March 22, 1932. T. G. NYBORG 1,850,891

BELT CONVEYER

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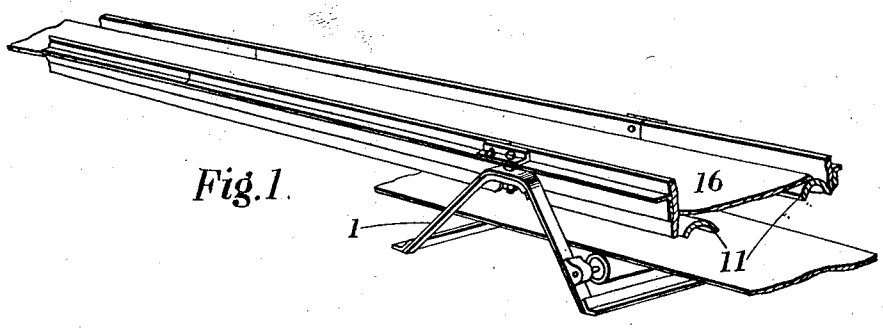

Fig. 1.

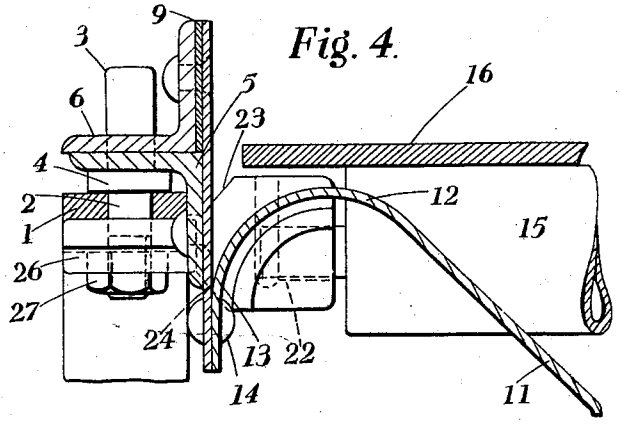

Fig. 4.

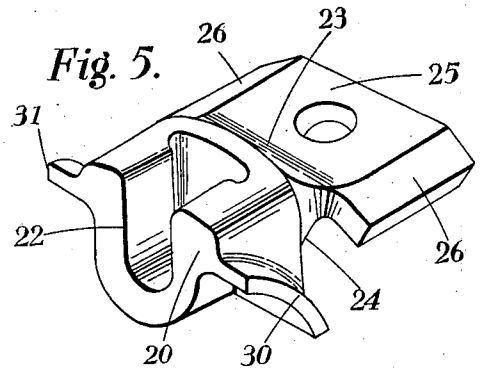

Fig. 5.

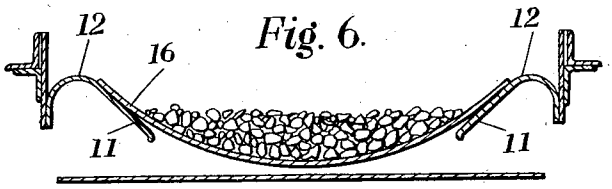

Fig. 6.

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Fig. 2.

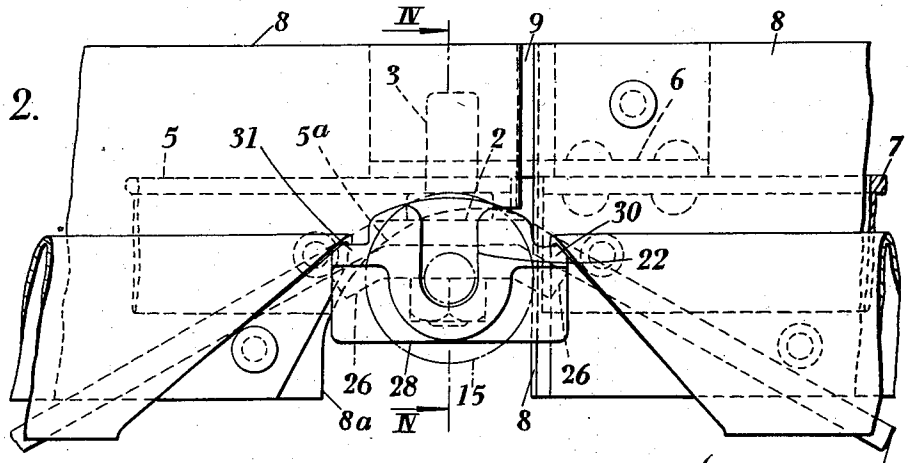
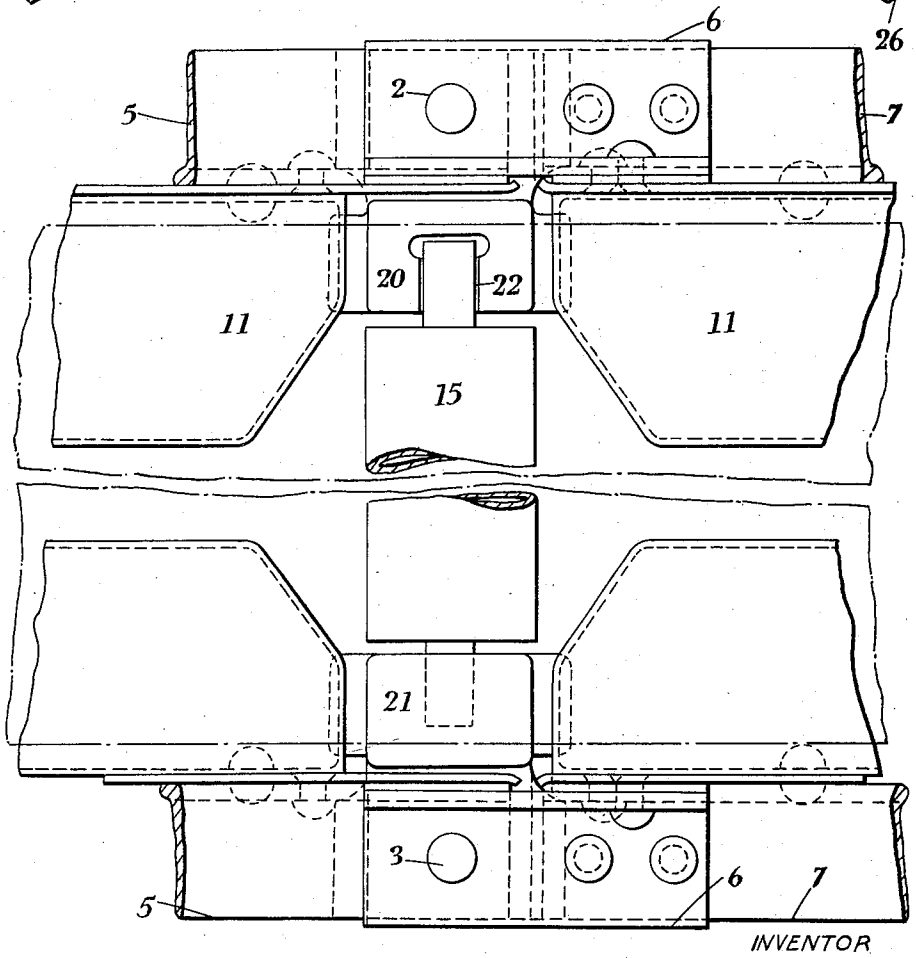


Fig. 3.



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UNITED STATES PATENT OFFICE

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BELT CONVEYER

Application filed March 25, 1930, Serial No. 438,874, and in Great Britain March 27, 1929.

This invention relates to conveyers of the kind employing endless travelling belts. It has already been proposed in such conveyers to provide a pair of anti-spillage shelves running in the direction of the length of the conveyer below the two edges of the belt, the belt resting on the said shelves when loaded, or on material gathered thereon.

It is an object of the present invention to provide an improved form of shelf construction in which, the anti-spillage shelves are provided with inner downwardly directed portions surmounted by curved portions which are upwardly convex. Preferably, the upwardly convex portions are extended arcuately into downward portions suitable for attachment to the side plates of the conveyer.

It is a further object of the invention to provide bearings for the supporting rollers which are located beneath the width of the belt so that any spillage from the belt is thrown clear of them and the upper surfaces of which form with the interrupted sections of the anti-spillage shelves a continuous channel to collect dust and small particles thrown off the belt.

It is a further object of the invention to provide an improved construction whereby the supporting frame may be adapted to support to the anti-spillage shelves and bearings of the above-mentioned kind.

The invention is illustrated in the accompanying drawings in which

Figure 1 illustrates a general view of a conveyer according to the present invention,

Figure 2 represents a side view, and

Figure 3 a plan of a preferred form.

Figure 4 is a side sectional view of Figure 2 taken on the line IV—IV,

Figure 5 is a perspective view shown separately of a member utilized in Figs. 2 to 4, and

Figure 6 shows a view of the loaded belt to a smaller scale.

Referring now to the form illustrated, the conveyer sections are supported by frames 1 spaced at intervals in known manner. The flattened tops of the frames 1 are holed at 2 to receive a bolt 3 having a shoulder 4. An L-shaped metal section 5 is supported on the shoulder 4, and an L-shaped plate 6 rests on the web of the section 5, the plate 6 being riveted to and supporting a second L-shaped metal section 7 which extends in line with the metal section 5 to form a structural support for the side plates 8 of the conveyer which are attached to the sections by rivets, the joints between adacent side plates being closed by bridge pieces 9. The end of the right hand plate 8 is cut square as shown in Fig. 2, but the end of the oppositely placed left hand side plate of this figure is cut away as shown at 8*a*. The vertical web of the section 5 is also cut away as shown at 5*a*.

The side plates 8 carry the anti-spillage shelves which comprise downwardly directed inner portions 11 extending inwards towards the middle line of the conveyer at an angle of about 40° to the horizontal. The oblique inner portions of the anti-spillage shelves are surmounted at their outer upward ends by curved portions 12 which are upwardly convex i. e. they are arcuate so that the upwardly extending portions 11 gradually curve off into horizontal elements. In the form shown the curvilinear portion is extended beyond the upper horizontal element until it ultimately forms a downwardly directed element 13 which serves as a means of attachment for the anti-spillage shelf to the side plates 8 by the intermediary of rivets 14.

It is understood that the anti-spillage shelves are formed in interrupted sections extending between adjacent bearings for the supporting rollers 15 for the belt 16, their downwardly directed webs being cut away obliquely as shown in Figs. 2 and 3 on the side of each bearing so that the bearings and shelves form a continuous channel to prevent material from falling onto the lower belt length.

The bearings 20, 21 Fig. 3, are supported from the bolts 3 in a manner which will now be described. One of the bearings 20 is shown separately in Fig. 5 in perspective view, from which it will be seen that the bearing proper comprises a block or casting provided with a central slot 22 to receive the spindle of the roller 15; the opposite bearings 21 are preferably closed it being assumed that the coal or other material is thrown on the belt towards

the bearings 21 in normal use. In both cases, however, i. e. bearings 20 and bearings 21, the side of the block remote from the bearing tapers down above and below at 23, 24 and extends laterally thereafter in the form of a plate or shelf having a central horizontal portion 25 provided with downwardly extending lateral ears 26, the whole of which is shaped to lie snugly under the upper part 2 of the frame 1, the central portion being holed to receive the lower threaded end of bolt 3 on which it is supported in the assembled position by means of a nut 27.

The block portion 20 of the casting is provided on each side with a lug 30, 31 shaped to the curvature of the parts 12, 13 of the anti-spillage shelves to form supports for the ends of these shelves. As clearly shown in Figures 3 and 4, the bearings 22 are located beneath the extended width of the belt 16 so that any spillage falling over the edge of the belt intermediate the shelves will fall down the inclined face 23 of the casting and be prevented from clogging up the bearing for the roller 5. Other débris remaining between the side plates 8 will remain on the shelves or be picked up again by the belt as its movement fluctuates.

In the normal unloaded position, the belt 16 lies just clear of the top of the portion 12 of the anti-spillage shelves which are only slightly lower than the tops of the rollers 15, 19, but when loaded the belt is depressed and contacts lightly with the anti-spillage shelves. As the belt is usually unevenly loaded, it will curve more or less as it travels and will make a sliding contact with the arcuate portions 12 of the shelves. Further, the belt usually swings from side to side as it travels, and here again the margins of the belt will slide smoothly up and down the arcuate portions 12, making a continuous seal against the possibility of débris falling down the shelves between the side plates. Débris will, of course, collect in the angle between the portions 13 and the side plates but it cannot fall clear, and when the amount is excessive, it will be pushed about a little by the edges of the belt during lateral swinging and will finally be caught up again by the belt and carried away. Figure 6 shows the belt under excessive loading at a local point, and it will be seen that as the belt recovers from this curve as it approaches a roller 15, it will continuously prevent débris from falling under the edges. Owing to the obliquity of the inwardly inclined portion 11 of the anti-spillage shelves, the belt is caused to take a substantially concave cross section which results in throwing the material down into the centre of the belt. The result is that those portions of the belt edges which actually rub along the portions 11 of the anti-spillage shelves are not engaged therewith with any substantial amount of friction such, for example, as they would be if the shelves were horizontal and the end portions of the belt which rested upon them were actually supporting some of the material. The clearance between the shelves and the belt in the unloaded position is designed so that the amount of rubbing between the belt and the shelves when the belt is loaded may be light without unduly increasing the endwise tension on the belt. Nevertheless, the belt definitely contacts with the shelves under all working conditions of load since its edges are adapted to form a sliding contact with the arcuate portions 12 of the shelves. Thus, when the belt is loaded lightly its edges contact with the upper parts of the portions 12, and when it is loaded more heavily they contact with the lower parts of the portions 12. Figure 6 shows the final position under a maximum working load at a point intermediate a pair of supporting rollers 15. In this position the edges of the belt contact for a slight distance rectilinearly with the oblique rectilinear portions 11 of the shelves.

It is realized that a certain amount of friction will occur continually owing to the contact of the belt with the shelves, but the expense thereby occasioned is negligible as compared with the saving which is effected in cleaning up, i. e. freeing the bearings and returning idle belt length from spillage which is otherwise liable to collect unless the belt is enabled to contact with the shelves in all conditions of load, which requirement is ensured by the provision of the arcuate portions 12, with which the moving belt is enabled to make a sliding contact as it lifts and sags and sways from side to side.

I claim:

1. For use in a belt conveyer, a casting including a bearing for a roller, a pair of supports for anti-spillage shelves, and a web for attachment to a supporting frame.

2. In a belt conveyer, the combination of a belt, supporting rollers therefor, interrupted arcuate anti-spillage shelves with which the belt can make a contact according to its load, and bearings for said rollers located beneath the belt and forming a continuous channel with said shelves.

3. In a belt conveyer, the combination of a belt, supporting rollers therefor, interrupted anti-spillage shelves below the belt edges, and bearings for said rollers located beneath the belt, said bearings forming a continuous channel with said shelves.

4. A belt conveyer including a belt, rolling supports for the belt, anti-spillage shelves for cooperation with the edges of the belt supported intermediate the rollers, said shelves including arcuate portions underlying and extending beyond the edges of the belt, the arcuate portions of the shelves providing for sliding movement of the belt dur-

ing travel without separation of the belt edges from such shelves.

5. In a belt conveyer, a belt, roller supports therefor, and anti-spillage shelves supported intermediate the rollers and including a rounded area directly underlying the free edges of the belt and providing a belt contacting surface to facilitate sliding movement of the belt without separation, the shelves including a substantially flat area inwardly of the rounded area.

6. In a belt conveyer, a belt, roller supports therefor, and anti-spillage shelves supported intermediate the rollers and including a rounded area directly underlying the free edges of the belt and providing a belt contacting surface to facilitate sliding movement of the belt without separation, the shelves including a substantially flat, inwardly and downwardly inclined area.

In testimony whereof I affix my signature.

TAGE GEORG NYBORG.