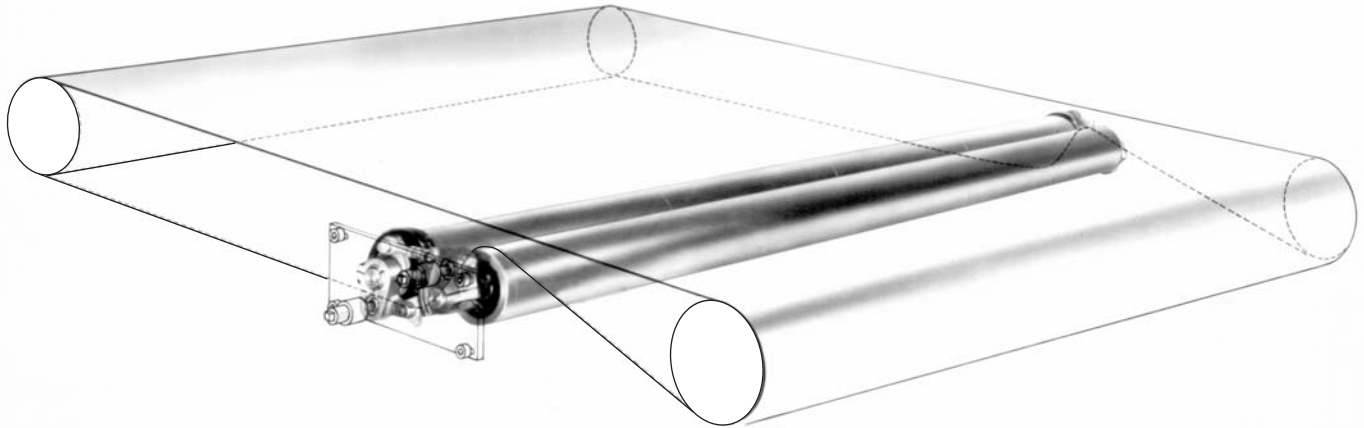


DISCIPLIGN™

trains your wayward belts to go straight



DISCIPLIGN™ **The self-energized Belt Guide.**

- DISCIPLIGN, when built into conveyors or special machinery, provides accurate, continuous, automatic alignment of wide, flat belts.
- DISCIPLIGN is completely mechanical and self-energized, no external source of power is required.
- DISCIPLIGN is especially suited for use on belt systems of short head-to-tail center distances ranging from less than two feet to 30 feet or more and widths to 96 inches or wider.
- DISCIPLIGN reduces costly belt maintenance and downtime by minimizing edge wear.
- DISCIPLIGN provides precision guiding of payload.

MANUFACTURED BY



CORPORATION



The DISCIPLIGN Belt Guide

The DISCIPLIGN guide is a self-energized mechanical aligning device for use with flat conveyor belts. Its operating speed is typical of that found in special machinery: from a few feet per minute to 150 feet per minute or more.

In its standard form, it consists of a pair of tracking rollers over which the belt passes, and includes a pair of Drive Drums, which are activated by the moving belt itself. In such configuration the guide is referred to as the standard “two-roller DISCIPLIGN”, and is especially suitable for use on belt systems of short head-to-tail center distances.

In certain applications involving long belt systems, it may be advantageous to use the device configured with 3 rollers, in which case the guide is referred to as a “three-roller DISCIPLIGN”, and is described on Pages 5 and 6.

The DISCIPLIGN is offered in three basic sizes designated 3, 4, or 5. Each size designation indicates in inches the diameter of its rollers.

A typical installation of the standard

two-roller DISCIPLIGN guide is shown in Figures 1 and 2. Tracking rollers are mounted locations **X** on spherical bearings supported by removable pins **Y**. Mounting brackets are offered for ease of installation, or the purchaser may install his own means of mounting.

One tracking roller (called the active roller) is activated at each end with a Drive Drum and this roller may be divided into segments for increased tracking sensitivity. In operation, the Drive Drums, containing planetary gears linked to the roller, respond automatically to a lateral displacement of the belt if it should move to either side of center. The Drive Drums receive power from the belt edge and impart a corrective shift to the roller.

The second tracking roller is a follower, and is not equipped with Drive Drums. This roller may or may not be divided into segments, depending upon the application. Besides serving as part of the guiding system, the follower roller dampens and restricts excessive shifting of the active roller to minimize overshooting.

2-Roller DISCIPLIGN

BELT TYPE Nearly any kind of good quality flat belting ranging in thickness from 1/16 through 5/16 inch may be used. Belts should have good lateral stability for a given width, and not be prone to fraying and raveling. Cleated belts are not normally usable, but rough-top types may be used if not too thick to pass properly between the tracking rollers.

Accuracy of Tracking Tracking accuracy is dependent upon the accuracy of the belt width, and upon the accuracy with which the mating edges of the belt are aligned with each other at the lacing.

The belt is kept tracking within space **K** between the drive Drums, Figure 2, by the action of the DISCIPLIGN mechanism. The belt width must be less than dimension **K**, but if the belt is accurately cut to width, and carefully laced, accuracies of the order of $\pm 1/16$ inch from center, or closer, can be held.

In less demanding applications, dimension **K** is made larger than the belt width by an amount equal to the belt width manufacturing tolerance, plus additional clearance of from 1/8 to 1/4 inch.

Selection Size selection is made from the three available sizes of DISCIPLIGN guides using the data in Table 1. Size selection is based upon thickness of belt, width of belt, and the total belt tension imposed upon the tracking rollers. For detailed selection information, see page 7.

Installation Generally, the DISCIPLIGN guide should be installed nearest the head or tail pulley toward which the return side of the belt is approaching, as illustrated in Figure 1. Usually, only one guide is required for belt systems of 30 ft. or less head-to-tail length. For minimum load on the guide, installation preferably should be made in the slack side of the belt system, but this is not essential so long as the maximum belt tension load as given in Table 1 is not exceeded. Special consideration is given to long belt systems by use of the three-roller DISCIPLIGN, as described on Page 5.

The DISCIPLIGN guide is intended for installation in a dry environment, but the internal parts are protected from dirt to an extent approximating shielded ball bearings.

Reverse Operation The DISCIPLIGN guide is inherently capable of reverse operation, but more care is required in locating the guide on the machine for a reversing belt system.

On a continuously-operated, reversing, short-centered belt system of about 8 ft. or less head-to-tail

center distance, the guide should be located preferably centrally between the head and tail pulley. Continuous reverse operation on long belt systems may require a guide at each end. For information relating to long belt systems, see Page 5.

If reverse operation is intermittent and for short periods of time, then the installation should favor the normal operating direction by locating the guide nearest the pulley toward which the return side of the belt is most frequently approaching, just as in one-way operation.

Belt Path Configuration It is not necessary for the belt to follow the exact path over the tracking rollers as shown in Figure 1. The belt may also be directed over the rollers in paths shown as examples in Figures 7 and 8.

Because the two Drive Drums on the active roller differ internally, the end-for-end orientation, when installing this roller, depends upon the belt path chosen. The follower roller, however, is installed without regard to end-for-end orientation. For details, refer to the Instruction Manual. If the belt is likely to be contaminated from the product it is transporting, then a belt path should be chosen to result in the inside, or uncontaminated side, of the belt in contact with the active roller, to minimize the transfer of contamination to the Drive Drums.

Mounting Brackets Two kinds of mounting brackets are offered for the 2-roller standard DISCIPLIGN: the Plate-Type in a typical installation, or the purchaser may install Threaded-Bosses by welding, as shown in Figures 5 and 6. Only the Plate-Type is offered for the 3-roller DISCIPLIGN, and is described in Figures 12 and 13.

The Plate-Type, Figures 3 and 4, requires mounting holes and a clearance hole of dimensions **S** x **T**, or if desired merely oversized holes through which the support pins **Y** may pass.

The Threaded-Boss Type shown in Figures 5 and 6 may require more shop capability on the part of the installer, but offers a more compact installation. The Threaded-Bosses are welded over tap-drill-size holes provided by the installer in the machine frame. After welding the bosses to the machine frame, the thread in each is completed by tapping.

When installing the rollers on the threaded pins **Y**, it is **important to allow a lateral clearance of 1/64 to 1/32 inch** between the pin should and the spherical bearing. Each threaded pin is locked in place by two setscrews, each with nylon packs to prevent marring the threads.

2-ROLLER DISCIPLIGN

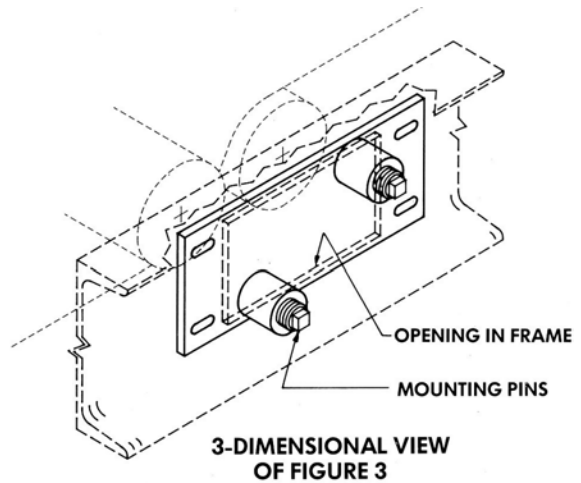
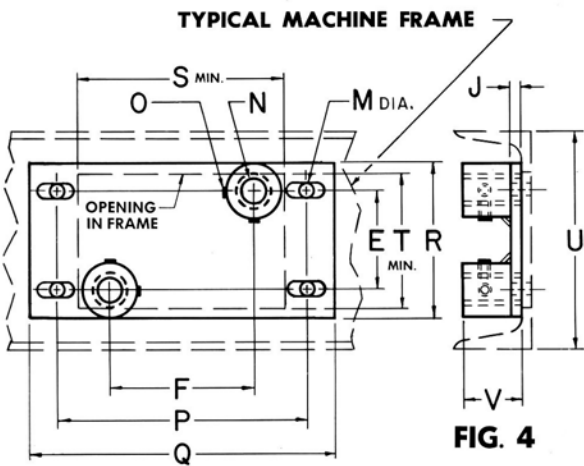
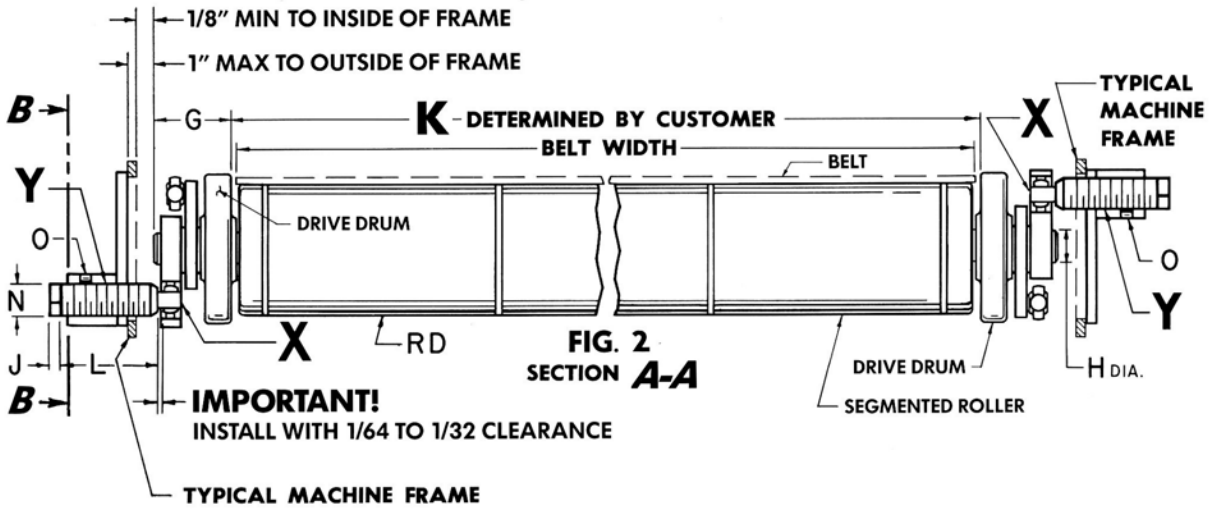
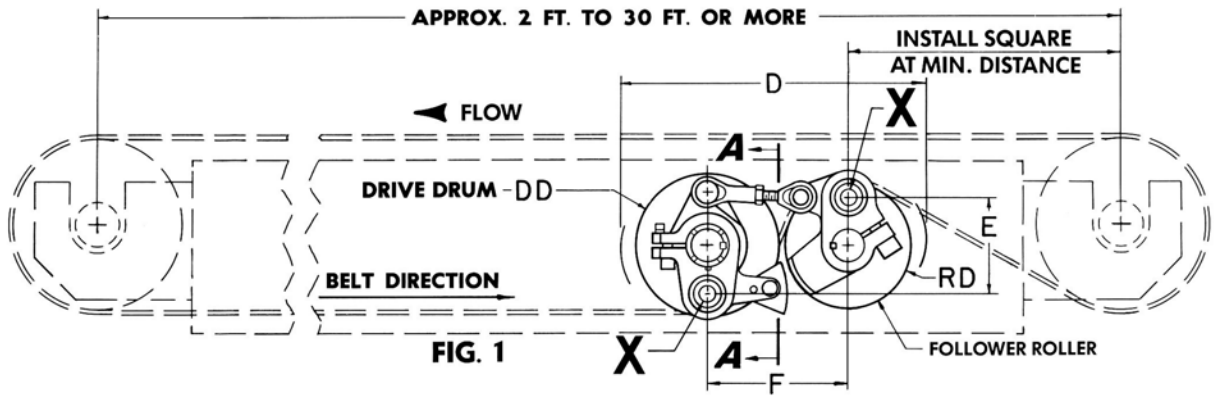


FIG. 3 TYPICAL SECTION **B-B**

2-ROLLER MOUNTING BRACKET

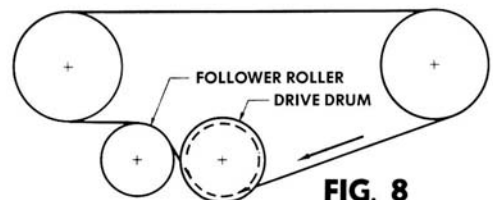
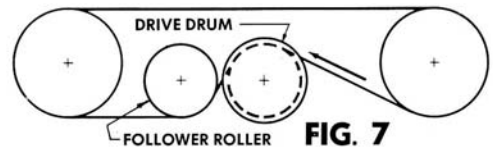
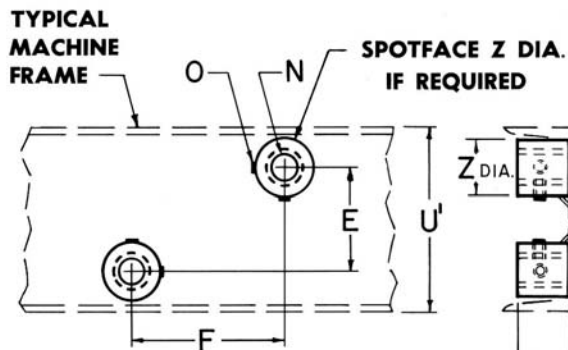


FIG. 5 TYPICAL SECTION **B-B**

FIG. 6

FIG. 8

TABLE 1 for Figures 1 through 6, page 4

DISCIPLIGN SIZE	ROLLER DIA. RD	DRUM DIA. DD	BELT THICKNESS		MAX. BELT		MAX. ROLLER SHIFT D	E	F	G	H	J		
			MIN.	MAX.	WIDTH	LOAD -LBS.								
3	3	3 $\frac{1}{2}$	$\frac{1}{16}$	$\frac{3}{16}$	60	900	7 $\frac{5}{8}$	2 $\frac{1}{4}$	3 $\frac{5}{16}$	1 $\frac{11}{16}$	$\frac{3}{4}$	$\frac{1}{4}$		
4	4	4 $\frac{5}{8}$	$\frac{3}{32}$	$\frac{1}{4}$	72	1745	9 $\frac{3}{4}$	3	4 $\frac{3}{8}$	2	1	$\frac{5}{16}$		
5	5	5 $\frac{3}{4}$	$\frac{5}{32}$	$\frac{5}{16}$	96	2780	11 $\frac{7}{8}$	3 $\frac{3}{4}$	5 $\frac{7}{16}$	2 $\frac{3}{8}$	1 $\frac{1}{4}$	$\frac{3}{8}$		
	L	M	N	O	P	Q	R	S	T	U _{MIN.}	U' _{MIN.}	V	W	Z
3	2 $\frac{1}{2}$	$\frac{9}{32}$	$\frac{3}{4}$ -16	$\frac{1}{4}$ -28	7	8 $\frac{1}{4}$	3 $\frac{1}{2}$	5 $\frac{1}{4}$	3 $\frac{1}{4}$	5	4	1 $\frac{3}{8}$	1 $\frac{1}{8}$	$\frac{1}{4}$
4	2 $\frac{3}{4}$	$\frac{11}{32}$	1-14	$\frac{5}{16}$ -24	8 $\frac{3}{8}$	10	4 $\frac{1}{2}$	6 $\frac{3}{4}$	4 $\frac{1}{4}$	6	5	1 $\frac{9}{16}$	1 $\frac{1}{4}$	1 $\frac{5}{8}$
5	3	$\frac{13}{32}$	1 $\frac{1}{8}$ -12	$\frac{5}{16}$ -24	10	11 $\frac{3}{4}$	5 $\frac{1}{2}$	8 $\frac{1}{4}$	5 $\frac{1}{4}$	7	6	1 $\frac{7}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$

Guiding Long Belt Systems

USING TWO-ROLLER DISCIPLIGN GUIDE

Long belt systems require special consideration for guiding the belt because the two ends of the belt system are remote from each other and behave independently in respect to belt alignment.

On such systems, one two-roller DISCIPLIGN guide installed in the normal manner will guide the belt at the loading (starting) end, but not at the remote, discharge end. A second two-roller DISCIPLIGN guide installed at the remote end, in the lower (return) web of the belt will be non-functional, since the installation would be in the web moving away from the pulley. The second DISCIPLIGN could be installed in the upper (top) web, which is approaching the pulley, and be quite functional, but the DISCIPLIGN so installed would create a hazardous "bite" as well as potentially entangling the transported material.

One method to train the belts on such long systems is to use one two-roller DISCIPLIGN guide at the loading end, installed in the normal manner and train the belt at the remote end by use of conventional means, that is, by fore and aft adjustment of the remote pulley, and/or use of crowned rollers.

USING THREE-ROLLER DISCIPLIGN GUIDE

A second method of training the remote end of the system is by use of a three-roller DISCIPLIGN installed in the upper web of the belt near the discharge end.

The use of three rollers permits some types of transported material to bridge over the "bite" that otherwise is presented by a two-roller DISCIPLIGN installed in the upper web. When configured with three rollers, a gap in the path still exists, but does not present a hazardous bite.

The three-roller DISCIPLIGN is mainly useful when transporting material of sufficient size or length to pass over the gap in the belt path.

Figure 9 shows diagrammatically a long belt system with a two-roller DISCIPLIGN at the loading end, and a three-roller DISCIPLIGN installed at the discharge end. Detailed information is shown in Figures 10, 11, 12, 13 and 14.

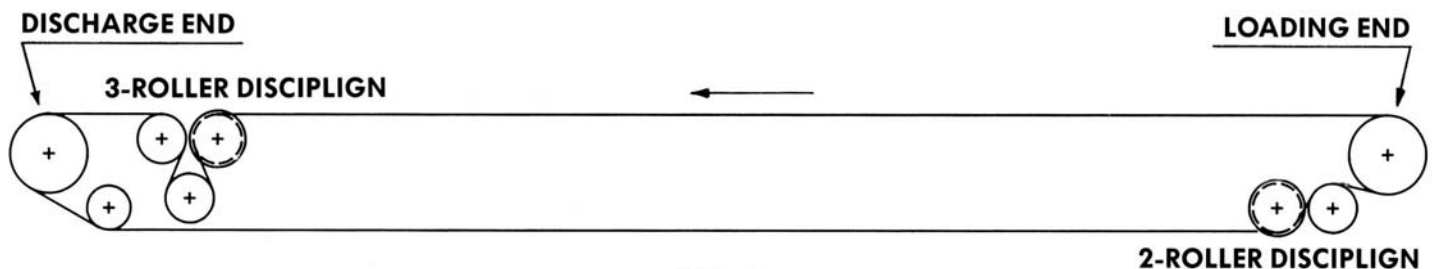
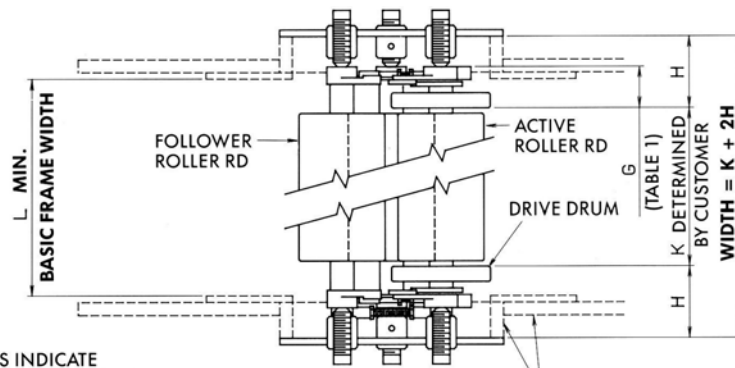


FIG. 9

3-ROLLER DISCIPLIGN



SOLID LINES INDICATE
DISCIPLIGN COMPONENTS
DASHED LINES INDICATE
USER SUPPLY

FIG. 10

USER-SUPPLIED FRAME STRUCTURE
SEE 3-DIMENSIONAL VIEW

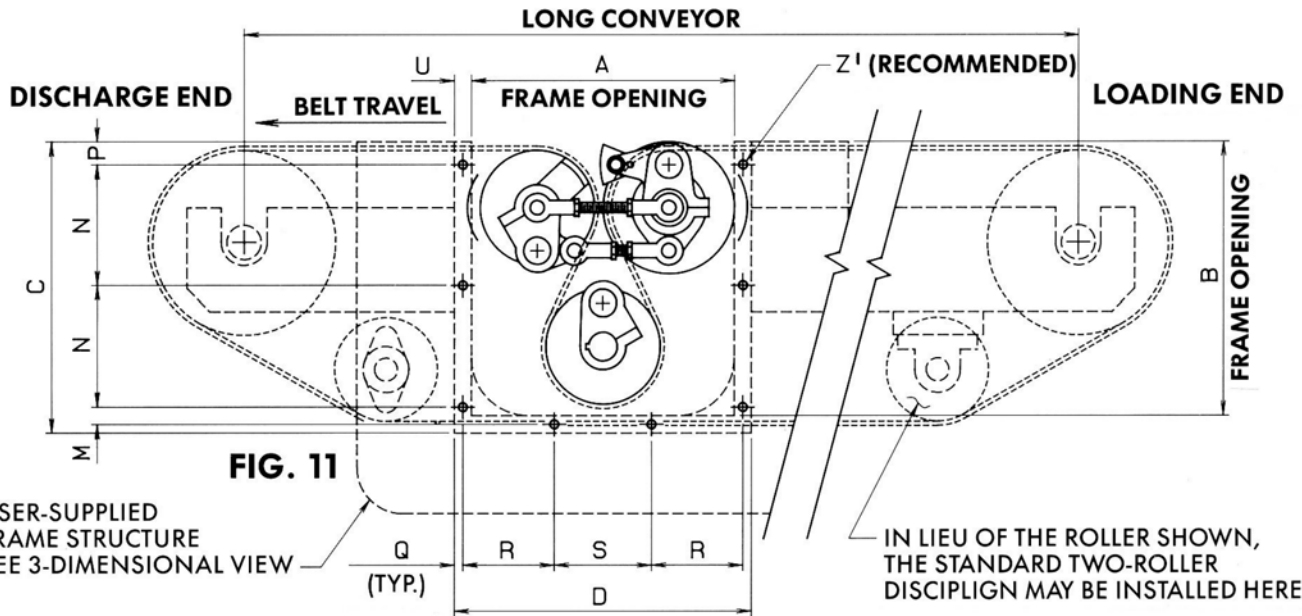


FIG. 11

USER-SUPPLIED
FRAME STRUCTURE
SEE 3-DIMENSIONAL VIEW

IN LIEU OF THE ROLLER SHOWN,
THE STANDARD TWO-ROLLER
DISCIPLIGN MAY BE INSTALLED HERE

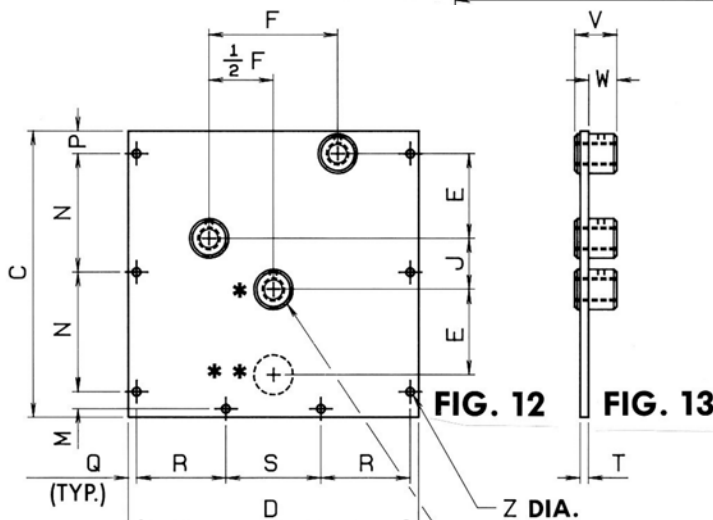


FIG. 12

FIG. 13

3-ROLLER MOUNTING BRACKET

ONE REQUIRED WITH BOSS AT *
ONE REQUIRED WITH BOSS AT **

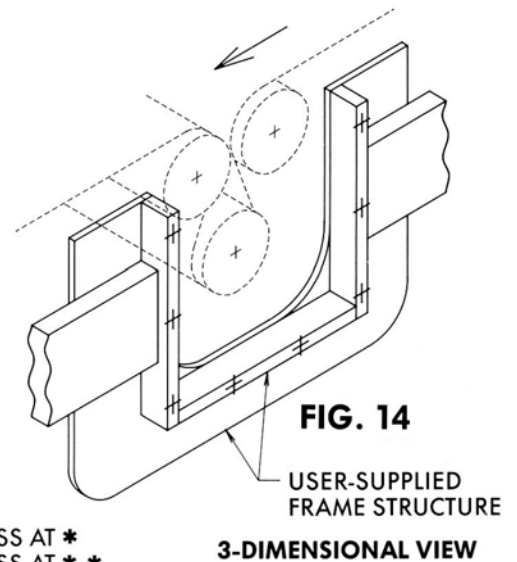


FIG. 14

USER-SUPPLIED
FRAME STRUCTURE

3-DIMENSIONAL VIEW

TABLE 2
for Figures
10 through 13

DISCIPLIGN SIZE	ROLLER DIA. RD (IN.)	A	B	C	D	E	F	H MIN.	H MAX.	J	L MIN.	M
3	3	8	7 ⁵ / ₈	8 ¹ / ₈	9	2 ¹ / ₄	3 ¹ / ₂	2 ³ / ₄	3 ³ / ₄	1 ¹ / ₂	K+1 ³ / ₄	5 ⁵ / ₈
4	4	9 ³ / ₄	10	10 ⁵ / ₈	11	3	4 ⁵ / ₈	3 ¹ / ₄	4 ¹ / ₄	2	K+2	7 ⁷ / ₈
5	5	11 ¹ / ₂	11 ⁷ / ₈	12 ⁵ / ₈	13	3 ³ / ₄	5 ³ / ₄	3 ⁷ / ₈	4 ⁷ / ₈	2 ¹ / ₄	K+2 ¹ / ₄	3 ³ / ₄
		N	P	Q	R	S	T	U	V	W	Z	Z'
3	3	3 ¹ / ₄	3 ³ / ₄	1 ¹ / ₄	2 ³ / ₄	3	1 ¹ / ₄	1 ¹ / ₂	1 ³ / ₈	7 ⁷ / ₈	9 ⁹ / ₃₂	1 ¹ / ₄ -20
4	4	4 ¹ / ₄	1 ⁵ / ₁₆	5 ⁵ / ₁₆	3 ⁷ / ₁₆	3 ¹ / ₂	5 ⁵ / ₁₆	5 ⁵ / ₈	1 ⁵ / ₈	1 ¹ / ₁₆	1 ¹ / ₃₂	5 ⁵ / ₁₆ -18
5	5	5 ¹ / ₄	1	3 ³ / ₈	4	4 ¹ / ₄	3 ³ / ₈	3 ³ / ₄	1 ⁷ / ₈	1 ¹ / ₄	1 ³ / ₃₂	3 ³ / ₈ -16

Selecting a DISCIPLIGN Guide

A Complete DISCIPLIGN Guide consists of these Principle Parts:

1. A tracking roller, activated at each end with a Drive Drum. This roller is usually made segmented if longer than 36 inches.
2. A follower roller of the same diameter as the active roller; the follower roller may be segmented, **but is usually supplied plain.** (See follower roller requirements below). If the DISCIPLIGN is a three-roller type, two follower rollers are supplied, one of which is segmented if longer than 36 inches. The second follower roller for the three-roller DISCIPLIGN is always supplied plain.
3. Mounting brackets, which may be either of the Plate-Type, or the Threaded-Boss Type, as described on Pages 4 and 5 for the two-roller DISCIPLIGN, or on page 6 for the three-roller DISCIPLIGN. Mounting brackets include the Threaded Pins **Y**, and linkages as pictured.

A two-roller DISCIPLIGN will be supplied unless a three-roller type is specifically ordered.

When Ordering a DISCIPLIGN Guide the Following Information is Required:

1. The DISCIPLIGN size.
2. The value of Dimension **K**, Figure 2, Page 4, and belt width.
3. Whether the follower roller is plain or segmented.
4. The type mounting brackets for the installation. (2-roller standard, Figures 3 and 4. 2 roller threaded boss type, Figures 5 and 6. 3-roller, figures 12 and 13.)

Size Selection First the belt width and thickness are obtained from the machine on which the DISCIPLIGN guide will be installed. Belt tension load is measured or calculated by conventional analysis.

If the guide is to be installed in the slack side of the belt system, then normally only the tension arising from belt tightening need to be considered when calculating tension load.

If the guide is to be installed in the tension side of the belt system, then both the static belt tension, and the tension arising from the dynamic load on the belt must be considered when calculating total load.

In Table 1, Page 5, refer to the Belt Thickness column, and find the maximum and minimum belt

thickness in which the belt fits.

If the belt width and maximum belt tension load as given in Table 1 is not exceeded, then the DISCIPLIGN guide size corresponding to the belt thickness is usually satisfactory.

If the belt is wider, or the total belt tension load for a given thickness is greater than that recommended in Table 1, then the next size guide for which these values are not exceeded is selected.

Determination of Dimension **K** The belt is kept tracking within space **K** (Page 4, Figure 2) between the two Drive Drums.

Tracking accuracy depends on the width of the belt compare to Dimension **K**; the closer **K** is to the width of the belt, the more accurately will the belt track.

In no case, however, must the belt edges contact both Drive Drums at the same time. Dimension **K**, therefore, is dependent upon the belt width manufacturing tolerance, and upon the accuracy with which the mating edges of the belt are aligned with each other at the lacing. Dimension **K**, then, becomes the maximum width of the belt, plus a small clearance to allow for lacing inaccuracies.

Follower Roller Requirement The follower roller, besides serving as part of the guiding system, also dampens and restricts excessive shifting of the active roller to minimize overshooting.

The follower roller may or may not be segmented. A segmented roller will follow the active roller more easily, and adds to the guiding of the belt, whereas the plain roller will provide more damping and restriction for the active roller to minimize overshooting. Excessive overshooting, while not necessarily harmful to tracking, causes the DISCIPLIGN guide to work more frequently, and therefore it may be expected to have a shorter life.

The selection of a plain Vs. segmented follower roller requires judgement on the part of the machine designer, but the following generalities will serve as a

1. On belt systems of simple path configuration; low tension; width less than 60 inches; and speeds above 90 feet per minute, the plain follower roller may be the best selection.
2. On more complicated belt systems with high belt tension; high friction of the belt on the rollers; width over 60 inches; and wherever good sensitivity is required, then the segmented follower roller may be the best selection.

Mounting Brackets Mounting brackets are selected to suit the physical requirements of the machine, and from considerations given on Pages 4 and 5. Special brackets are available upon request.

Optional Variations

1. Heavy Duty Bearings

For those applications involving high belt tension, the active and follower rollers may be supplied with spherical roller bearings in lieu of the ball bearings normally supplied.

2. Corrosion Resistant Rollers and Components

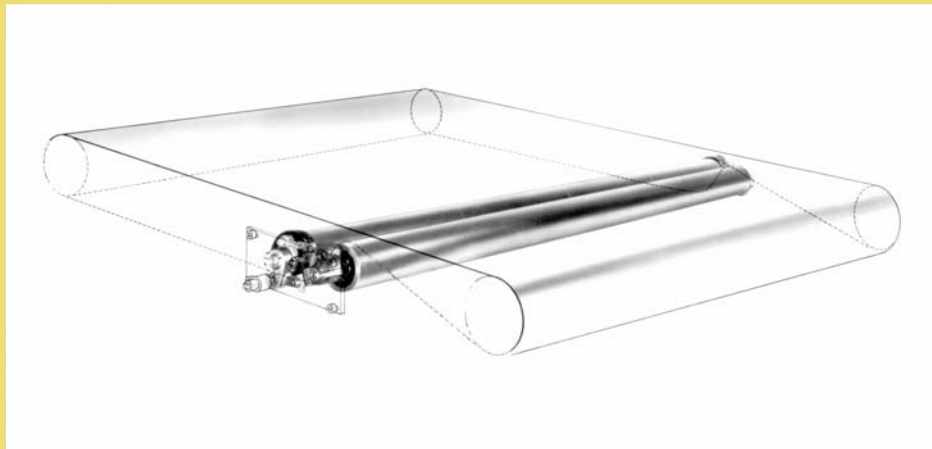
- a. The DISCIPLIGN rollers and or Drive Drum housing may be supplied zinc plated.
- b. In size 3 only, K less than 36 inches, rollers may be supplied in stainless steel.
- c. In Size 3 only, the Drive Drum housing and internal gears may be supplied in stainless steel.

3. Special Lubrication

The DISCIPLIGN mechanism is normally supplied lubricated with Number 0 Lithium-base grease, but may optionally be supplied with special grease for high temperature, or for applications involving handling of food.

4. Damping

Fast-moving belts (200 feet per minute or more) require special consideration relating to damping the action of the DISCIPLIGN to prevent rapid hunting. Special dampers may be supplied.



The
DISCIPLIGN™
**SELF-ENERGIZED
BELT GUIDE**

MANUFACTURED BY



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