CONVEYING CHAIN PAIR FOR GRIPPER CARRIAGES ON SHEET-FED MACHINES, PARTICULARLY OFFSET PRINTING PRESSES

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Filed: Sept. 17, 1973
Appl. No.: 397,790

Foreign Application Priority Data
Sept. 20, 1972 Germany 2246061

U.S. Cl. 74/250 C; 74/251 C; 198/179
Int. Cl. F16g 13/02
Field of Search 74/245 C, 245 R, 250 R, 74/250 C, 251 C; 198/179, 180, 177 R, 129, 181

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ABSTRACT

A conveyor chain in the form of a roller chain guided between spaced longitudinal guide members presenting flat land surfaces lying in a vertical plane at the edge of the chain. Certain ones of the pins of the roller chain, in a repetitive pattern, are extended outwardly of the land surfaces. Mounted upon the pins are a series of flatly overlapping cover plates which ride against the land surfaces and seal the guideway against entry of contaminants or escape of lubricant. In the preferred embodiment the cover plates are of oval construction with the rounded end portions thereof having cooperating circular recesses to permit flat seating as well as relative articulation of the cover plates when the chain is directed along a curved path.

7 Claims, 3 Drawing Figures
3,878,735

CONVEYING CHAIN PAIR FOR GRIPPER CARRIAGES ON SHEET-FED MACHINES, PARTICULARLY OFFSET PRINTING PRESSES

In a conveyor chain construction for a sheet fed printing press, conveyor chains are provided as a laterally spaced pair with gripper mechanisms carried bridgingly between them. The chains are guided in trackways which must be lubricated. Because the abrasive dust, paper particles and the powder used to prevent offsetting the printed impressions from one sheet to another, the surfaces quickly become coated with a gummy accumulation which is difficult to remove and which tends to destroy the effect of the lubricant and thus shorten the life of the chains and trackways. Moreover, the lubricant from the chains often is thrown upon the sheets being transported requiring that the soiled sheets be discarded.

It is, accordingly, an object of the present invention to provide a conveyor chain construction which has novel sealing means for operation in a contaminated environment such as that to be found about conveying and delivery mechanism of a printing press. It is a general object to provide a conveyor chain construction in which the chain and its guideways are sealed against entry of foreign matter and sealed against escape of lubricant so that the moving parts are protected against the effect of abrasive materials and the lubricant is kept clean and fully effective. It is a related object to provide a conveyor chain construction which is both simple and effective but which reduces maintenance to a minimum, avoiding necessity for frequent cleaning or lubrication and permitting operation at high speed and efficiency over a long period of time. It is also, an object of the invention, when the device is used in a printing press, to prevent the sheets which are being transported from being spotted and soiled by escaping lubricant.

It is a further object of the present invention to provide a conveyor chain of the roller type which is guided in a track or guideway and in which the guideway is enclosed by cover plates which are secured to the side of the chain in overlapping, flately interfitted relation, with each plate in the series being circularly recessed for permitting articulated movement of adjacent plates as the chain is guided in a curved path.

It is finally an object of the present invention to provide a sealing arrangement for a conveyor chain which is simple and inexpensive, which may be added at minimum cost to existing designs of conveyors and which may be employed as a conversion feature in conveyors already in the field.

Other objects and advantages of the invention will become apparent upon reading the attached detailed description and upon reference to the drawings in which:

FIG. 1 is a plan view of a section of conveyor chain looking along line 1—1 in FIG. 2, with portions in partial section.

FIG. 2 is an elevational view looking along line 2—2 in FIG. 1.

FIG. 3 is a vertical section taken along line 3—3 of FIG. 1.

While the invention has been described in connection with a preferred embodiment, it will be understood that I do not intend to be limited to the particular embodiment shown but intend, on the contrary, to cover the various alternative and equivalent constructions included within the spirit and scope of the appended claims.

Turning now to the drawings there is shown a length of conveyor chain 10 of the type usually referred to as "roller" chain made up of parallel rows of flat links 11, 12 in overlapping relation, pinned together by pins 13, certain of the pins, 14, being extended laterally away from the chain for a purpose which will shortly appear. Interposed between the rows of links are rollers or spacers 15. The rollers may have an internally telescoped hardened liner as indicated in cross section at 16.

It will be understood that two such conveyor chains 10 are mounted horizontally in parallel relation for the purpose of supporting spaced gripper carriages as indicated at 18 (FIGS. 1 and 3). It will be understood, however, that the gripper carriages do not per se form a part of the present invention so that there is no need to describe the gripper carriage construction, and reference, for this purpose, may be had to the prior art and published literature.

For the purpose of guiding the chain 10 along a path of movement, a guide assembly 20 is provided which, as shown in FIG. 3, is preferably in the form of a channel 21 of inverted U-shaped construction secured along one of its walls, by means not shown, to supporting frame structure 22. The member 21 has a downwardly presented edge 23. Supported in opposed, edgewise position is a cooperating guide member 24 having an upwardly facing edge 25. The edges are spaced parallel to one another to form a track or guideway, and are of such width as to mate with, and support, the rollers 15 of the conveyor chain. It will be understood that while the track defined by the edges 23, 25 may have a long, straight run portion, the chain 10 is endless and the track is accordingly curved or looped at its ends (not shown).

In accordance with the present invention, land surfaces are provided straddling the chain and lying in a vertical plane which extends along the lateral edge of the chain. Carried on the pins of the chain, and along one side of the chain, are overlapping coverplates which ride flatly against the land surfaces and which are cooperatively recessed in the region of overlap to provide a continuous sealing surface and to permit relative movement, or articulation, as the chain departs from a straight line path. Referring to the drawings, a typical cover plate is shown at 30, formed of a flat layer of metal or plastic, of oval contour, and having pin openings 31, 32 centered within its rounded ends 33, 34. In order to nest together the overlapping portions of adjacent cover plates, the cover plate 30 has a shallow recess 35 of circular profile at one end and a similar shallow circular recess 36 at the opposite end, the two recesses being oppositely faced. The plate presents a flat inwardly facing surface 37.

Turning attention to the adjacent cover plate 40, which may be of the same or different length, it will be seen that this plate has spaced openings 41, 42 for mounting purposes with rounded ends 43, 44 formed with shallow circular recesses 45, 46 and having a flat inwardly facing surface 47.

For the purpose of sealingly engaging the inwardly facing surfaces 37, 47 on the plates, flat land surfaces 51, 52 are provided extending along the edge of the chain in straddling relation. Such surfaces are formed
on members 53, 54 which may be secured by welding or the like to the respective guide members 21, 24. The land surfaces 51, 52 are aligned with one another in the same plane, a plane which is slightly offset from the chain body as shown in FIG. 3. Because the recessing of the adjacent cover plates, the cover plates cooperate to provide a continuous sealing engagement with the land surfaces. Means are preferably provided for caus-
ing the cover plates to bear resiliently against the land surfaces; for example, a coil spring 55 may be used (FIG. 1) seating against a bushing 56 which is telescoped into the aligned plate openings.

Since the conveyor chain is endless, turn-arounds must be provided, and for this purpose the track surf-
aces 23, 25 which bear against the chain rollers may be mutually curved so that the chain links and cover plates undergo articulating movement. Because of the fact that the ends of the cover plates and the co-operating recesses in which such ends are fitted are of circular profile, a substantially continuous seal is provided, yet the adjacent plates are free to swing with respect to one another. At least one of the openings 31, 32 or 41, 42 in each of the cover plates is made oversized so as to accommodate the relative shifting of the plate mounting centers which occurs as the chain is drawn around a curve.

As a result of the continuous "face" engagement be-
tween the cover plates and the land surfaces which they engage, the guideways surrounding the chain, along its right-hand side as viewed in FIGS. 1 and 3, is sealed against entry of foreign matter and against loss of lubricant normally provided at the track surfaces. In the case of a conveyor chain for transporting of gripper carriages in a sheet fed printing press installation, the air is constantly contaminated with paper, dust and abrasive particles as well as the anti-offset powder which is applied to the freshly printed surfaces of the sheet such substances forming a gummy accumulation which is difficult to remove and which so affects lubrication that the chains and guideway wear prematurely. It will be apparent that with use of present design seal, contaminants are kept out and lubricant is kept in, with no possibility of soiling the transported sheets.

The discussion has been directed to the seal which exists at the inner or right-hand edge of the chain 10. It will be understood that the left-hand edge of the chain may be protected by the simple expedient of bridging the opening at the lower edge of the inverted channel. While the invention has been found to be particularly well suited to use in conveyors for sheet fed presses, it will be understood that the invention is not limited thereto and may be employed wherever it is de-
sired to shield and protect a conveyor chain of the roller type.

What I claim is:

1. In a conveyor chain construction for use in a con-
taminated environment, the combination comprising a roller chain having parallel rows of flat links and having pins for pinning the links in overlapping relation with rollers interposed between them, the rollers being of lesser dimension so as to define a longitudinally extend-
ing groove on each side of the chain, parallel guide members enclosing the chain and extending longitudi-

2. The combination as claimed in claim 1 in which the mutually overlapping portions of the covering plates are cooperatively recessed so that the covering plates provide substantially continuous and uninterrupted contact with the land surfaces.

3. The combination as claimed in claim 2 in which a pin of mating circular profile to permit articulation of the covering plates as the chain departs from a straight path.

4. The combination as claimed in claim 1 in which the covering plates are of oval profile and sufficiently long so as to span a multiple of the pin-to-pin distance on the chain.

5. The combination as claimed in claim 1 in which gripper structure is secured to the extended pins in a position outwardly of the cover plates.

6. The combination as claimed in claim 1 in which biasing means are interposed between the pins and the covering plates for biasing the covering plates toward the land surfaces.

7. The combination as claimed in claim 4 in which a circular bushing is interposed between an extended pin and the cooperating plates carried by the pin and in which at least one of such plates has an oversized opening to accommodate the change in spacing of the ex-
tended pins which occurs when the chain departs from a straight path.

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