Oct. 18, 1932. L. A. BUCK 1,883,528

CONVEYER

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Fig. 1

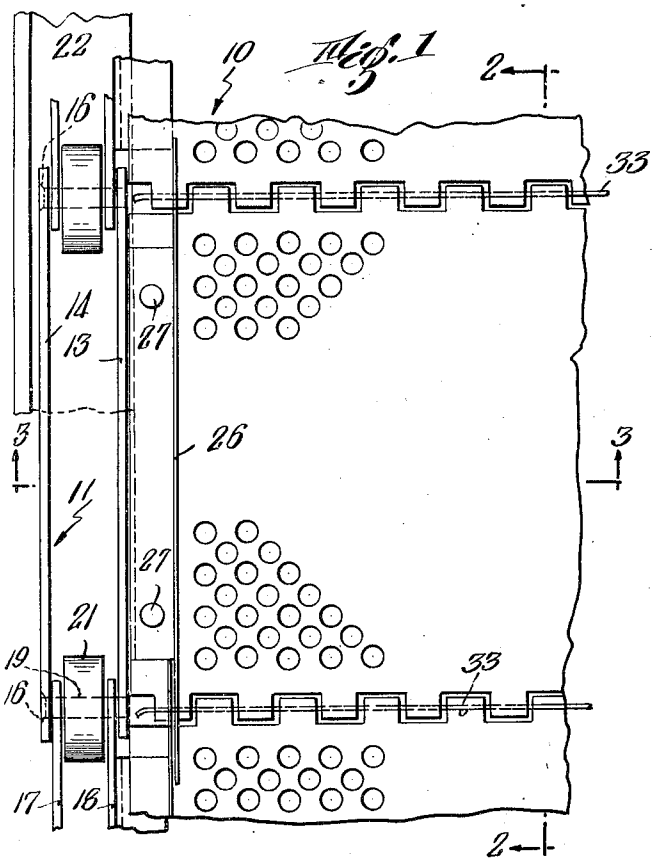


Fig. 2

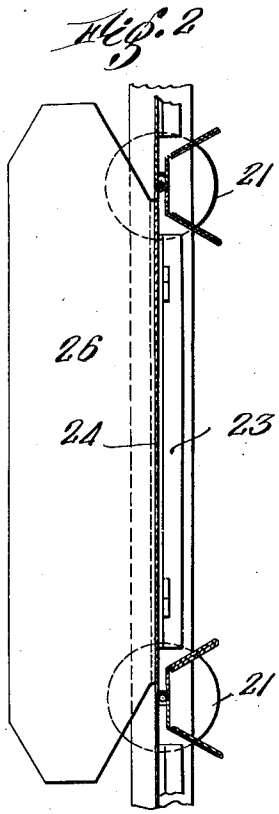


Fig. 3

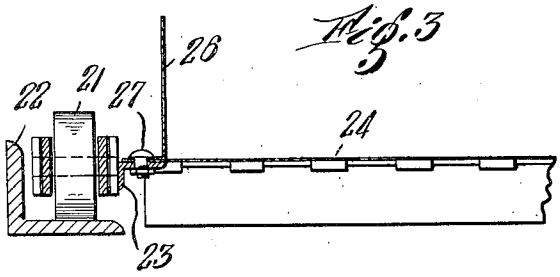
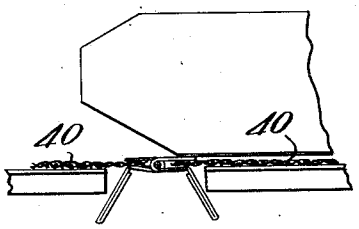


Fig. 4



Inventor
Lucien A. Buck.
By Roberts Cushman & Woodberry
his Attorneys

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CONVEYER

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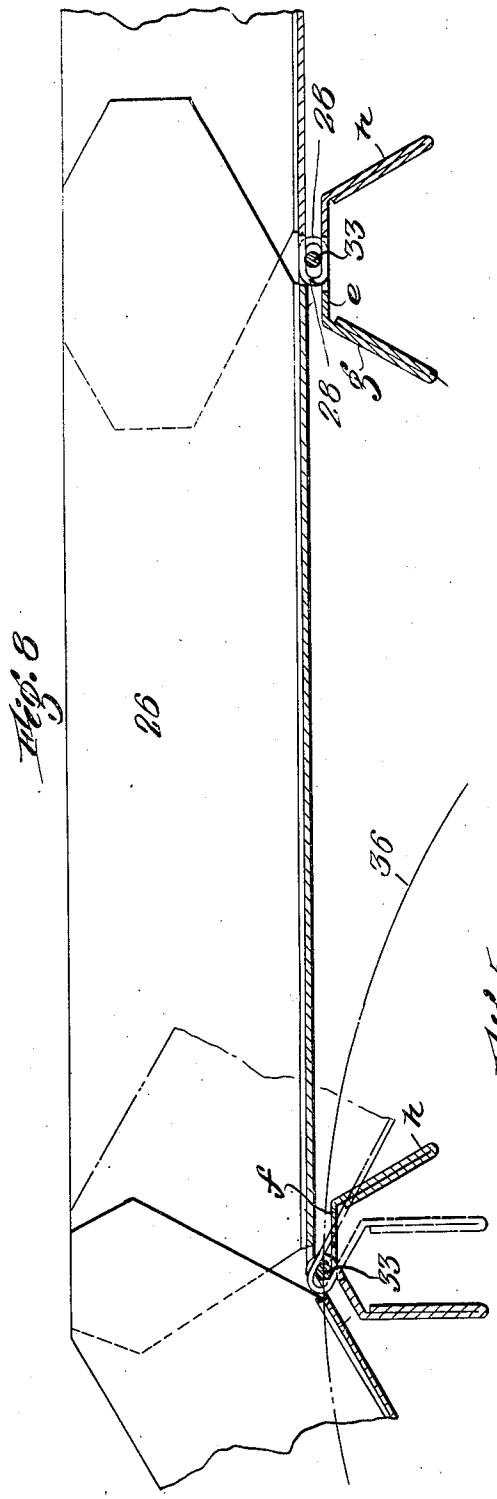


Fig. 6

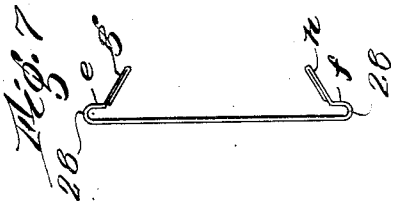


Fig. 7

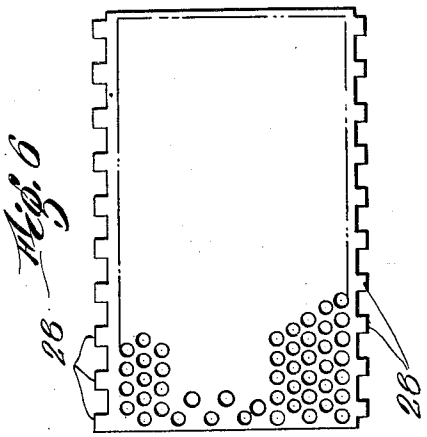


Fig. 6

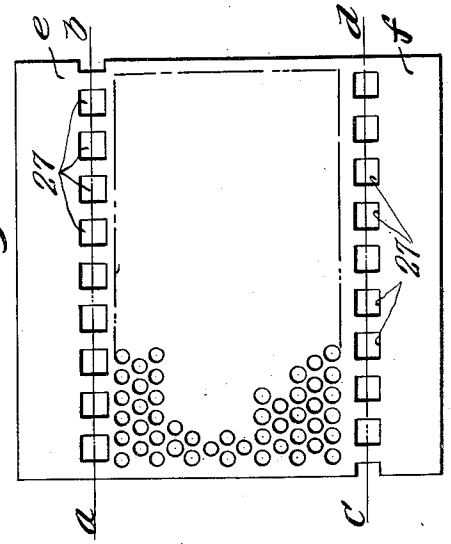


Fig. 5

Inventor:
Lucien A. Buck
by Roberts Cushman & Woodbury
his attorneys

Patented Oct. 18, 1932

1,883,528

UNITED STATES PATENT OFFICE

LUCIEN A. BUCK, OF MOUNT VERNON, NEW YORK, ASSIGNOR OF ONE-HALF TO BUCK DRYER CORPORATION, OF MANCHESTER, CONNECTICUT, A CORPORATION OF NEW YORK

CONVEYER

Application filed January 17, 1931. Serial No. 509,341.

This invention relates to conveyers of the general type having an apron comprising independent sections flexibly connected to form an endless traveling surface, and more particularly to conveyers wherein the sections are suspended between flexible elements such as side chains which operate over sprockets, and carry the sections around the sprockets at the ends of the conveyer.

It is highly desirable to have these sections arranged with their adjacent edges as close together as possible to prevent the material being conveyed from entering into or falling through the spaces between the sections, and further that the sections abut without overlapping, so as to present a continuous and uninterrupted conveying surface, since this makes it possible to clean adhering material from the surface by the operation of a scraper or other instrumentality, which may move relatively to the sections from one section to another, and in fact from one end of the conveyer to the other without encountering obstructions. While these sections may conveniently be connected at their ends by various types of hinge assemblies, usual constructions of this kind permit the adjacent ends of the sections to separate as the conveyer is flexed so that particles or fragments of material being handled may fall through the openings thus provided, and either become lodged therein or are otherwise effective to interfere with the proper operation of the hinges.

Objects of this invention are to improve the construction of conveyers of the class described by providing for maintaining the upper surfaces of the apron sections substantially coplanar or in end to end alignment, especially while on the active run of the conveyer, while keeping successive sections close enough together, effectively to prevent material from falling between adjacent ends thereof; to provide improved means for connecting adjacent sections so that the conveyer may flex without exposing any appreciable recess or cavity in which fragments of material might become lodged; to provide an improved hinge construction for connecting the sections and having means for adequately enclosing and protecting the hinge pivot under various conditions of operation; to improve the efficiency of conveyers of this kind by providing apron plates embodying features of construction giving durability, long life and freedom from repairs and thus to produce a more economical machine especially from a maintenance standpoint; to provide for making apron plates embodying these features from a single piece of material; to provide apron plates of this character of simple and efficient construction affording adequate strength and rigidity so that it is unnecessary to employ separate supporting members extending transversely of the plates and between the conveyer chains; to improve the construction of conveyers of the class referred to by providing an improved apron embodying a rugged, durable hinge construction consisting of relatively few and simple shapes which are inexpensive to manufacture; and also to provide apparatus of the class described having an improved construction and relative arrangement of parts.

In the drawings:

Fig. 1 is a top plan view of a portion of a conveyer;

Fig. 2 is a section along the line 2—2 of Fig. 1;

Fig. 3 is a section along the line 3—3 of Fig. 1;

Fig. 4 is a longitudinal section through a conveyer of the general type shown in Fig. 1, but embodying a modified form of construction;

Fig. 5 is a developed view of an apron plate;

Fig. 6 is a top plan view of a completed apron plate;

Fig. 7 is a side elevation of the plate shown in Fig. 6; and

Fig. 8 is a longitudinal section of a portion of the conveyer illustrating the manner in which the sectional apron may flex in passing around sprockets.

The conveyer selected for illustration comprises a sectional apron, indicated generally at 10, suspended between link side chains, likewise indicated generally at 11. Each side chain is composed of pairs of links 13 and 14 which are connected together at their

outer ends by a suitable fastening means such as rivets 16. The links 17 and 18 of the next adjacent pair are arranged with their ends disposed between the links 13 and 14, the ends of these links being fitted upon a tubular member 19 which receives the rivet 16 and provides a bearing for the roller 21. These chains are supported by means of side angles 22 (Fig. 3) on which the rollers 21 are adapted to ride. The inner links 13 and 18 of the chains carry longitudinally disposed angles 23 which provide supports for the sectional apron. In this instance the apron is composed of perforated sheet metal plates 24 which extend transversely from one side to the other, and overlie the supporting angles 23. Side guards 26 are disposed along the longitudinal edges of these apron plates and have their flanged lower ends held to the plates by bolts 27 which also connect the apron plates to the angles 23.

Each apron plate, as shown in Fig. 5, may be made from a substantially rectangular piece of sheet material by forming a row of transversely spaced substantially rectangular openings 27 across each end thereof. Each row of openings is spaced sufficiently from the end of the plate to leave adequate material for forming a reinforcing and hinge construction to be described.

The blank or sheet of material is then bent downwardly approximately along the transverse center lines *a*—*b*, *c*—*d* of the openings 27 of each row so that the material between these openings may form hinge straps or loops 28. Preferably the portions *e*, *f* of the plate immediately outside the openings are bent through an angle of approximately 180° so that the material immediately beyond the loops extends substantially horizontally under the plate and provides a reinforcing means connecting these hinge straps or loops. In order further to strengthen and stiffen this hinge construction, the marginal portions *g*, *h* of each plate may be bent downwardly in an inclined direction such that similar portions of each plate converge toward each other (Fig. 7). These marginal portions are preferably folded or doubled to add stiffness to this reinforcing construction.

As will be apparent from a consideration of Fig. 5, the openings 27 at one end of a plate may be staggered with respect to those at the opposite end of the same plate. When the completed plates are arranged in end to end relation, the hinge straps or depending loops at one end of one plate will fit between the hinge straps or loops of the next adjacent plate. The apron plates are assembled between the side chains in this manner and a hinge pin 33 is passed through the staggered interfitting loops of adjacent plates to provide a pivotal connection between the latter. The ends of this pin may be bent over, or any other approved means may be employed for holding the pin in proper position in the hinge straps.

It should be noted that the pin here introduced is not essentially a pivotal connection, as the apron would function satisfactorily, for some purposes at least, without these pins, for the individual plates are rigidly attached to the individual links of the chains on either side thereof and the loops in the plates themselves, which form a retainer for the pin, conform to the pitch of the chain, being disposed centrally of and in alignment with the chain rivet. Hence the plates would operate integrally with the apron chains if the pins were omitted. The pin is introduced primarily to maintain the plates in line and to form an interference which will prevent the plates being distorted and leaving a transverse crack between the plates. It will also be evident that the pin forms a locking device so that when the plates are assembled irrespective of the conveyer chain, they provide a continuously interlocked and interlaced apron.

It will be seen that in this construction, the plates are substantially co-extensive with the link members of the side chains and are pivotally connected at points in the vertical planes of the pivotal connections of the links of the side chains. This provides a compact and efficient construction wherein the hinge assembly comprises a series of hinge straps or loops integrally united with the upper member of each apron plate, each hinge strap merging smoothly into the upper surface of the plate so that the operative run of the conveyer presents a smooth substantially continuous surface with which a scraper or similar device may cooperate without interference. As the conveyer passes around a sprocket 36 (Fig. 8) or is otherwise caused to flex, the hinge straps having a radius of curvature which maintains their outer surfaces substantially even with the contiguous portions of the apron plates, are effective to fill in gaps or cavities which might otherwise open or be exposed as adjacent plates are flexed.

While these desirable features may be conveniently embodied in a conveyer having apron plates formed of a single sheet of material, such as the plates 10 just described, it is also possible to form a sectional apron of substantially rectangular sections of wire mesh material 40 (Fig. 4) which are secured between the supporting angles 23 in the same manner as the apron plates. In this instance, however, the hinge construction is similar in all respects to that formed on the ends of the sheet metal plates but the upper portion of each loop is cut off at a point inwardly of the openings 27 and the loops are riveted or otherwise affixed to the upper and lower surfaces of the interposed section of wire mesh material, as clearly shown in Fig. 4. In all

other respects the conveying apparatus illustrated in Fig. 4 is of the same general type as that previously described.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. In a conveyer comprising side chains and apron sections disposed therebetween to provide a load supporting surface, the combination of spaced loop members depending from adjacent apron sections and disposed in a row extending transversely of the conveyer between adjacent apron sections, alternate loop members of the row merging integrally into the upper surface of one of the adjacent apron sections and projecting outwardly therefrom, the remaining loop members of this row merging integrally into the upper surface of the other of these adjacent apron sections and projecting outwardly therefrom, a hinge pin extending through loop members of both adjacent apron sections, and a reinforcing member connecting end portions of the loop members of each section, the reinforcing members diverging downwardly below the loop members to provide adequate clearance between these parts to maintain the reinforcing members in spaced relation when the conveyer is flexed.

2. An apron plate for a conveyer comprising a sheet of material having a series of similar substantially rectangular openings spaced substantially uniformly in a transverse row across at least one end of the sheet, the row of openings being spaced from the end of the sheet to provide a strip of material for reinforcing the openings, the material separating the openings of the row forming hinge straps, the latter being curved downwardly and backwardly for engagement with a hinge pin, the reinforcing strip of material extending downwardly below the sheet, and means reinforcing the downwardly extending portion of this strip.

3. An apron plate for a conveyer comprising a sheet of material having a series of similar substantially rectangular openings spaced substantially uniformly in a transverse row across at least one end of the sheet, the row of openings being spaced from the end of the sheet to provide a strip of material for reinforcing the openings, the material separating the openings of the row forming hinge straps, the latter being curved downwardly and backwardly for engagement with a hinge pin, the reinforcing strip of material extending from the hinge straps approximately parallel to the main body of the sheet and then inclining downwardly away from the hinge straps to provide adequate clearance for the reinforcing strip while moving around sprockets.

4. An apron plate for a conveyer comprising a sheet of material having a series of similar substantially rectangular openings spaced substantially uniformly in a transverse row across at least one end of the sheet, the row of openings being spaced from the end of the sheet to provide a strip of material for reinforcing the openings, the material separating the openings of the row forming hinge straps, the latter being curved downwardly and backwardly for engagement with a hinge pin, the reinforcing strip of material extending from the hinge straps approximately parallel to the superposed portion of the sheet and then inclining downwardly away from the hinge straps to provide adequate clearance for the reinforcing strip while moving around sprockets, the free end of the downwardly inclining portion of the reinforcing strip being turned backwardly substantially against this downwardly inclining portion for stiffening the same and giving added reinforcement to the hinge straps.

5. An apron plate comprising a sheet of material having opposite end portions thereof folded backwardly under the sheet along substantially parallel lines, the folded end portions having transversely spaced slots extending from the fold inwardly to form hinge straps between the slots, the outer surface of each hinge strap merging smoothly into the upper surface of the sheet, the free end portions of the sheet extending beyond the slots toward the central portion of the sheet in a direction approximately parallel thereto and then converging downwardly toward each other, the extreme ends of the downwardly converging portions being folded upwardly substantially against the upper parts of these downwardly converging portions.

Signed by me at New York city, N. Y., this fourteenth day of January, 1931.

LUCIEN A. BUCK.