The armature of the Style "E" clutch is threaded in the clutch cage, and carries no torque stresses.

Friction Member

The friction member consists of a substantial cast iron housing, in which the friction elements are mounted. The friction materials used are noted for their great mechanical strength and uniform frictional qualities. They are also capable of withstanding high temperatures, combining the two qualities of heat resistance and strength, to a remarkable degree. The metal of the pressure and driving rings is selected for its frictional and non-warping qualities. The friction linings are liberally proportioned in area. The driven rings engage the driven hub thru teeth cut in their inner diameters. The pressure, driving and adjustable rings have teeth cut in their periphery and are driven by corresponding teeth cut in the housing. The low unit pressure, as well as the low engagement velocity employed over large area, make long, hard starts possible without overheating.

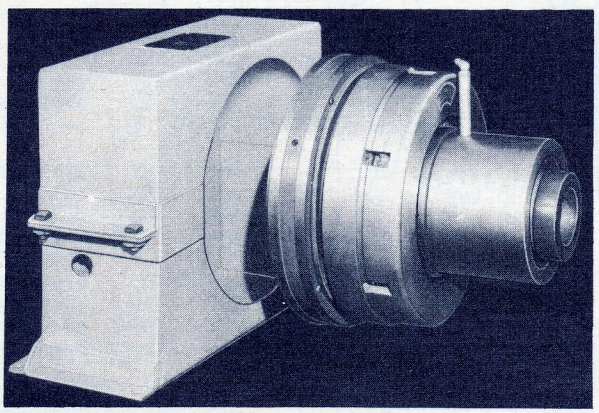


FIG. 434 "Stearns High Duty" Style "E" Magnetic Clutch design for special application and equipped with housing feature.

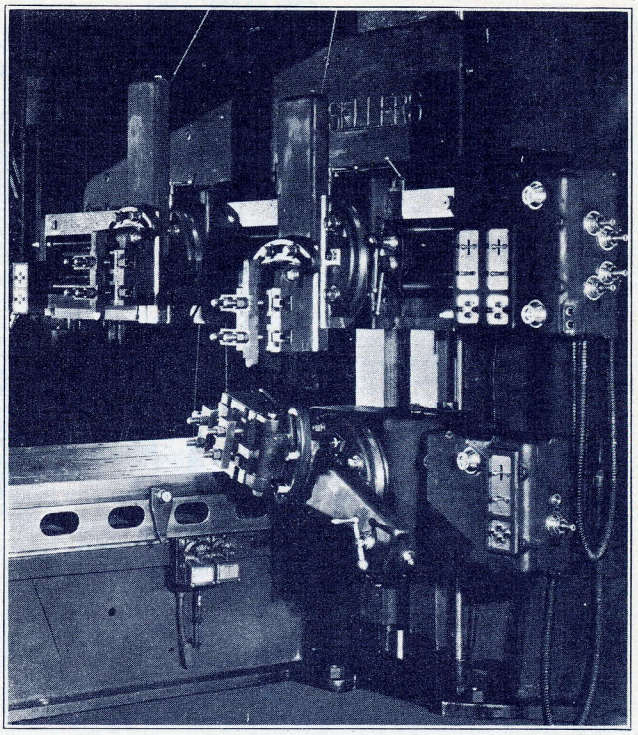


FIG. 345. "Stearns High Duty" Magnetic Clutches control this planer—the largest of its kind ever built.

New Features

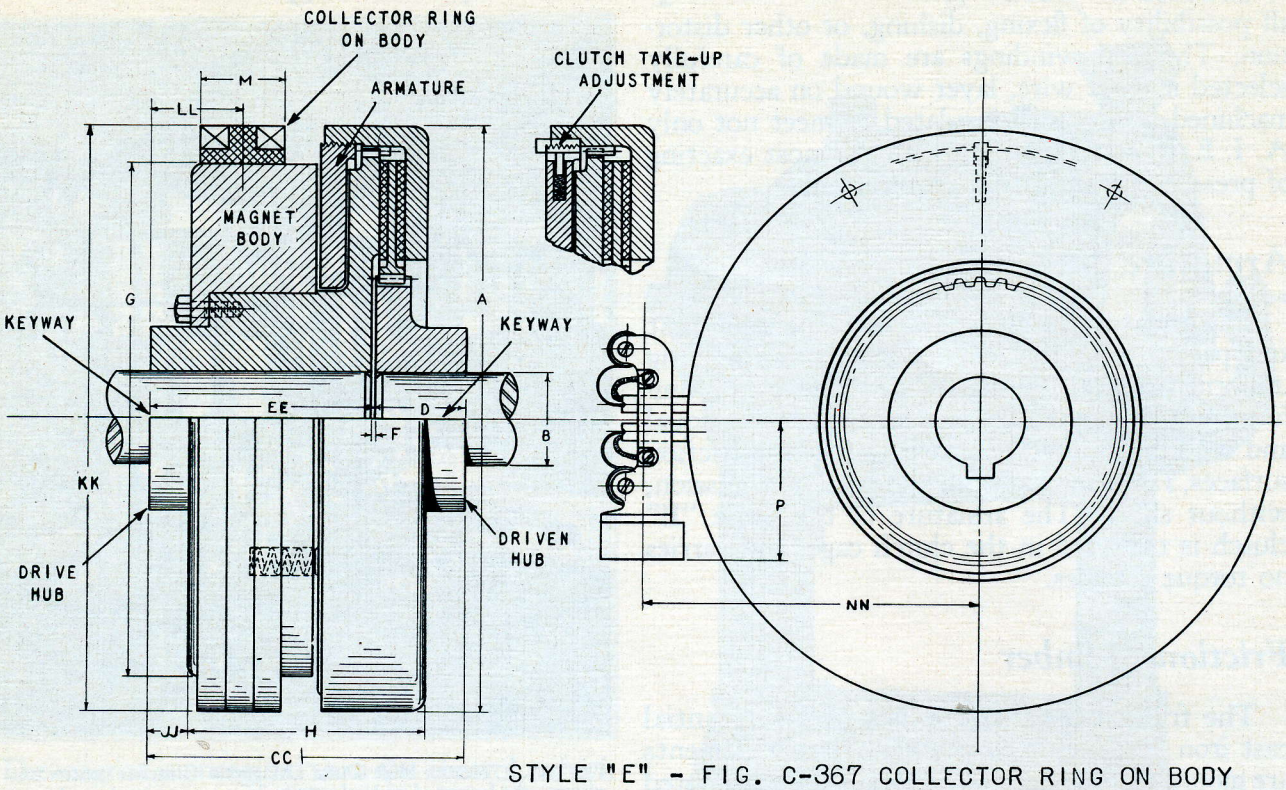
Other exceptional features, not to be overlooked, are the extremely low WR^2 value of the driven end of the clutch, which is very important where little or no drifting is desired, after clutch is disengaged.

Adjustment

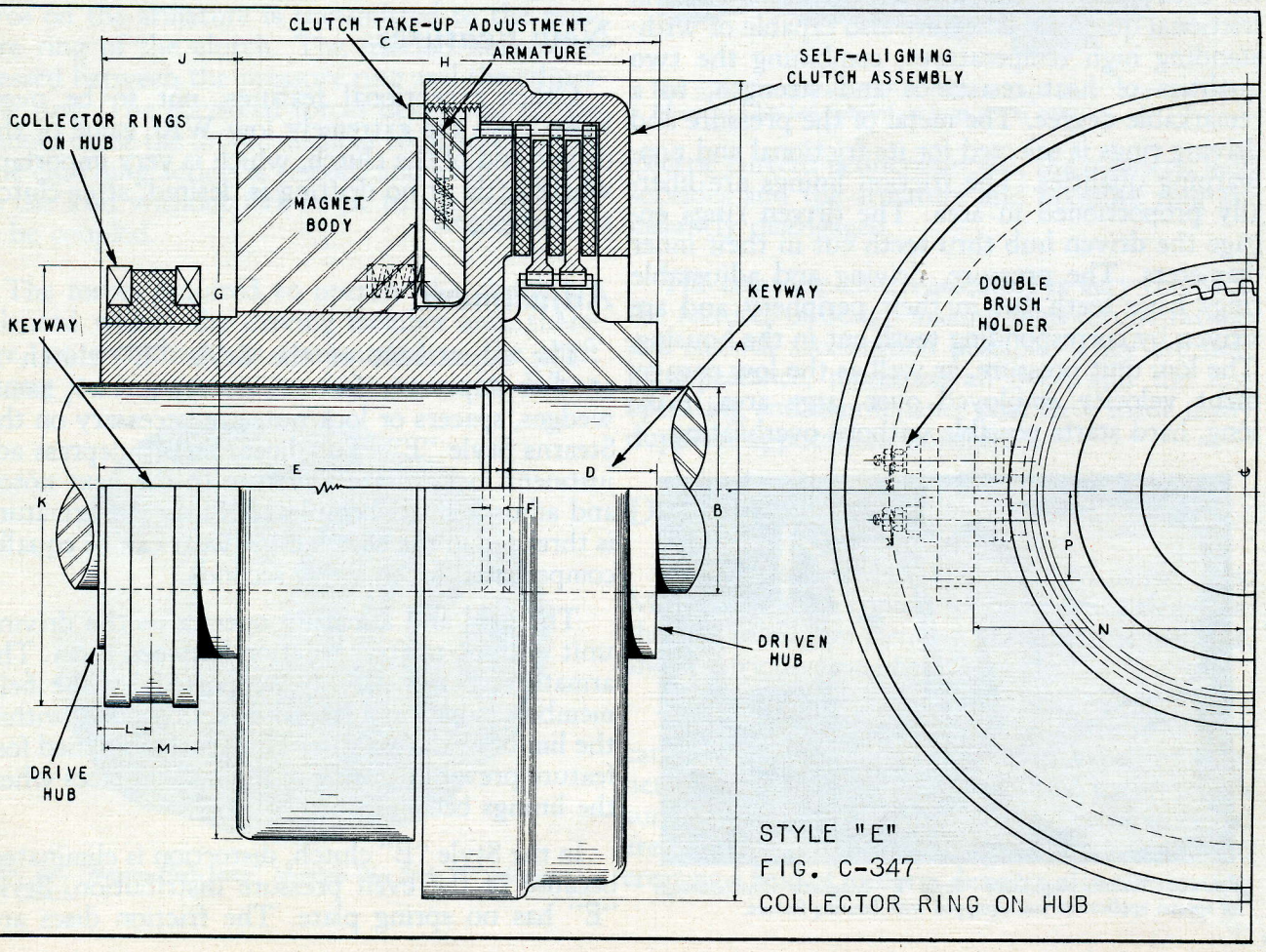
The adjustment of the Style "E" clutch is another important feature; no set screws, cams, wedges, spacers or lock nuts are necessary on the Stearns Style "E". To adjust, simply depress adjustment lock, rotate armature to the next notch and adjustment is completed. Since the armature is threaded in the clutch cage, wear can be equally compensated for in a few seconds.

The field and armature operate as the driving unit with no relative rotation between them. The armature, being slidably supported by the field member, moves in a lateral direction only, within the limits of the air gap. This (patent applied for) feature prevents scoring of the magnet faces when the linings become worn.

In the Style "E" clutch, distortion is eliminated because of the even pressure distribution. Style "E" has no spring plate. The friction discs are



STYLE "E" - FIG. C-367 COLLECTOR RING ON BODY



STYLE "E"
FIG. C-347
COLLECTOR RING ON HUB

STYLE "E" SPECIFICATIONS

SIZE	MAX.‡ TORQUE FT. LB.	H. P.‡ AT 100 R.P.M.	LINING AREA SQ. IN.	D. C. WATTS	W.R.²(LBS. FT.²)§ DRIVE END	W.R.²(LBS. FT.²)§ DRIVEN END	APP. SHIP. WGHT.	DIMENSION IN INCHES* A	B#	C	CC	D	E	EE	F	G†	H	J	JJ	K	KK	L	LL	M	N	NN	P
402	7	.13	8	24	.14	.002	21	4	1	4 7/8	3 1/4	3/4	4 3/8	2 1/2	1/8	4	3 1/4	1 5/8		3	5	5/8	7/8	1 1/8	2 1/8	3 1/8	1 1/4
404	14	.26	16	24	.16	.005	22	4	1	5 3/8	3 3/4	1 1/4	4 1/8	2 1/2	1/8	4	3 3/4	1 5/8		3	5	5/8	7/8	1 1/8	2 1/8	3 1/8	1 1/4
406	21	.39	24	24	.18	.008	24	4	1	5 7/8	4 1/4	1 3/4	4 1/8	2 1/2	1/8	4	4 1/4	1 5/8		3	5	5/8	7/8	1 1/8	2 1/8	3 1/8	1 1/4
408	28	.52	32	24	.20	.015	26	4	1	6 3/8	4 3/4	2 1/4	4 1/8	2 1/2	1/8	4	4 3/4	1 5/8		3	5	5/8	7/8	1 1/8	2 1/8	3 1/8	1 1/4
502	13.5	.25	15	29	.33	.007	28	5	1 3/16	5	3 3/8	3/4	4 1/4	2 5/8	1/8	5	3 3/8	1 5/8		4	6	5/8	7/8	1 1/8	2 5/8	3 5/8	1 1/4
504	27.0	.50	30	29	.35	.013	30	5	1 3/16	5 1/2	3 7/8	1 1/4	4 1/4	2 5/8	1/8	5	3 7/8	1 5/8		4	6	5/8	7/8	1 1/8	2 5/8	3 5/8	1 1/4
506	40.5	.75	45	29	.37	.020	33	5	1 3/16	6	4 3/8	1 3/4	4 1/4	2 5/8	1/8	5	4 3/8	1 5/8		4	6	5/8	7/8	1 1/8	2 5/8	3 5/8	1 1/4
508	53.5	1.00	60	29	.39	.026	35	5	1 3/16	6 1/2	4 7/8	2 1/4	4 1/4	2 5/8	1/8	5	4 7/8	1 5/8		4	6	5/8	7/8	1 1/8	2 5/8	3 5/8	1 1/4
602	35	.66	25	45	1.01	.08	40	7	1 3/4	6 7/16	5 3/16	1 3/4	4 11/16	3 1/16	1/8	6	3 5/8	1 7/8	5/8	4	7	13/16	1 5/8	1 1/8	2 3/4	4 1/4	1 1/4
604	70	1.3	50	45	1.11	.11	44	7	1 3/4	6 7/8	5 5/8	2 3/16	4 11/16	3 7/16	1/8	6	4	1 7/8	5/8	4	7	13/16	1 5/8	1 1/8	2 3/4	4 1/4	1 1/4
606	105	1.9	75	45	1.21	.15	48	7	1 3/4	7 5/16	6 1/16	2 5/8	4 11/16	3 7/16	1/8	6	4 7/16	1 7/8	5/8	4	7	13/16	1 5/8	1 1/8	2 3/4	4 1/4	1 1/4
608	140	2.6	100	45	1.31	.19	52	7	1 3/4	7 3/4	6 1/2	3 1/16	4 11/16	3 7/16	1/8	6	4 7/8	1 7/8	5/8	4	7	13/16	1 5/8	1 1/8	2 3/4	4 1/4	1 1/4
802	140	2.6	44	75	4.3	.27	73	9 1/4	2 1/4	7 5/8	6	1 13/16	5 13/16	4 3/16	1/4	8	4 3/8	2 3/8	3/4	5	9 1/4	1	1 15/16	1 1/2	3 1/4	5 3/8	1 9/16
804	280	5.2	88	75	4.6	.52	82	9 1/4	2 1/4	8 1/8	6 1/2	2 5/16	5 13/16	4 3/16	1/4	8	5 1/4	2 3/8	3/4	5	9 1/4	1	1 15/16	1 1/2	3 1/4	5 3/8	1 9/16
806	420	7.8	132	75	4.9	.76	91	9 1/4	2 1/4	8 5/8	7	2 13/16	5 13/16	4 3/16	1/4	8	5 3/8	2 3/8	3/4	5	9 1/4	1	1 15/16	1 1/2	3 1/4	5 3/8	1 9/16
808	560	10.4	176	75	5.2	1.00	100	9 1/4	2 1/4	9 1/8	7 1/2	3 5/16	5 13/16	4 3/16	1/4	8	6 1/4	2 3/8	3/4	5	9 1/4	1	1 15/16	1 1/2	3 1/4	5 3/8	1 9/16
1002	400	7.6	72	110	11.9	.667	130	11 1/2	3 1/4	8 3/8	6 3/4	1 7/8	6 1/2	4 7/8	1/4	10	5 1/2	2 3/8	3/4	6 3/8	11 1/2	1	2 1/16	1 1/2	3 13/16	6 1/2	1 9/16
1004	800	15.0	144	110	12.3	1.20	142	11 1/2	3 1/4	8 7/8	7 1/4	2 3/8	6 1/2	4 7/8	1/4	10	6	2 3/8	3/4	6 3/8	11 1/2	1	2 1/8	1 1/2	3 15/16	6 1/2	1 9/16
1006	1200	22.0	216	110	12.7	1.74	154	11 1/2	3 1/4	9 3/8	7 3/4	2 7/8	6 1/2	4 7/8	1/4	10	6 1/2	2 3/8	3/4	6 3/8	11 1/2	1	2 1/8	1 1/2	3 15/16	6 1/2	1 9/16
1008	1600	30.0	288	110	13.1	2.28	166	11 1/2	3 1/4	9 7/8	8 1/4	3 3/8	6 1/2	4 7/8	1/4	10	7	2 3/8	3/4	6 3/8	11 1/2	1	2 1/8	1 1/2	3 15/16	6 1/2	1 9/16
1202	600	11.0	125	125	27.5	1.70	250	14	4	8 7/8	7 1/4	2 1/8	6 3/4	5 1/8	1/4	12	6	2 3/8	3/4	7 1/8	14	1	2 1/8	1 1/2	4 1/2	7 3/4	1 9/16
1204	1200	22.0	250	125	28.9	3.00	265	14	4	9 3/8	7 3/4	2 5/8	6 3/4	5 1/8	1/4	12	6 1/2	2 3/8	3/4	7 1/8	14	1	2 1/8	1 1/2	4 1/2	7 3/4	1 9/16
1206	1800	33.0	375	125	30.3	4.31	280	14	4	9 7/8	8 1/4	3 1/8	6 3/4	5 1/8	1/4	12	7	2 3/8	3/4	7 1/8	14	1	2 1/8	1 1/2	4 1/2	7 3/4	1 9/16
1208	2400	44.0	500	125	31.7	5.62	295	14	4	10 3/8	8 3/4	3 5/8	6 3/4	5 1/8	1/4	12	7 1/2	2 3/8	3/4	7 1/8	14	1	2 1/8	1 1/2	4 1/2	7 3/4	1 9/16
1402	900	17	166	165	55	3.36	300	16	4 3/4	11 1/2	8 1/2	2 1/2	9	6	1/4	14	6 1/2	4	1	8	16	1 3/8	2 1/2	2 1/4	5 1/4	9 1/4	3 7/8
1404	1800	34	332	165	63	6.45	345	16	4 3/4	12 3/4	9 3/4	3 3/4	9	6	1/4	14	7 3/4	4	1	8	16	1 3/8	2 1/2	2 1/4	5 1/4	9 1/4	3 7/8
1406	2700	51	498	165	71	9.55	390	16	4 3/4	14	11	5	9	6	1/4	14	9	4	1	8	16	1 3/8	2 1/2	2 1/4	5 1/4	9 1/4	3 7/8
1408	3600	68	664	165	79	12.64	435	16	4 3/4	15 1/4	12 1/4	6 1/4	9	6	1/4	14	10 1/4	4	1	8	16	1 3/8	2 1/2	2 1/4	5 1/4	9 1/4	3 7/8
1602	1500	28	212	185	99	6.26	480	18	5 1/2	12 5/8	8 7/8	3 3/8	9 1/4	6 1/4	1/4	16	6 7/8	4	1	10	18	1 3/8	2 1/2	2 1/4	6 1/4	10 1/4	3 7/8
1604	3000	57	424	185	112	11.1	545	18	5 1/2	13 1/8	10 1/8	3 7/8	9 1/4	6 1/4	1/4	16	8 1/8	4	1	10	18	1 3/8	2 1/2	2 1/4	6 1/4	10 1/4	3 7/8
1606	4500	85	636	185	125	16.0	610	18	5 1/2	14 3/8	11 3/8	5 1/8	9 1/4	6 1/4	1/4	16	9 3/8	4	1	10	18	1 3/8	2 1/2	2 1/4	6 1/4	10 1/4	3 7/8
1608	6000	114	848	185	138	20.8	675	18	5 1/2	15 5/8	12 5/8	6 3/8	9 1/4	6 1/4	1/4	16	10 5/8	4	1	10	18	1 3/8	2 1/2	2 1/4	6 1/4	10 1/4	3 7/8
2002	3000	57	300	220	315	18.6	630	23	6 1/2	12 1/4	9 1/2	2 3/4	9 1/2	6 3/4	1/4	20	7 1/4	4	1 1/4	12	23	1 1/2	2 3/4	2 1/2	8 5/16	12 13/16	3 15/16
2004	6000	116	600	220	341	33.6	715	23	6 1/2	13 1/2	10 3/4	4	9 1/2	6 3/4	1/4	20	8 1/2	4	1 1/4	12	23	1 1/2	2 3/4	2 1/2	8 5/16	12 13/16	3 15/16
2006	9000	171	900	220	367	48.5	800	23	6 1/2	14 3/4	12	5 1/4	9 1/2	6 3/4	1/4	20	9 3/4	4	1 1/4	12	23	1 1/2	2 3/4	2 1/2	8 5/16	12 13/16	3 15/16
2008	12000	228	1200	220	393	63.5	885	23	6 1/2	16	13 1/4	6 1/2	9 1/2	6 3/4	1/4	20	11	4	1 1/4	12	23	1 1/2	2 3/4	2 1/2	8 5/16	12 13/16	3 15/16
2402	6400	122	424	350	659	46.5	1300	27 1/2	7 1/2	15 1/8	12 1/8	4 1/4	10 7/8	7 7/8	1/4	24	8 5/8	4 1/2	1 1/2	14	27 1/2	1 3/4	3 1/2	2 1/2	8 5/16	15 1/16	3 15/16
2404	12800	244	848	350	739	86.3	1470	27 1/2	7 1/2	16 1/2	13 1/2	5 5/8	10 7/8	7 7/8	1/4	24	10	4 1/2	1 1/2	14	27 1/2	1 3/4	3 1/2	2 1/2	8 5/16	15 1/16	3 15/16
2406	19200	366	1272	350	819	126	1640	27 1/2	7 1/2	17 7/8	14 7/8	7	10 7/8	7 7/8	1/4	24	11 3/8	4 1/2	1 1/2	14	27 1/2	1 3/4	3 1/2	2 1/2	8 5/16	15 1/16	3 15/16
2408	25600	488	1696	350	899	165	1810	27 1/2	7 1/2	19 1/4	16 1/4	8 3/8	10 7/8	7 7/8	1/4	24	12 3/4	4 1/2	1 1/2	14	27 1/2	1 3/4	3 1/2	2 1/2	8 5/16	15 1/16	3 15/16
2802	10000	190	540	485	1356	85	1820	32	9 1/2	15 7/8	12 7/8	4 3/4	11 1/8	8 1/8	1/4	28	9 3/8	4 1/2	1 1/2	16	32	1 3/4	3 3/4	2 1/2	9 5/16	17 5/16	3 15/16
2804	20000	380	1080	485	1496	149	2075	32	9 1/2	17 3/4	14 3/4	6 5/8	11 1/8	8 1/8	1/4	28	11 1/4	4 1/2	1 1/2	16	32	1 3/4	3 3/4	2 1/2	9 5/16	17 5/16	3 15/16
2806	30000	570	1620	485	1636	223	2330	32	9 1/2	19 5/8	16 5/8	8 1/2	11 1/8	8 1/8	1/4	28	13 1/8	4 1/2	1 1/2	16	32	1 3/4	3 3/4	2 1/2	9 5/16	17 5/16	3 15/16
2808	40000	760	2160	485	1776	295	2585	32	9 1/2	21 1/2	18 1/2	10 3/8	11 1/8	8 1/8	1/4	28	15	4 1/2	1 1/2	16	32	1 3/4	3 3/4	2 1/2	9 5/16	17 5/16	3 15/16
3202	15000	285	848	410	2940	352	3200	36 1/2	11	24		8	9 3/4		6 1/4	32	12	5 1/4		21		1 3/4		3	14 1/2		1/2
3204	30000	570	1696	410	3440	600	3500	36 1/2	11	24		8	9 3/4		6 1/4	32	14 1/2	5 1/4		21		1 3/4		3	14 1/2		1/2
3206	45000	855	2544	410	3940	882	3800	36 1/2	11	26 1/2		10 1/2	9 3/4		6 1/4	32	17	5 1/4		21		1 3/4		3	14 1/2		1/2
3208	60000	1140	3392	410	3994	1120	4200	36 1/2	11	27 1/4		11 1/4	9 3/4		6 1/4	32	17 3/4	5 1/4		21		1 3/4		3	14 1/2		1/2
3602	20000	380	1130	515	7300	756	4000	41	12 1/2	27 1/2		8	12		7 1/2	36	13 3/4	6 3/4		21		2		3	14 1/2		1/2
3604	40000	760	2260	515	7340	1256	4200	41	12 1/2	27 1/2		8	12		7 1/2	36	16 3/8	6 3/4		21		2		3	14 1/2		1/2
3606	60000	1140	3390	515	7380	1756	4400	41	12 1/2	30 1/4		10 3/4	12		7 1/2	36	19 1/8	6 3/4		21		2		3	14 1/2		1/2
3608	80000	1520	4520	515	7420	2256	4600	41	12 1/2	31 1/2		12	12		7 1/2	36	20 3/8	6 3/4		21		2		3	14 1/2		1/2
4202	40000	760	1626	665	11430	1340	7200	48	14	30 3/4		9 1/4	12		9 1/2	42	17 1/4	6 1/4		24		2		3	16		1/2
4204	80000	1520	3253	665	13600	2420	8600	48	14	30 3/4		9 1/4	12		9 1/2	42	20 3/8	6 1/4		24		2		3	16		1/2
4206	120000	2280	4878	665	15760	3520	10100	48	14	32 1/4		10 3/4	12		9 1/2	42	24 1/4	6 1/4		24		2		3	16		1/2
4208	160000	3040	6504	665	17950	4660	11600	48	14	35 3/4		14 1/4	12		9 1/2	42	27 3/4	6 1/4		24		2		3	16		1/2

*Owing to structural variations, certified prints to insure accuracy of final dimensions should be obtained from factory in all cases.

#Recommended maximum bore.

§†To compute the kinetic energy in foot-pounds, use the equation, K. E. $= \frac{WR^2 \times RPM^2}{5867}$

‡Consult factory for following applications: through shaft, pilot bearings, oil applications and service factor on individual applications.

carried in a stub-toothed splined cage which confines and transmits the torque directly to the shaft. Scoring of clutch facing is eliminated also. Equalized pressure on friction linings is an outstanding feature in the Style "E" clutch.

The air gap, which is the space between the armature and the magnet body, is normally set at .040" when the clutch is engaged. The torque rating in the data section is based on this setting. As the lining wears, the air gap decreases to a minimum gap of approximately 1/64", when the clutch should be adjusted.

The collector rings are cast to pattern of a high grade bronze; very rugged and of an approved design. Bronze brushholders furnished with high grade carbon brushes; where service requires, double brushholders are supplied.

Bore Sizes

Another important feature of the Style "E" clutch is the flexible range of bore sizes. It provides maximum bores as is indicated in the specification tables which follow.

The Style "E" clutch provides extremely low WR^2 which is an important feature where little or no drifting is desired after the clutch is disengaged. The driven member carries only the friction elements.

Style "E" clutch can be used as a dry or wet application. For applications of this nature give details and other information and our engineering department will make a recommendation.

Application

The torque ratings, given in the data section, are maximum, beyond which the clutch will slip or pull out. In selecting a clutch for a certain drive, the maximum conditions must be considered and suitable allowance made for factors not subject to direct calculation. Frequent and long starting periods must also be provided for. Shafts on which the clutch is mounted, when used as a coupling, should be carefully aligned, as a pilot bearing is not a cure-all for misalignment. On thru shaft, flywheel, or pulley applications, no pilot bearing is required.

Power presses, power shears, forging machines, paper mill drives, steel mill applications, and machine tools are but a few of the many drives which have been successfully coupled with "Stearns High Duty" Magnetic Clutches.

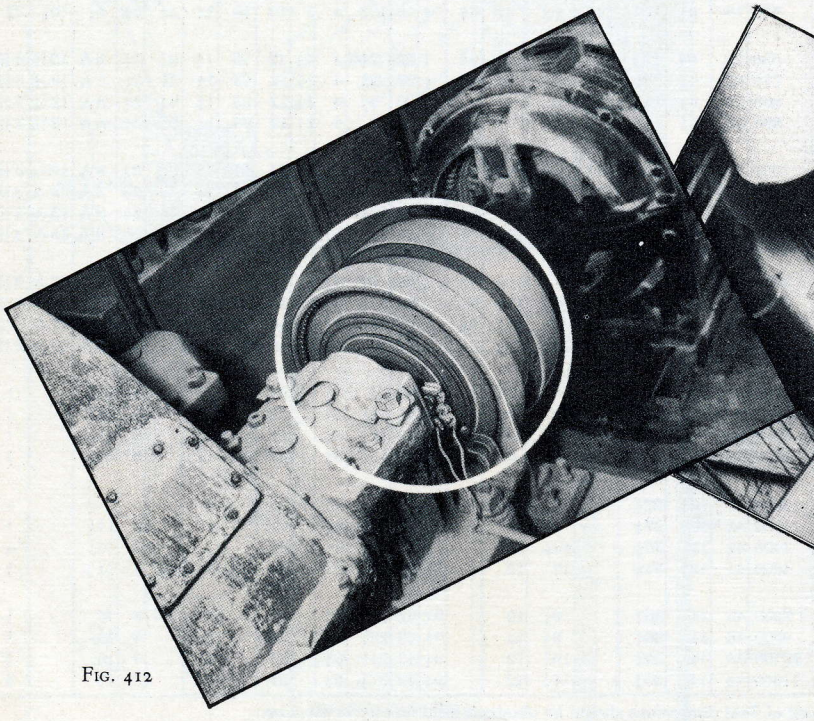


Fig. 412

Rubber mills must have smooth start and accurate fast stop.

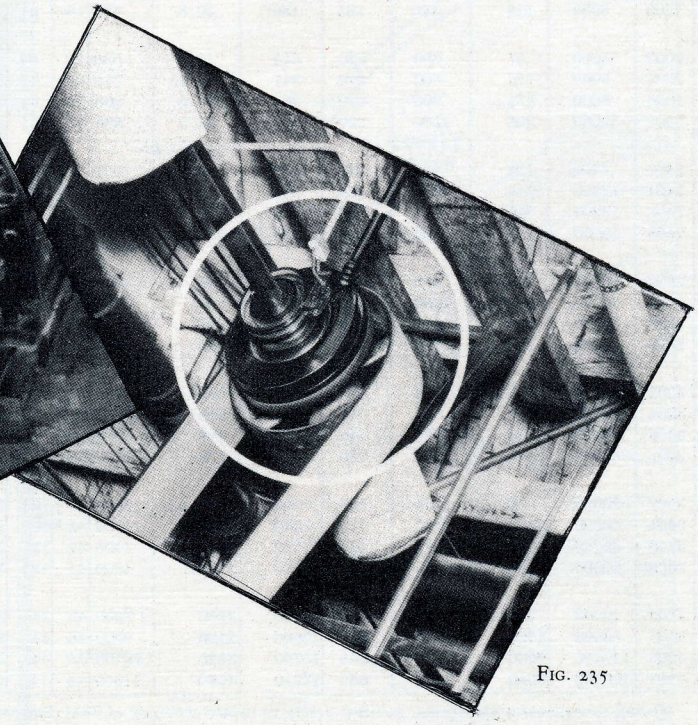


Fig. 235

No more failure of mechanical clutches in this extensive textile plant.

Clutch and Brake Combinations

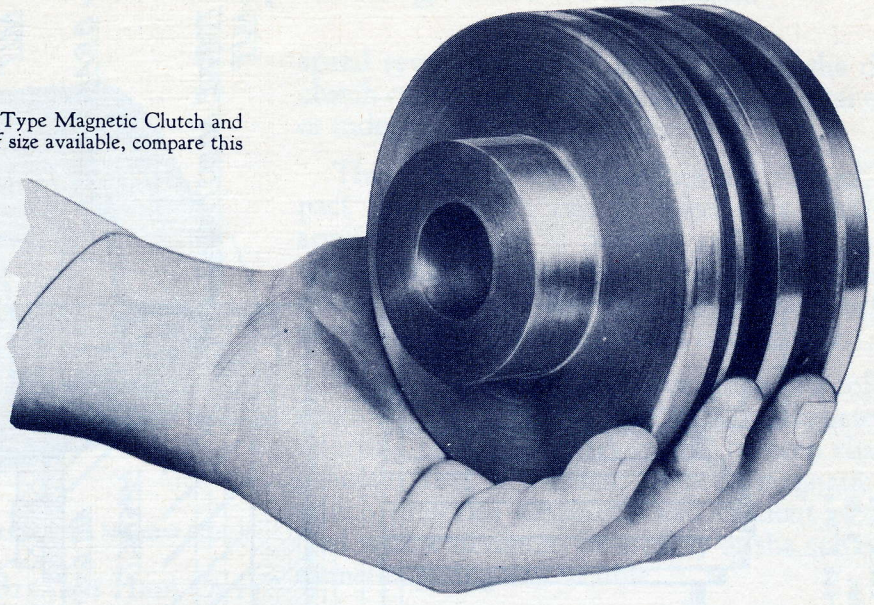


FIG. 340-A. Stearns High Duty Safety Type Magnetic Clutch and Brake combination. To indicate range of size available, compare this model with the one shown in Fig. 399.

The "Stearns High Duty" Style "EE" Combination Clutch-Brake is designed to combine the efficiency of the Stearns clutch and brake, both of which have been thoroughly tested over many years of service.

This clutch-brake unit incorporates the features of smooth acceleration, elimination of mechanical parts requiring replacement or repair, and provides quick, snappy and automatic stopping with positive safety at all times. Especially is this important as the brake is automatically applied in the event of an interruption in the electrical circuit. Being actuated by springs, the brake portion stops when the circuit is opened.

From the smallest motor-driven spindles on machine tools to the control of massive power presses, bull-dozers and similar equipment, the Stearns Style "EE" clutch-brake has a wide variety of applications. For the protection of the employe and for most efficient production in heavy machining operations, speedy and absolute control is necessary at all times.

Positive safety demands that massive moving parts must be stopped instantly and within the smallest fraction of an inch. While the Stearns magnetic clutch-brake is the smallest part of the machine in many instances, yet it plays a tremendously important part in accurate control and safe operation.

The Stearns Style "EE" clutch-brake is a rugged, yet sensitive unit and combines substantial friction area to give maximum torque with greatest heat dissipation, thus assuring minimum adjustment or replacement of the friction linings. With virtually no moving parts, except the friction linings, tests have shown that more than 16,000,000 engagements and disengagements can be made without replacement.

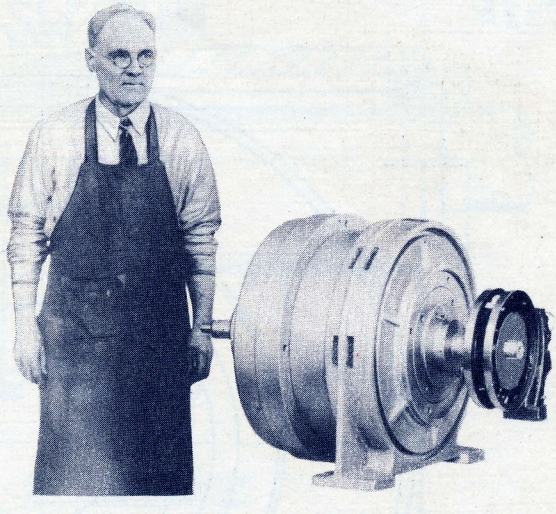


FIG. 399. Showing wide range of sizes and combinations available in Style "EE" Combination Clutch-brakes.

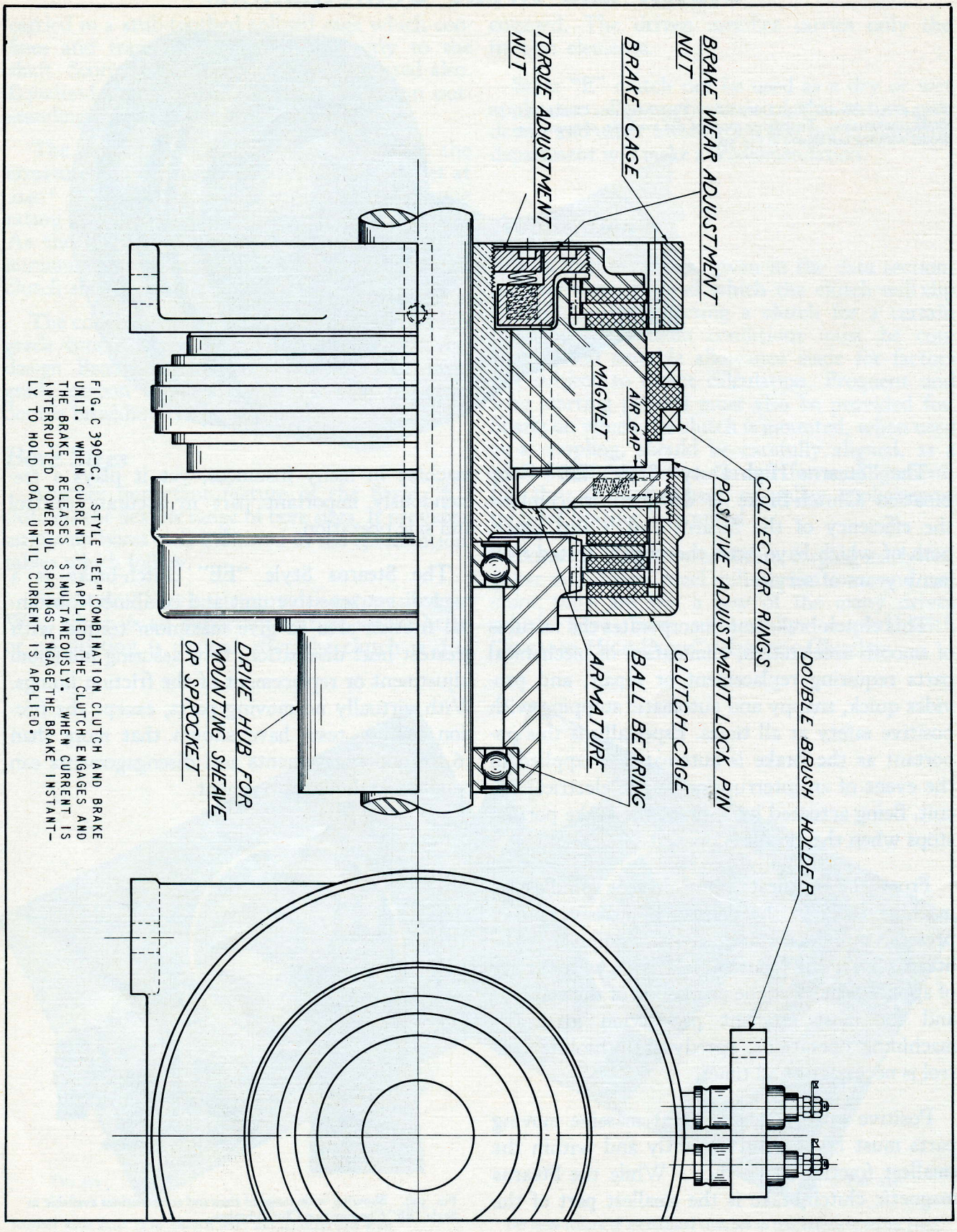


FIG. C 390-C. STYLE "EE" COMBINATION CLUTCH AND BRAKE UNIT. WHEN CURRENT IS APPLIED THE CLUTCH ENGAGES AND THE BRAKE RELEASES SIMULTANEOUSLY. WHEN CURRENT IS INTERRUPTED POWERFUL SPRINGS ENGAGE THE BRAKE INSTANTLY TO HOLD LOAD UNTIL CURRENT IS APPLIED.

Stearns Duplex Type Magnetic Clutches

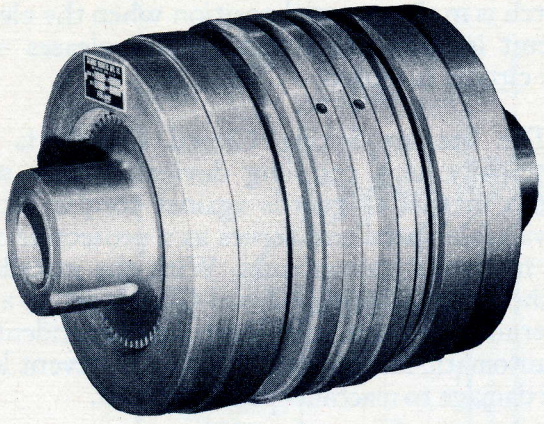


Fig. 426. Style "ED" "Stearns High Duty" Duplex Magnetic Clutch.

Style "AD" and "ED" "STEARNS HIGH DUTY" is a magnetic clutch arrangement consisting of two single or multiple disc clutches combined into a single duplex unit. They answer a demand for magnetically controlled double clutch for use in two-speed drives, reversing drives, or two-speed reversing drives. Either side of the duplex clutch can be controlled to operate simultaneously or independent of one another.

These duplex style clutches are rugged, compact units which can be used in a variety of applications, such as carriage and rapid traverse operations, tool slide feeds, spindle and other requirements where the clutch must have extreme flexibility and positive control at all times.

Where specified, to conserve space, the collector rings can be carried on the outside diameter. By referring to Fig. C-492A it will be seen that one collector ring is common to both magnetic coils which provides simplicity and efficient electrical feed with a minimum possibility of the contacting elements giving any trouble.

Additional information concerning specific problems will be supplied by our engineers upon receipt of details, drawings, etc., together with the required periods of operations and types of applications.

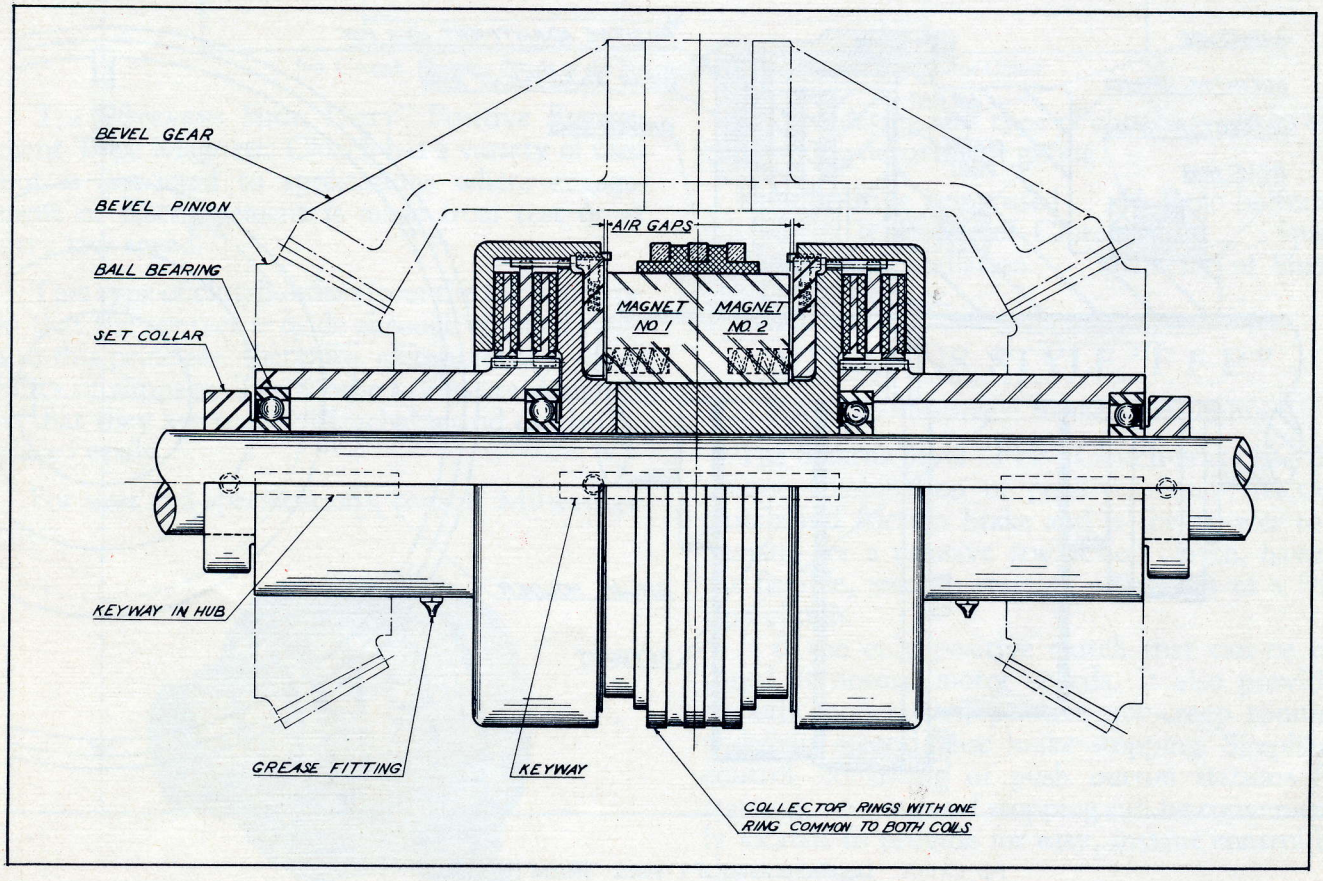


FIG. C-492-A. Line drawing shows details of Style "ED" Duplex Clutch. Dotted lines indicate gear and pinion arrangement for reversing application.

Spring Closed Clutches

The "Stearns High Duty" Spring Closed Magnetic Clutch is designed for use in applications where continuous engagement and infrequent disengagement are the governing factors.

In the spring closed clutch, the principle of operation is reversed from the other types of electrically energized clutches, such as Types "A", and "E" where the clutch is engaged when the magnet is energized.

By means of strong compression springs the clutch is in the engaged position when the electric circuit is open and automatically releases when the circuit is closed.

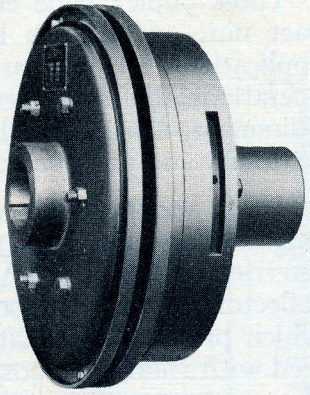


Fig. 440. Stearns Spring Closed Type Magnetic Clutch.

The Stearns Spring Closed Clutch is used principally as a coupling device. It is a safety clutch in that it guards against torque increase or variable speed and serves as a protective member in power transmission. With the installation of the Stearns Spring Closed Clutch set at a predetermined torque, the plant superintendent has an automatic safety device that will prevent losses and damage to machinery and material.

The Stearns Spring Closed Magnetic Clutch is available in various sizes, from 4" to 24". For dimensions and specifications consult Milwaukee office.

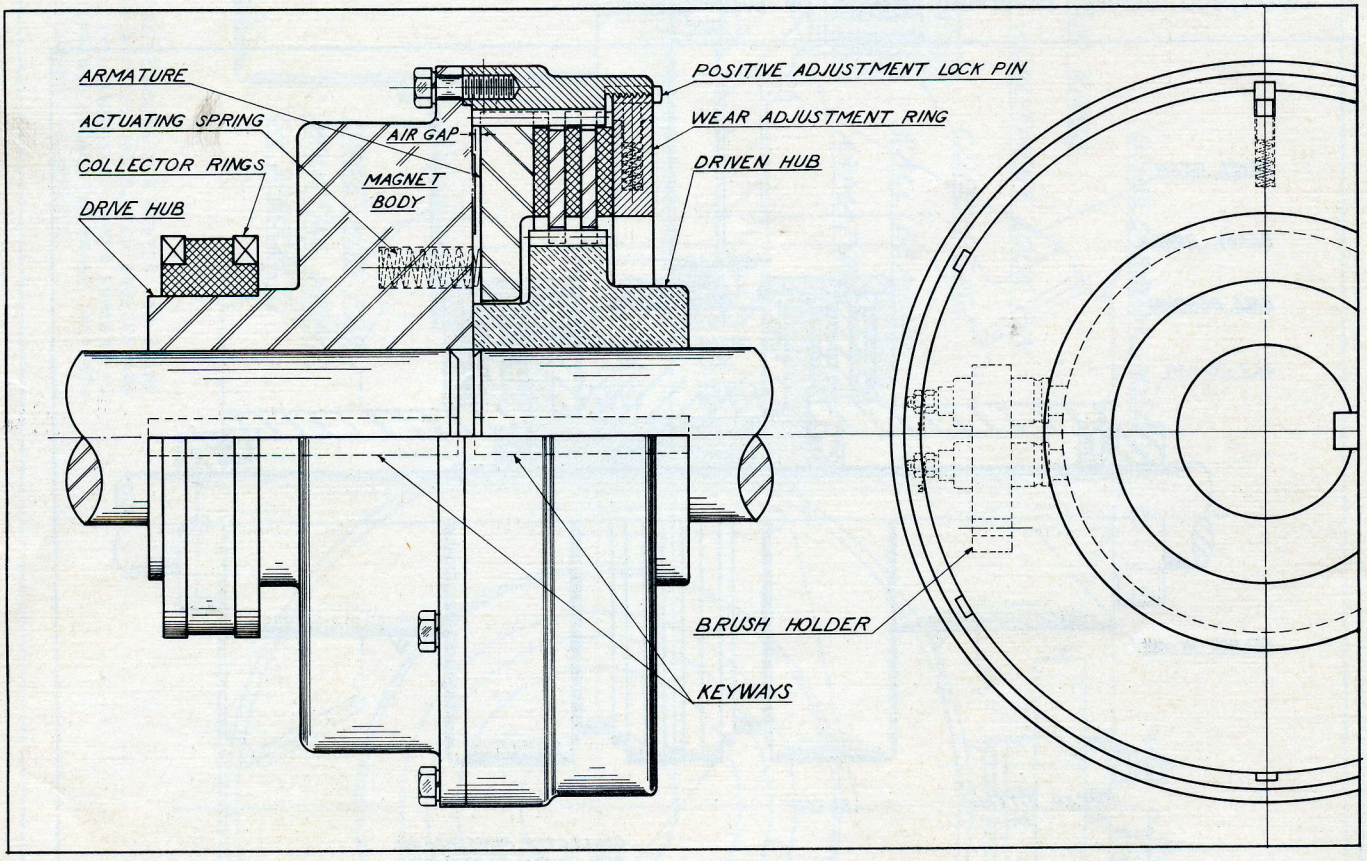


Fig. C519A. Detailed drawing of a typical "Stearns High Duty" Style "SCE" Spring Closed Magnetic Clutch.

Stearns Positive Engagement Magnetic Clutch

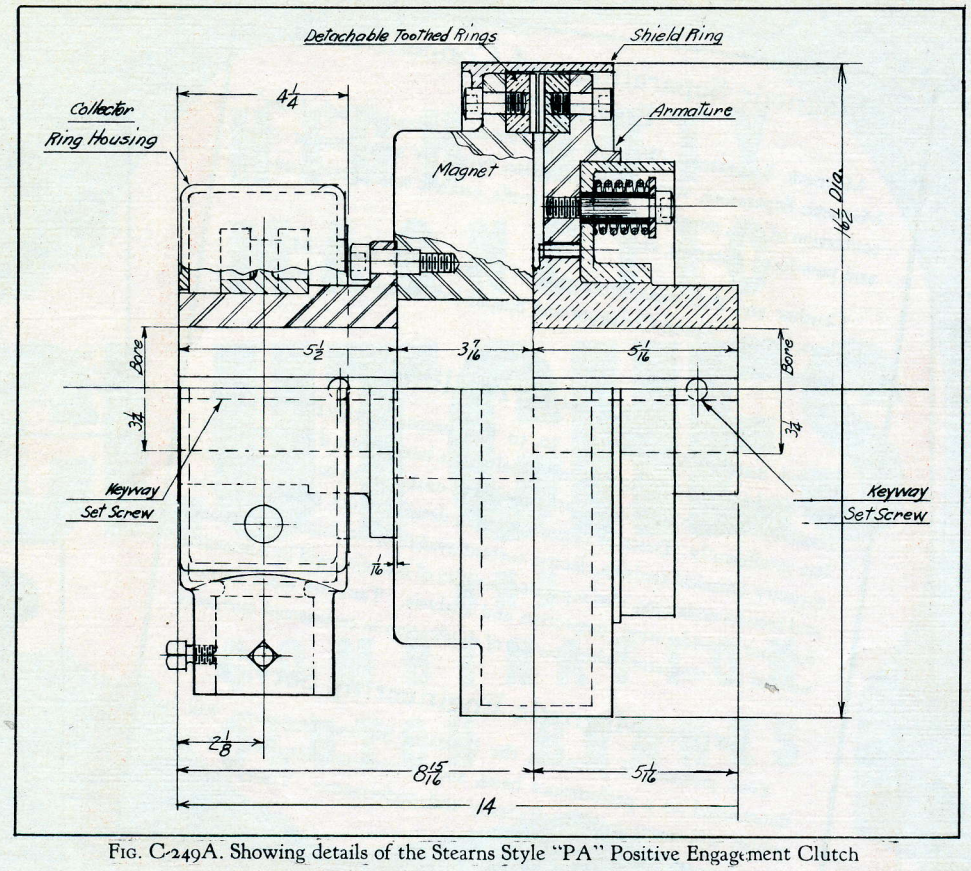


FIG. C-249A. Showing details of the Stearns Style "PA" Positive Engagement Clutch

The "STEARNS HIGH DUTY" Positive Engagement Type Magnetic Clutch has a variety of uses but is restricted to applications where engagement or disengagement is made from rest or at very low speed.

This type of clutch differs from the friction type in that the contact is made through toothed rings and this principle, therefore, eliminates any possibility of slippage. The toothed rings are designed so that they are readily detachable and can be replaced easily.

For sizes and specifications, consult Milwaukee office.

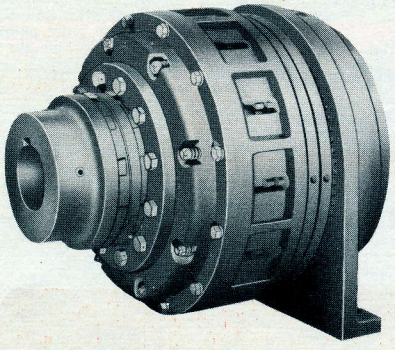


FIG. 428. "Stearns High Duty" Combination Clutch and Brake, Style "FFP", providing friction and positive clutch, with brake.

In considering this type of clutch, write to our engineering department giving:

Kind of drive being used . . . H. P. to be transmitted . . . R. P. M. of Clutch Shaft . . . Space available for installation . . . Diameter of Shaft. . . . D. C. Voltage.

STEARNS STYLE "F F P"

Friction—Positive—Brake Combination

The Stearns Style "FFP" Clutch-brake has the unique combination of positive clutch, friction clutch and friction brake and is the answer to a demand for a positive jaw action clutch, having the flexible, smooth starting properties of a friction clutch.

It is the only positive clutch that can be engaged at normal motor speeds. It also provides smooth acceleration, positive non-creep running and split second, disc brake stopping. Simplified control, consisting of push button stations for starting, running and stopping can be conveniently located to provide for easy, instant control by the operator.

This combination offers one of the many styles and applications available by the Stearns Company.

HIGH STEARNS DUTY

Magnetic Separating and Concentrating Equipment

Magnetic Separators—Wet and Dry Process—"Stearns High Duty" Magnetic Separators, standard or induction types for separation or concentration of ores, minerals, sands, food stuffs, ceramic ware, grain, powder and powdered materials, etc.

Crusher and Pulverizer Protection—"Stearns High Duty" Magnetic Pulleys, Drums, Apron Conveyor and Suspended Magnets for extraction of tramp iron, etc.

Laboratory Facilities

Send material for test—(25 to 50 lbs. prepaid) properly prepared, quartered and sized (20 to 80-mesh usually give best results if commercially feasible). Include all helpful data possible to enable us to handle the problem intelligently. Describe requirements in detail, results desired, hourly capacity, chemical analysis, electric current available, etc. Laboratory report and recommendations, also separated samples of material, will be submitted for your consideration, inspection and analysis. *Tests are made on commercial size separators which permit of duplication in commercial operation.*

Expert Magnetic Engineering Service

Your problem, if placed in the hands of Stearns Engineers, will be determined on a performance basis, and recommendations will be made which will maintain high efficiency and performance. *Thirty-five years' experience at your command.*

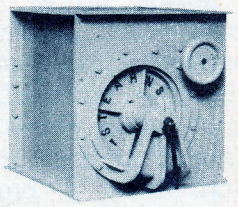


Fig. 416
"Stearns High Duty" Spout Separators with feed regulation and automatic iron discharge, fully enclosed, dust-tight and of all metal construction.

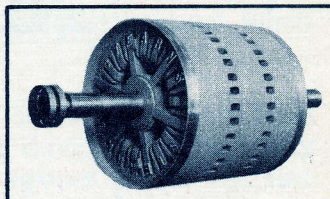


Fig. 417
"Stearns High Duty" Magnetic Pulleys made in all sizes for conveyor applications, also furnished in complete short belt separator units.

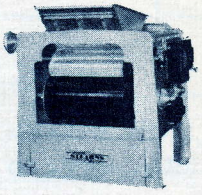


Fig. 141
"Stearns High Duty" Drum Type Magnetic Separator for separating impurities, iron, etc., from brass turnings and similar materials.

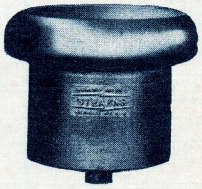


Fig. 404
"Stearns High Duty" Magnetic Separator designed for purifying liquids and other materials in solution. Especially recommended for ceramic ware and similar products.

HIGH STEARNS DUTY MAGNETIC EQUIPMENT

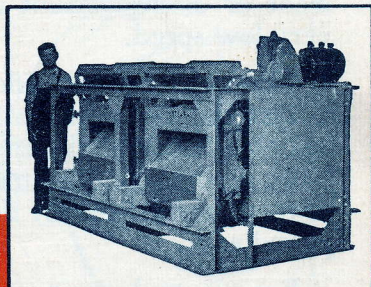


Fig. 295
"Stearns High Duty" Induction Separator for concentration of ores, minerals, etc., also for purifying glass, sand and similar materials containing iron compounds, oxides, and other similar detrimental impurities.

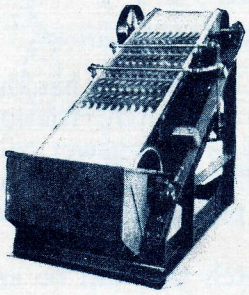


Fig. 150
"Stearns High Duty" Magnetic Separator for separating ores, sands, and other material by the wet process.

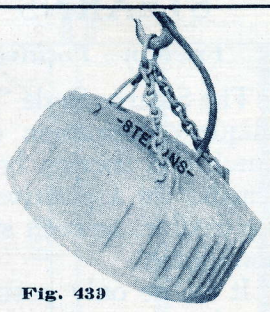


Fig. 439
"Stearns High Duty" Suspended Magnets, designed in a wide variety of sizes and in circular, rectangular and other shapes, for magnetic separation and special applications.

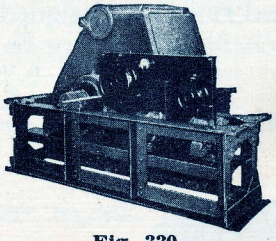


Fig. 220
"Stearns High Duty" Alternating Pole Drum Type Separator for concentration of magnetite ores and similar material in dry state.

1940

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LARGEST EXCLUSIVE BUILDERS OF MAGNETIC EQUIPMENT