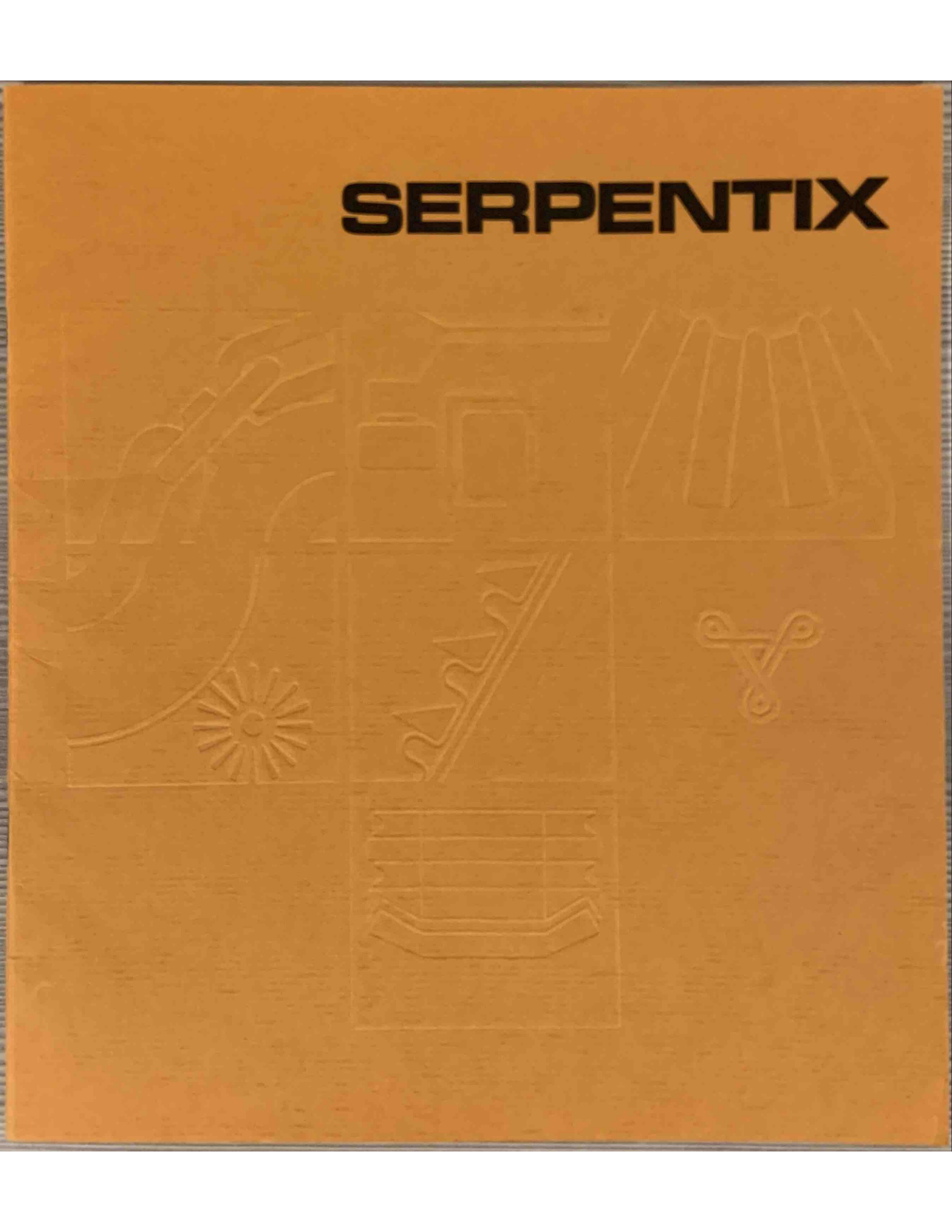
SERPENTIX



SERPENTIX

THE WORLD'S MOST VERSATILE TRANSPORTATION SYSTEM

The Serpentix conveyor is a flexible, continuous transportation system which makes all other conveyors obsolete.

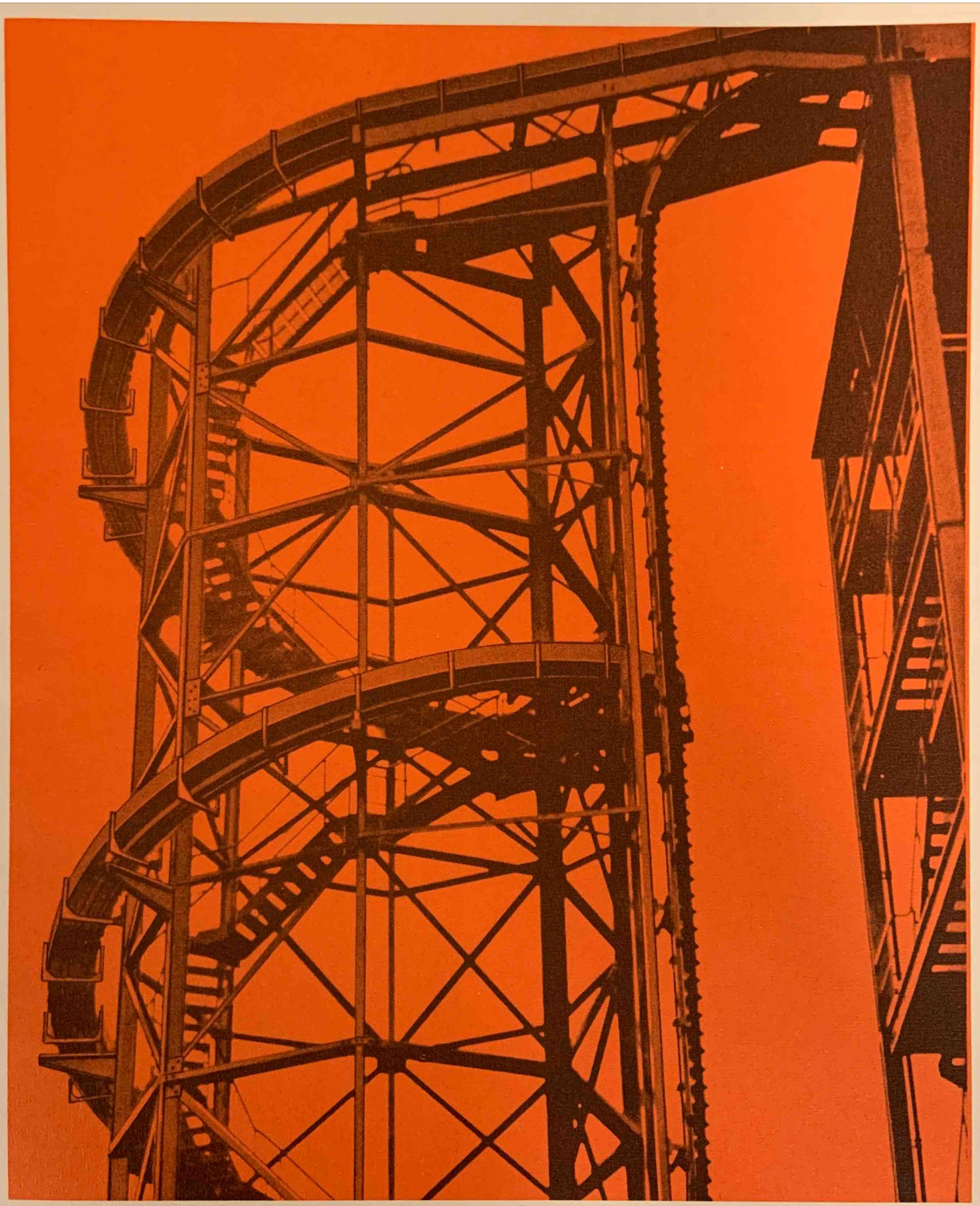
Now, Serpentix gives American industry a true conveyor system which can make complete turns, climb at angles up to 90-degrees, side discharge loads without slowing, and make load-bearing return runs.

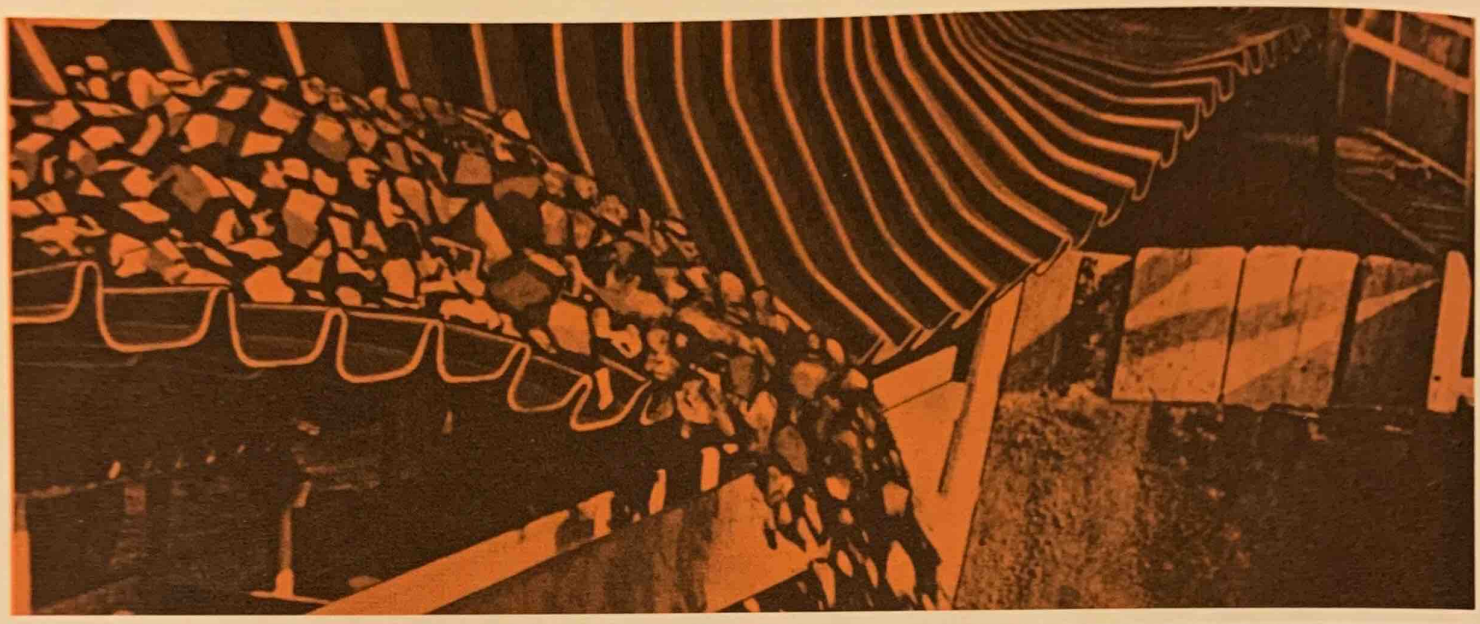
These unique capabilities eliminate the need for multiple conveyors, numerous and expensive drive stations and related equipment, and troublesome load transfer points — resulting in lower operating costs.

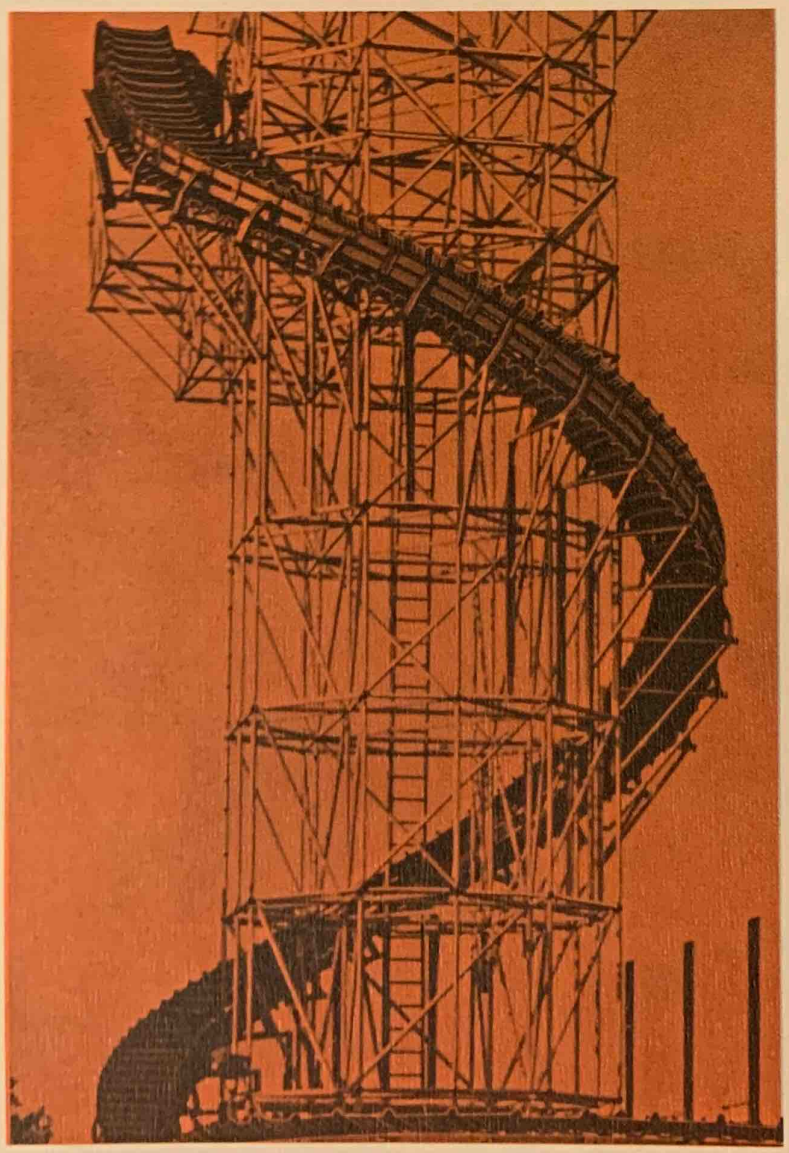
The Serpentix is designed and engineered for transporting material of the finest mesh as well as bulk and piece goods. And, the system can be automated to any degree desired — including closed circuit television, and remote selection of discharge points.

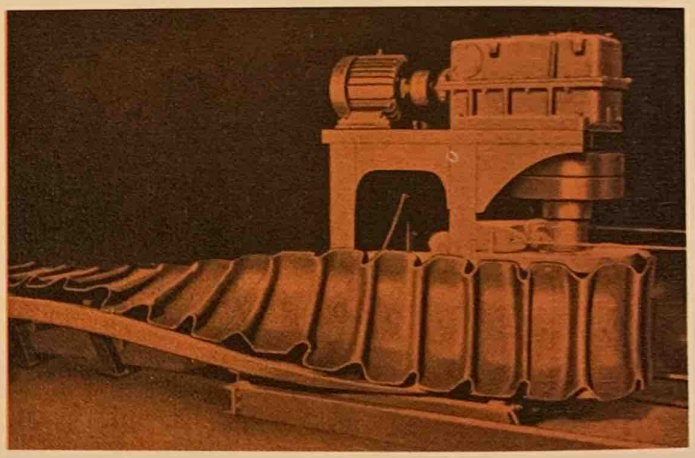
Originated in Europe, Serpentix conveyors have since helped sharpen the competitive positions of many space-cramped companies in highly industrialized areas throughout the world.

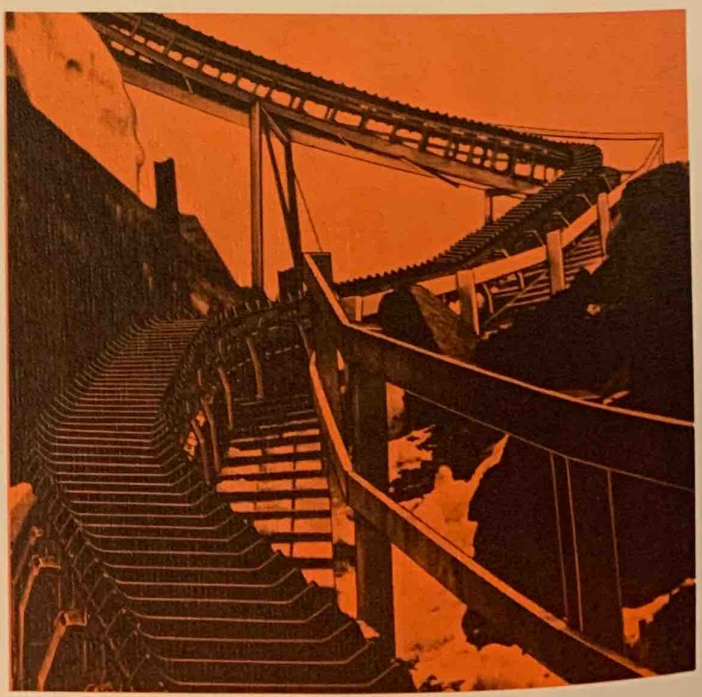
Serpentix conveyor systems now operate at more than 500 installations on five continents — carrying ore, coke and limestone to furnaces, aggregate and gypsum at cement factories, rocks from quarries, concrete to dam sites, clothes in textile factories, and even mail in post offices.





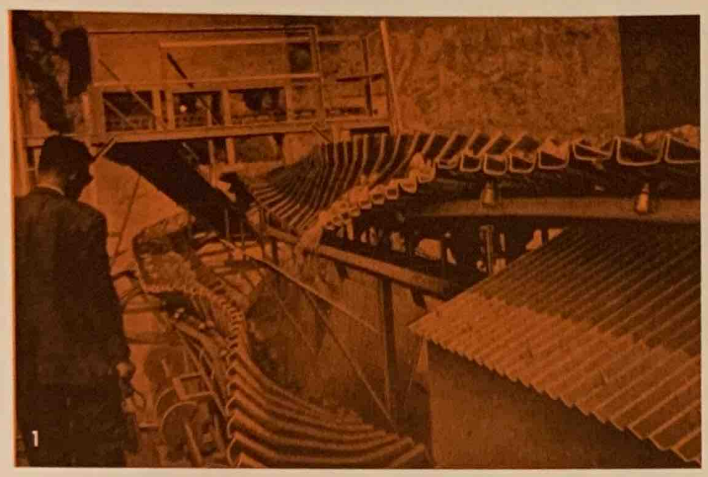


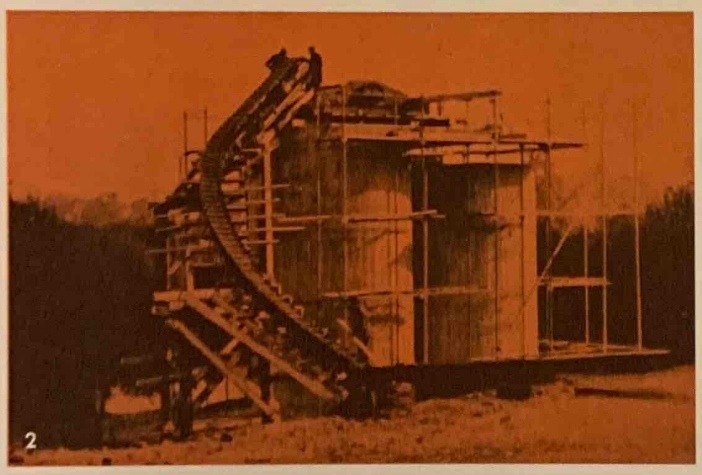


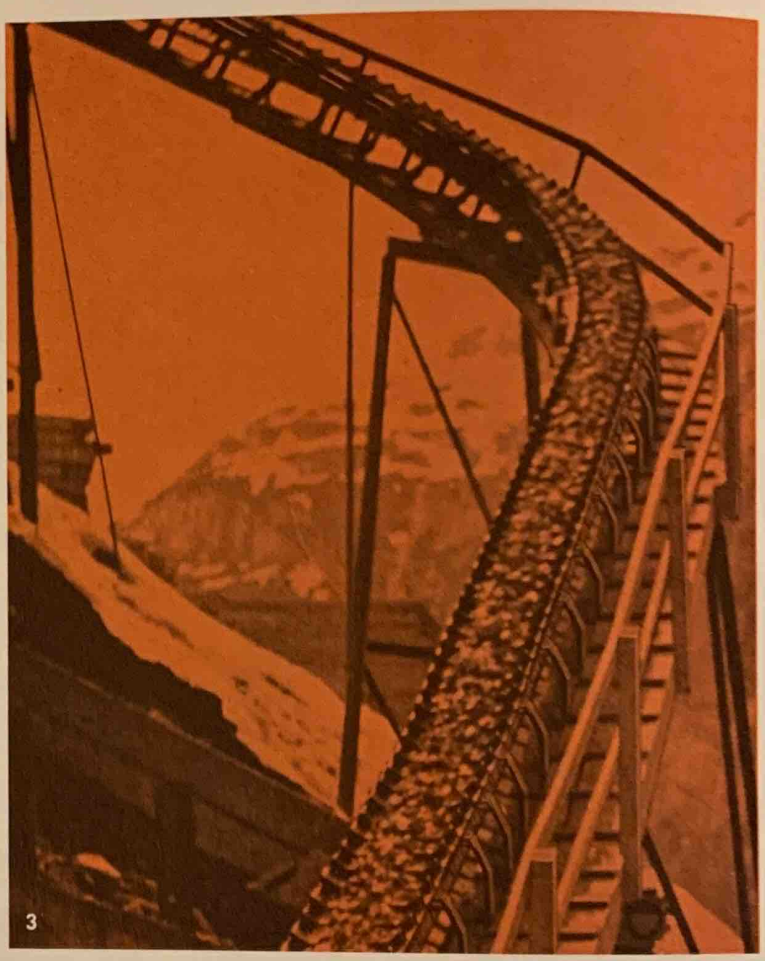


THE SYSTEM

AND ITS FLEXIBILITY







1 BECAUSE SERPENTIX conveyors can be instantaneously directed to deliver material to storage or production points, it can be "geared" to exact production requirements.

2 SERPENTIX OFFERS THE greatest possible space savings (volume and area) . . . an important factor in reducing the size of new plants and minimizing alterations to existing buildings.

3 A SINGLE SERPENTIX conveyor will replace multiple conveyors in any continuous transport system, regardless of length, degree of turn, and angle of climb.

3 ONLY SERPENTIX CAN PROVIDE an unlimited number of discharge points and loading positions . . . and permit operation of side discharges by manual, electro-mechanical, or remote control.

3 SERPENTIX PROVIDES ZERO-degree to 180-degree rotation of tracks and belt. Drive assemblies may be positioned at any point along the system and mounted at any angle up to 90-degrees.

4 SERPENTIX CONVEYORS have a greater load capacity (up to 10-percent more), per width, angle of climb, and speed. Natural belt "pockets" prevent drop-back or unintentional dumping of load.

THE SYSTEM

AND ITS ADVANTAGES

CLIMBING

The Serpentix conveyor can transport an infinite variety of materials straight up!

This can be done over a climbing, turning spiral where the degree of slope ranges as high as 40-degrees — without load slippage!

An almost vertical lift . . . where the angle of climb approaches 90 degrees . . . is possible. This is done by addition of special pockets to the modular Serpentix belt. The distance between the pockets can be adjusted to accommodate the characteristics and size of the material.

A major advantage when the conveyor is used for steep angles is that the direction of the belt can be changed at the points of loading and unloading. This maintains uniform loading and insures that pockets are totally emptied.

TURNING

Only Serpentix conveyors can make zero-degree to 180-degree turns in a single plane, complete 360-degree turns in a spiral, and turn in a radius as small as 7-ft.

This unique ability results from two important features of the system; modular, convoluted construction of the belt and use of a steel, case-hardened chain which "carries" and pulls the belt. This relieves the belt of the pulling strain which conventional conveyor belts experience — permitting the Serpentix belt to perform the more important task of gently cradling materials being transported.

Construction of the Serpentix belt results in high vertical rubber folds between each belt module. When turning curves, these folds allow the inner side of the belt to compress and the outer side to stretch. This flexibility makes possible horizontal turns within a 7-foot radius, and vertical curves within a 12¼-foot radius.

SIDE DISCHARGE

A major feature of the Serpentix is its side discharge capability, without which it would still be necessary to terminate the route to dump the load. Instead, fixed or moveable discharge stations can be installed at almost any point along the Serpentix conveyor route.

Side discharge is accomplished by tilting the belt surface to 90 degrees and back again to horizontal over a short distance. This is done by using flexible channel rails, within which the belt's roller carriages ride. The rails are formed over the full length of the desired discharge point as a series of short, interlocking increments. These pivotable "vertebrae" interlock around a shaft located midway between the rails. The belt is tilted by moving the vertebrae through 90 degrees at the center of the discharge station.

This side discharge capability makes Serpentix the only conveyor uniquely adaptable for operation by advanced automatic control systems. Side discharges can be operated electro-mechanically, pnuematically, or hydraulically; by direct or remote control.

LOAD BEARING RETURNS

Another major feature of the Serpentix conveyor is its two-way load carrying ability.

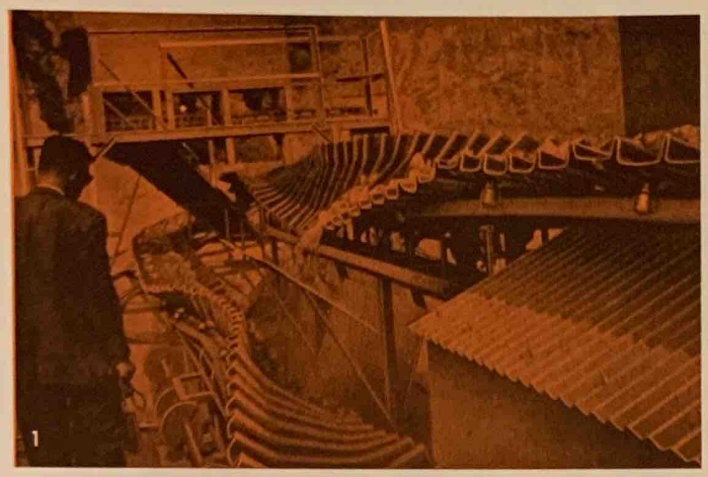
This is possible due to the extreme flexibility of the Serpentix belt and because the belt can be returned to its upright, load carrying position after discharging its original load. The belt can then be used for the return transport of the same or different materials.

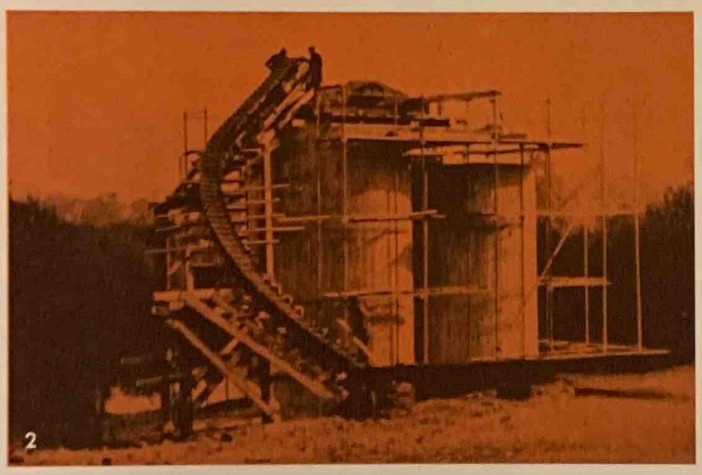
An added feature is that top-running, side-running, or bottom-running returns can be specified . . . permitting the most efficient arrangement and greatest space savings.

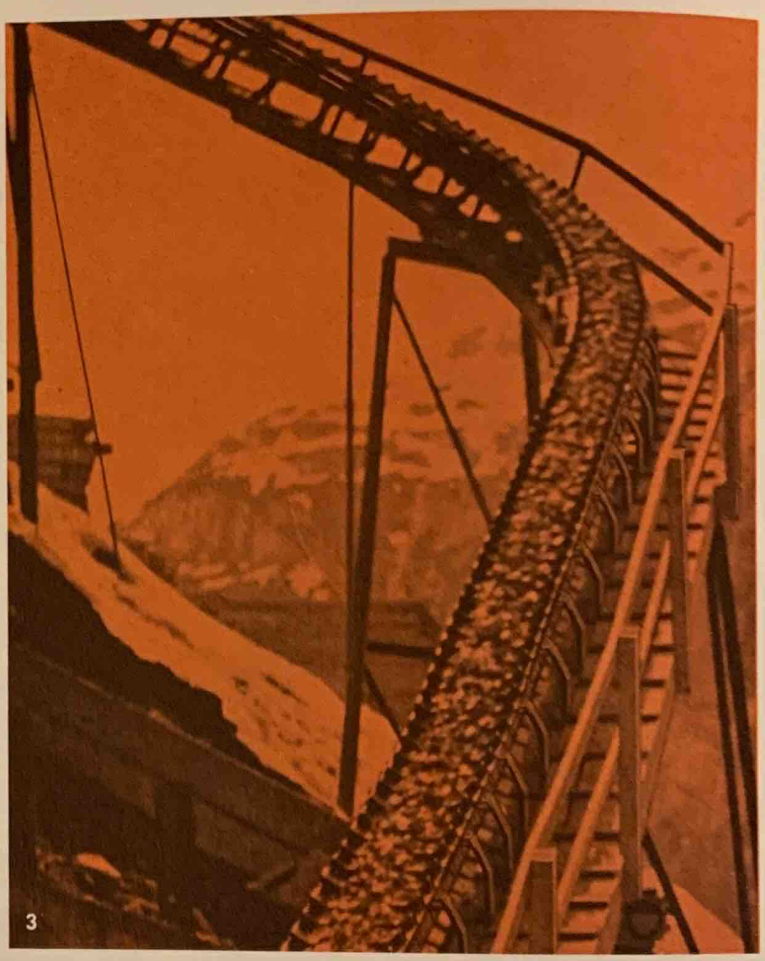
These four main features of Serpentix conveyors — climbing, turning, side discharge, and load bearing returns — give each Serpentix the advantages of a multiple-unit system. In addition, most Serpentix installations need only one drive station (which may be combined with tensioning), and except for the immediate area of the drive, is capable of conveying loads over a non-linear route.

THE SYSTEM

AND ITS FLEXIBILITY







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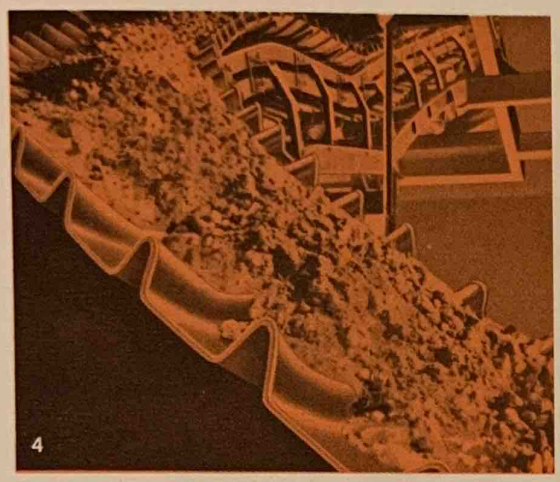
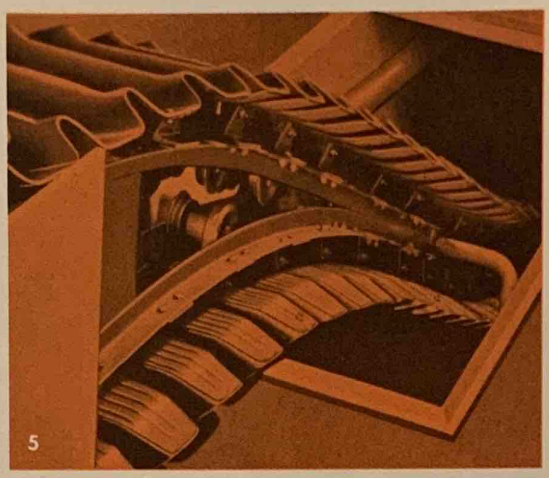
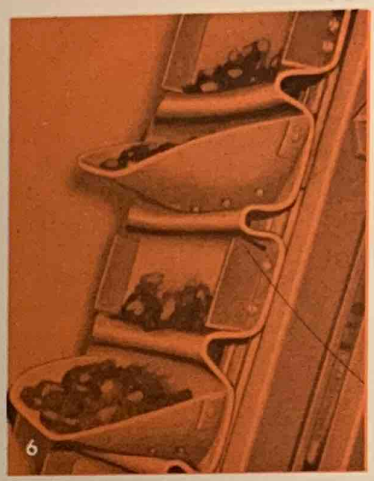
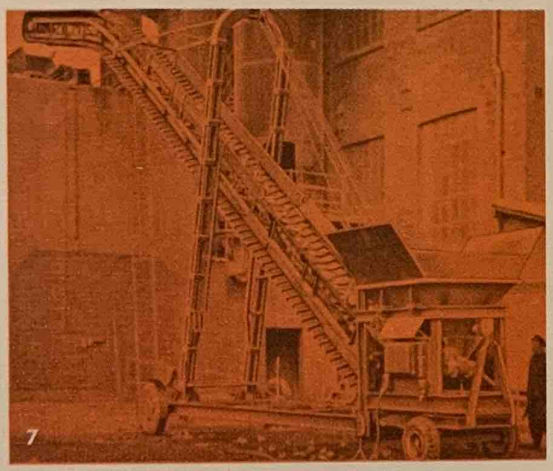
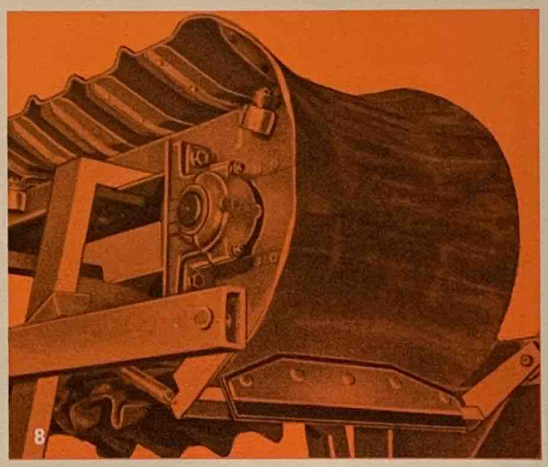








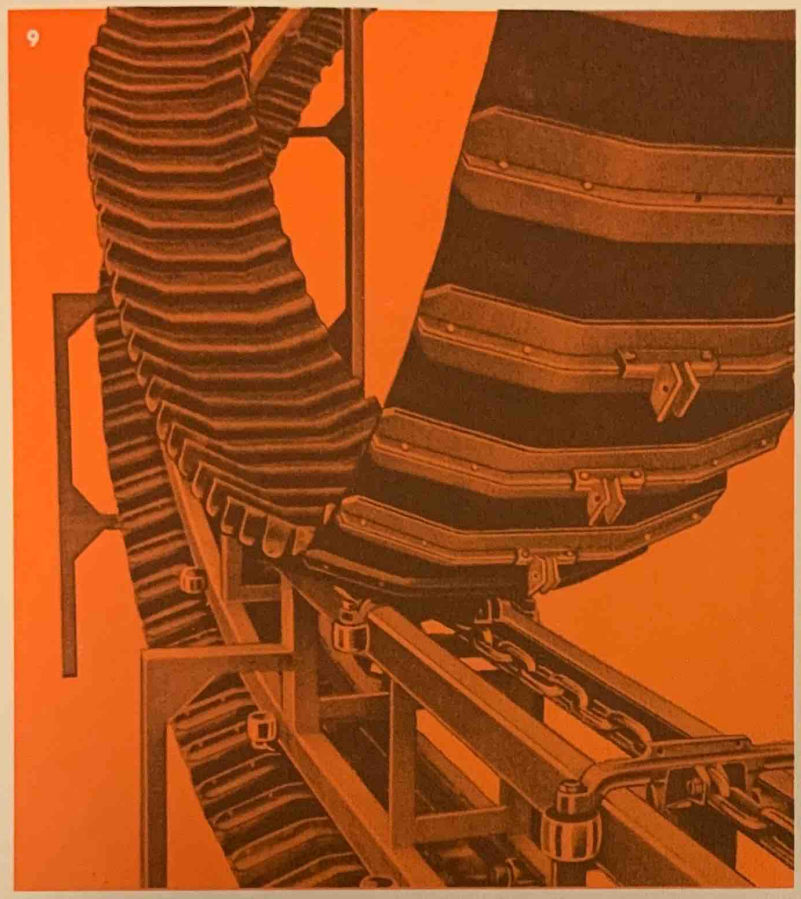


5 MODULAR BELT DESIGN permits belt and track to be added or removed to lengthen or shorten the conveyor. Also, belt damage from foreign objects is "localized," and damaged modules quickly replaced with minimum downtime.

6 EACH SYSTEM CAN BE "tailored" to meet all requirements posed as to capacities and types of material to be transported. Belt compounds to meet all service requirements are also available . . . including belts capable of operating at 500°F.

7 "CRADLE DESIGN" AND FOLDS IN belt give greatest load stability and capacity. Modular design also permits rapid assembly and disassembly of portable conveyor systems.

8 SELF-CLEANING ACTION TAKES place when rubber folds are pulled smooth at drive and tension points. Serpentix conveyors can also be equipped with automatic cleaning brushes and/or blades.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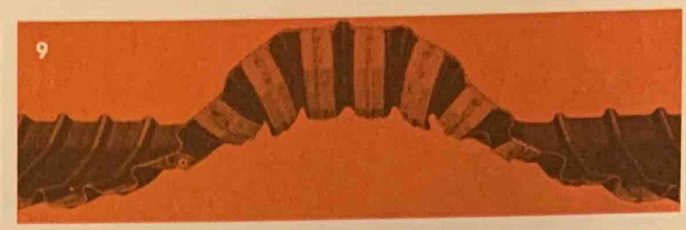
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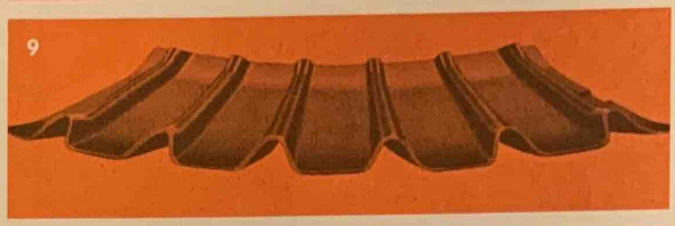
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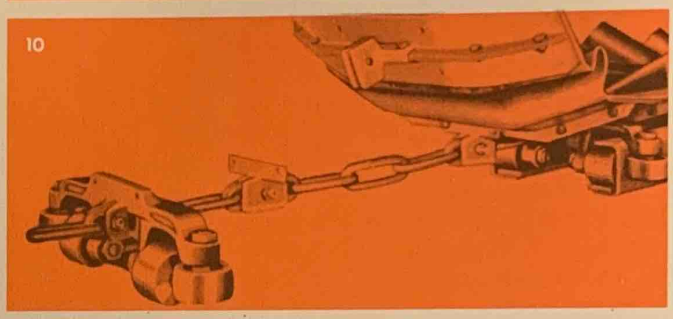
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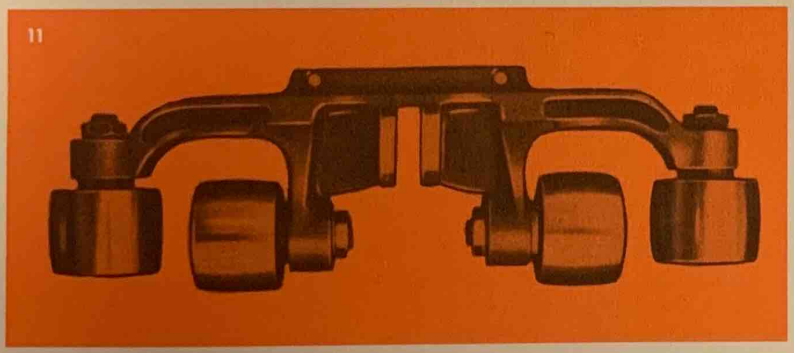
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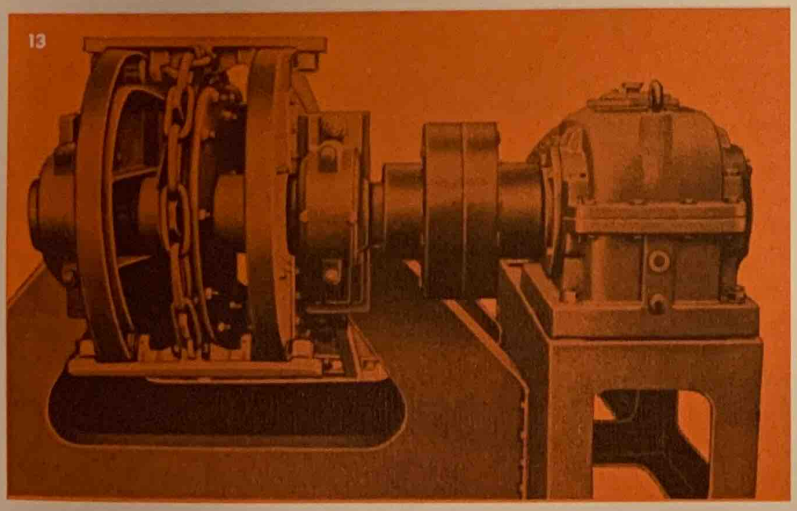
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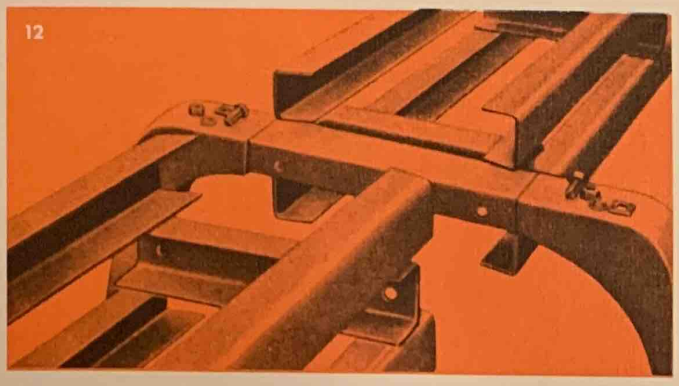
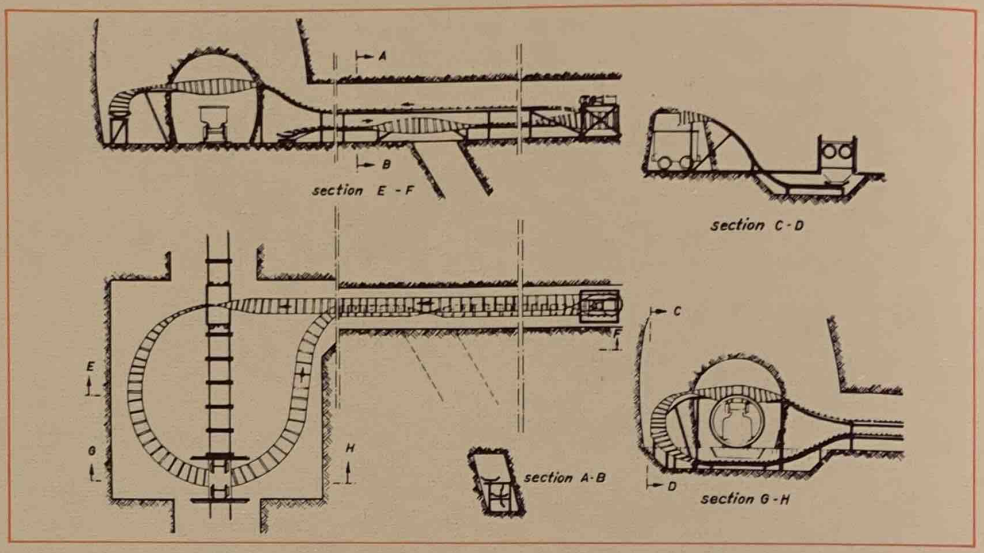

12

THE SYSTEM

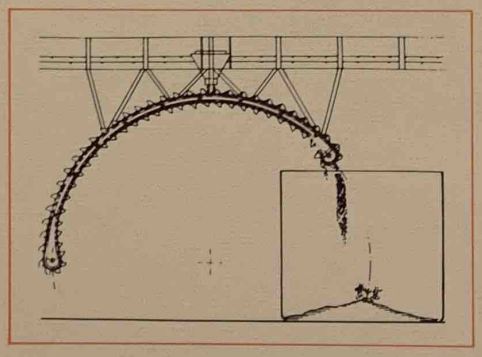
AND ITS APPLICATIONS

Serpentix makes possible a *single* conveying system extending for miles which could be fully automated for continuous operation. The system could be remotely controlled from a central point by computer or other instrumentation. Supervision of critical operational points — such as side discharge areas and automatic load zones — could be monitored constantly from central control via television. Such an installation . . . capable of transporting material of the finest mesh up to bulk and piece goods . . . could be operated by a single person.

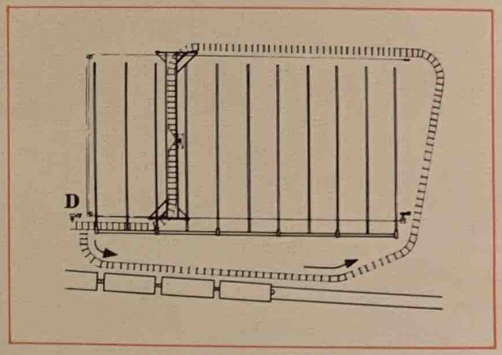


This 330-foot Serpentix conveyor was designed to carry 30 cubic yards per hour of fill and coal at a speed of 180-fpm in an underground mine. Mine cars loaded with fill enter the main corridor from the south and are flipped over onto the conveyor (Section G-H) by rotary car dump. The fill, used to prevent cave-ins, is carried along a narrow corridor on the lower part of the belt and dumped into worked out shafts (Section E-F). The conveyor's dump station may be moved or bypassed.

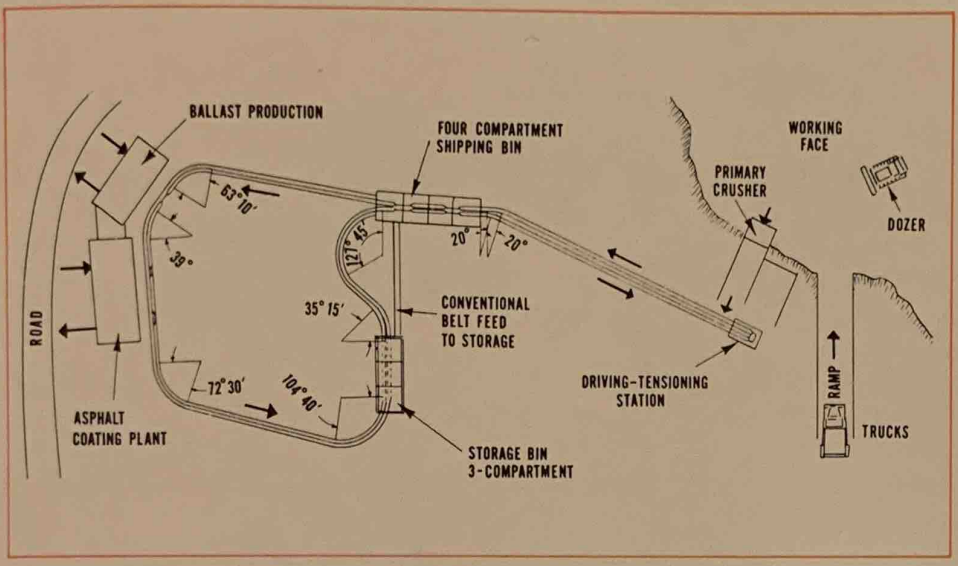
The mine cars, now righted after being emptied of fill, proceed north to a point under the raised part of the conveyor. Here coal, which has been loaded onto the upper part of the belt in the narrow corridor, is dumped into mine cars from above. Due to special conditions, the narrow corridor is angled so upper and lower belt sections (20-inches wide) cannot run in the same vertical plane (Section A-B). This is accomplished by using a space-saving vertical 5KW drive station at the end of the corridor.



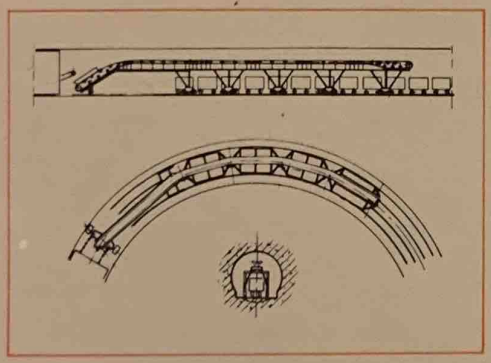
This Serpentix, outfitted with buckets, was designed to "follow the coke level" of a bunker and achieve a minimal drop to avoid disintegrating the coke. The 40-inch belt can be moved along the arc of a 15-foot radius and has a capacity of 65 cubic yards per hour, or 27.5 TPH. The position of the conveyor is automatically set by means of a probe which detects the level of the coke in the bunker.



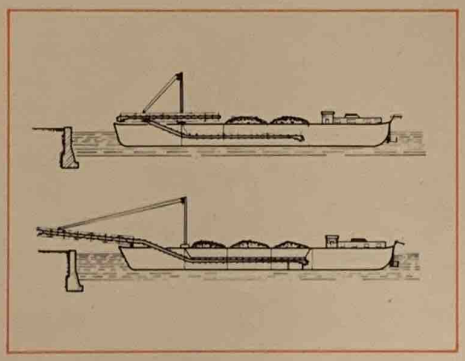
This installation utilizes the conveyor's unique flexibility, climbing, and turning abilities to distribute different grades of aggregate into 10 storage bins at 100 TPH via a gantry crane system. Beginning at the belt's single combined drive-and-tensioning station (D), the conveyor makes a vertical descent, then turns to receive material from the railway cars. Traveling at a rate of 180 fpm, it then makes a climb of 20-degrees around the north end to the height of the traveling crane which runs along the top. Since any point along the gantry may be automatically selected as a dump station, the bins can be quickly and completely utilized.



This Serpentix installation at a limestone quarry includes a single 1,060-foot route conveyor with eight side discharge stations. It transports 200 TPH in two directions at the same time, eliminating the need for nine conventional point-to-point conveyors, four trucks and seven men. The 26-inch belt easily transported 220 TPH of crushed limestone over a route that would be impossible with any conventional conveyor. Savings resulting from use of the Serpentix system enabled the company to pay off the entire cost of the Serpentix system within one year.



At a potash mine, a portable Serpentix conveyor has been designed to remove 110 TPH from behind an automatic mining machine, and along a narrow curving passage. The conveyor's 20-inch wide belt is mounted on a flexible trestle that allows the mine cars to run under it. The loading end of the 73-foot long Serpentix rests on a low, single-axle dolly which is chained to the continuous mining machine, thus allowing the entire system to proceed deeper into the mine without interruption of yield.



A barge has been outfitted with a unique Serpentix conveyor which automatically discharges its gravel cargo onto shore storage points at the rate of 150 TPH. The conveyor consists of two parts; one is permanently installed below bins, the second is mounted on a retractable jib boom. Just before anchoring, the jib is extended and the two parts of the belt are quickly connected to form a single conveyor 134-feet long.

THE SYSTEM

WITH OPTIONAL EQUIPMENT

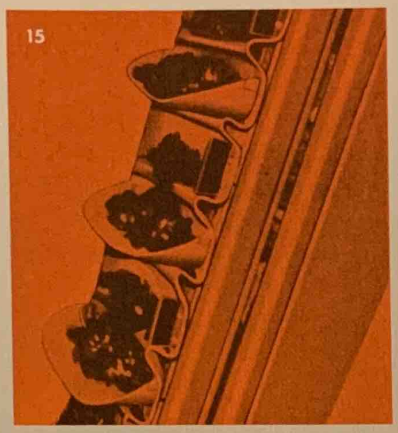
15 Rubber pockets can be attached to every second or third belt module of a standard Serpentix conveyor belt to increase the conveying capacity and to enable the conveyor to climb at angles of up to 90-degrees.

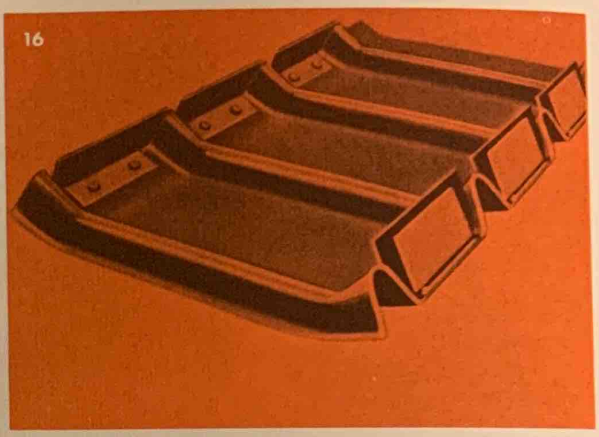
16 For systems requiring less steep climbs, special "side wall" attachments are available for standard Serpentix belts.

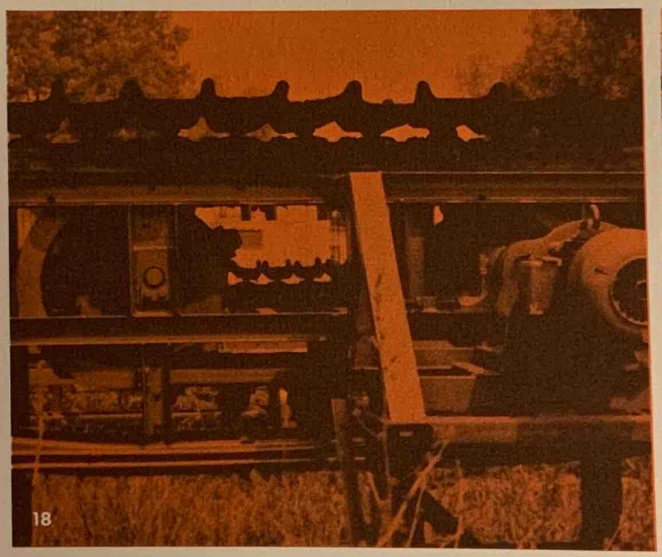
17 Stretching the folds flat at the drive and tensioning station is often sufficient to clean the Serpentix belt. However, special brushes or scrapers may be attached if additional cleaning is required. Belt brushes can either be chain driven from the drive shaft of the belt, or can be equipped with individual drives.

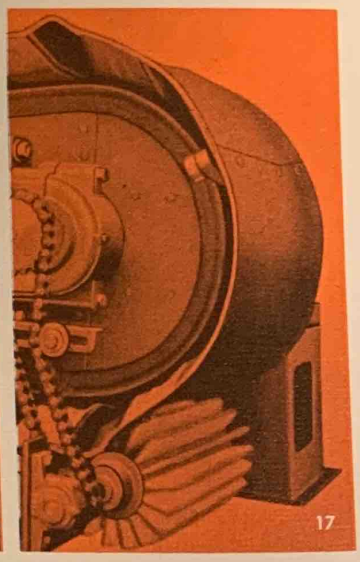
18 Almost unlimited length is possible with Serpentix conveyor systems with the use of intermediate drives. An important factor in use of intermediate drives is the reduction of the pulling forces of the chain. This increases the service life of the system and, consequently, lowers overall operating costs.

Every Serpentix system may also be completely hooded for dust control or other environmental reasons. In addition, the system can be equipped with silent running rollers where noise control is essential.





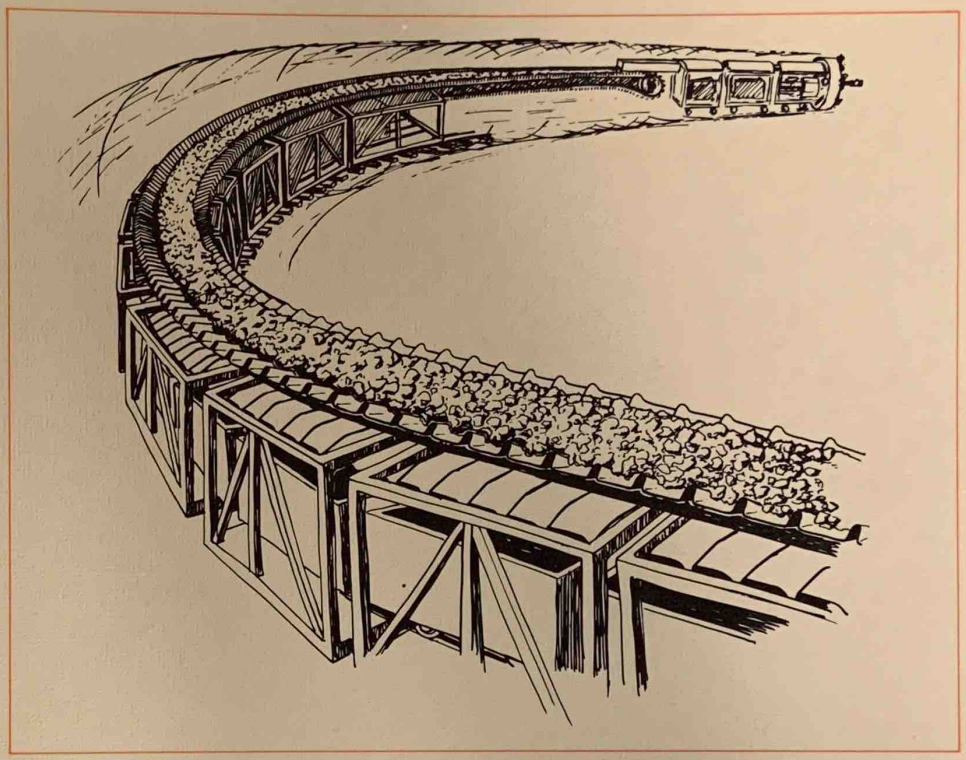




THE SYSTEM

FLEXIBLE BASE MODEL

A revolution in present-day mining concepts could result from combining the capabilities of the fixed base and flexible base Serpentix systems. Such a combination could result in a flexible base conveyor following behind boring machines at the mine face or power shovels in the pit, transporting newly mined ore to a fixed base Serpentix. The ore could then be carried through the mine or up the side of the pit and out to crushing mills for side discharge and processing. Such a system could extend for miles... intermediate drive stations being added as required. And, as the mine tunnel or pit progressed, the fixed base Serpentix could be lengthened quickly and economically due to the modular construction of the Serpentix' belt and channel rail support system.



A Serpentix conveyor system featuring an articulated track is available. The illustration shows such a system following behind a mining machine or tunnel boring machine, and delivering the muck to a string of cars. The conveyor is mounted on a gantry-type setup, which rolls on the same rails as the muck trains. For loading, the cars are pushed up a ramp into the gantry, and filled one at a time as the train is withdrawn. As operations decline in any area, the flexible Serpentix can be withdrawn and utilized in other situations where turns and curves prohibit the use of conventional conveyors.

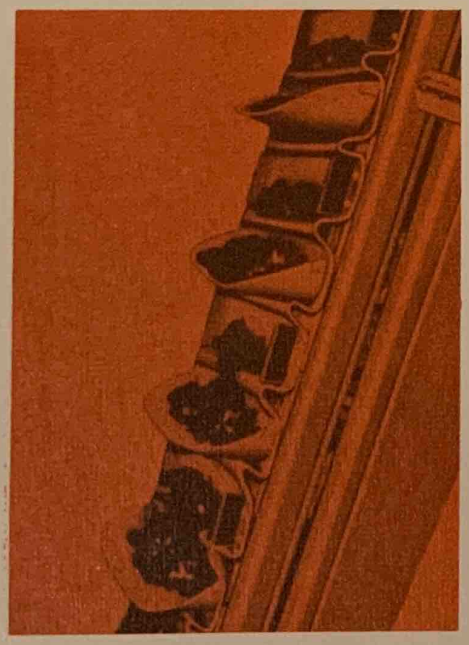
Applications other than those listed are limited only by imagination. Stock piling of materials through a 180-degree arc, and without material transfer points, would be possible by using a swinging boom connected to a stationary conveyor section by a segment of articulated track.

THE SYSTEM

ORDERING SPECIFICATIONS

CAPACITY IN CUBIC YDS/HR, HORIZONTAL WITH UNIFORM LOADING

20″	Q, in Yds ³/hr	50	56	70	80	90	100
Max Lump Size 6″	Belt Speed, fpm	106	120	150	170	190	210
	Rev of Drive Shaft, rpm	20	22.5	28	32	35.5	39.5
26″	Q, in Yds ³/hr	90	100	125	140	160	180
Max Lump Size 8″	Belt Speed, fpm	106	120	150	170	190	210
	Rev of Drive Shaft, rpm	20	22.5	28	32	35.5	39.5
32″	Q, in Yds ³/hr	140	156	190	220	245	275
Max Lump Size 12″	Belt Speed, fpm	106	120	150	170	190	210
	Rev of Drive Shaft						
	8 Tooth Sprocket	20	22.5	28	32	35.5	39.5
	12 Tooth Sprocket	13.3	15	18.8	21.3	23.8	26.3
40″	Q, in Yds ³/hr	230	260	320	365	410	460
Max Lump Size 16″	Belt Speed, fpm	106	120	150	170	190	210
	Rev of Drive Shaft						
	8 Tooth Sprocket	20	22.5	28	32	35.5	39.5
	12 Tooth Sprocket	13.3	15	18.8	21.3	23.8	26.3



STEEP ANGLE INSTALLATION

Fitting the Serpentix Conveyor with pockets enables it to convey materials at angles of up to 90°.

When considering steep-angle installations, the following design factors should be taken into account:

Material: dry easily running				
Size: 0 to 3/32″				
Angle: 60°				
Belt width in inches	20″	26″	32″	40″
Capacity Q, in cubic yds.	46	72	144	216
Material: dry				
Size: ⅝″ to 3¼″				
Angle: 60°				
Belt width in inches	20″	26″	32″	40″
Capacity Q, in cubic yds.	52	85	170	250

To ascertain these values the belt speed v = 200 fpm was taken.

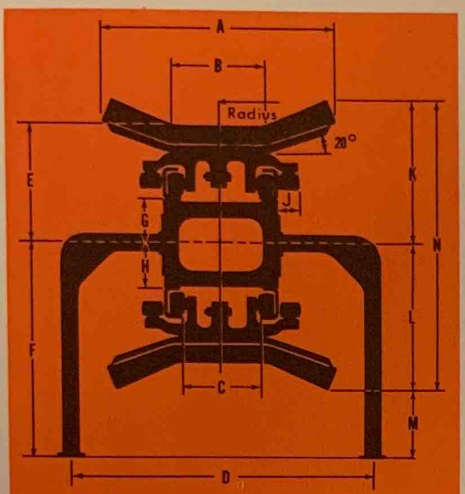


FIGURE 1: Cross-section of Standard Drive and Tension Stations. (Note 5)

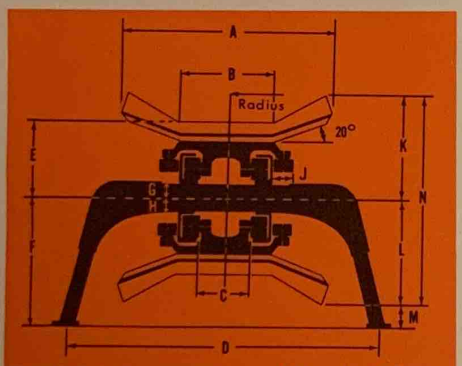
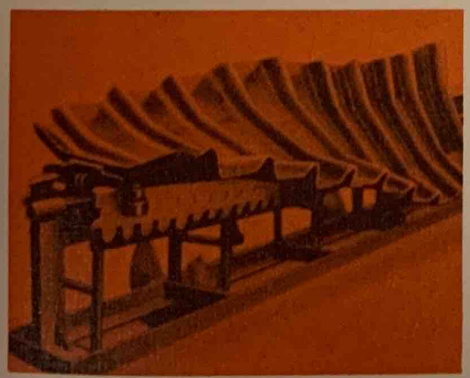


FIGURE 2: Cross-section of Standard Conveyor Between Drive and Tension Stations.



CONSTRUCTION DIMENSIONS (Inches)

Belt Width A	Figure No.	B	C	D	E	F	G	H	J	K	L	M_1	N	Radius$_4$	
20″	1	8.7	6.5	35.4	14	20	6.4	6.4	2.5	16	16	4	32	9′	Note 2
	2	8.7	6.5	21	9.2	15.2	2	2	2.5	11.2	11.2	4	22.5	9′	Note 2
26″	1	11.3	6.5	35.4	14.3	21.5	6.4	6.4	2.5	17.5	17.5	4	35	9′	Note 2
	2	11.3	6.5	37	9.8	17	2	2	2.5	13	13	4	26	9′	Note 2
32″	1	13.8	11	41.3	17	26.7	7.2	7.2	3	20.7	20.7	6	*41.5	10′6″	Note 3
	2	13.8	11	46.5	13	22.7	3	3	3	16.7	16.7	6	33.5	10′6″	Note 3
40″ (Light)	1	16.5	11	49.2	16.5	28.1	7.2	7.2	3	22.1	22.1	6	**44.2	13′	Note 3
	2	16.5	11	54.5	12.1	23.7	3	3	3	17.7	17.7	6	35.5	13′	Note 3
40″ (Heavy)	1	16.5	12.4	49.2	16.5	28.1	7.2	7.2	3	22.1	22.1	6	**44.2	13′	Note 3
	2	16.5	12.4	54.5	12.1	23.7	3	3	3	17.7	17.7	6	35.5	13′	Note 3

At reversing end superstructure height is measurement "N" when using 8-tooth sprocket.
*When using 12-tooth sprocket, dimension "N" is 50.9″ at reversing end.
**When using 12-tooth sprocket, dimension "N" is 54.2″ at reversing end.

NOTE:
1. Recommended *Minimum* Clearance.
2. Seven (7) foot minimum radius possible with 24-inch roller carriage spacing.
3. Decreased roller carriage spacing permits shorter radius. Consult Factory.
4. Standard radius using 40-inch roller carriage spacing.
5. No radius possible in drive or tension station areas.

SIDE DISCHARGE STATION When planning, the following should be observed:

Belt width	20″ / 26″	32″ / 40″
Length of dumping point	217″	242″
In addition, horizontal straight sections should be planned for on both sides of the dumping station.	The total length for one side discharge station is:	
Belt width	20″ / 26″	32″ / 40″
Total length	303″	331″

APPLICATION INFORMATION

The following information should be considered prior to ordering a Serpentix system.

MATERIAL TO BE HANDLED

Description: loose density, weight per cubic foot

Grain size and sieve analysis: composition, maximum edge length (inches), shape (round, cubic form, sharp-edged, flake form), contaminated by what?

Angle of repose, discharge angle: does the material have a tendency to flow?

Condition: dry, sticky, damp, wet, percent of moisture content

Normal temperature fahrenheit (maximum, minimum)

Special characteristics: tendency to pack, tendency to mat, bridge-over, corrosive, dusty, flammable, frangible, hygroscopic, etc.

Is food-handling cleanliness required?

Other special handling requirements?

CONSTRUCTION FEATURES

Type: stationary, convertible, adjustable, mounted on wheels, portable, floating

Drive: electricity, gasoline, gas and/or diesel fuel, compressed air, other

Electric characteristics: volts, AC, DC, number of phases, number of cycles

Enclosures: standard, totally enclosed, drip-proof, waterproof, explosion-proof

Running characteristics: belt speed in feet per minute, variable speed (from, to)

Adjustment: stepless, steps, reversible, frequency of speed adjustment or reversal

Support spacing distance in feet, support height in feet

Type of finish: paint, galvanized, etc.

Color of finish?

Unloading: overhead, sidedump

Is extending or shortening planned?

Specjal construction or equipment required: all-weather protection, dust collection enclosures, magnetic separator, weigh station, inert gas atmosphere, etc.

PRODUCTION OUTPUT

Normal output: yds^3/hr, t/hr

Highest output: yds^3/hr, steady, or with interruption

Daily operating time?

Is increased capacity planned? number of t/hr

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