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GUIDE ROD FOR SMALL GRAIN ELEVATORS

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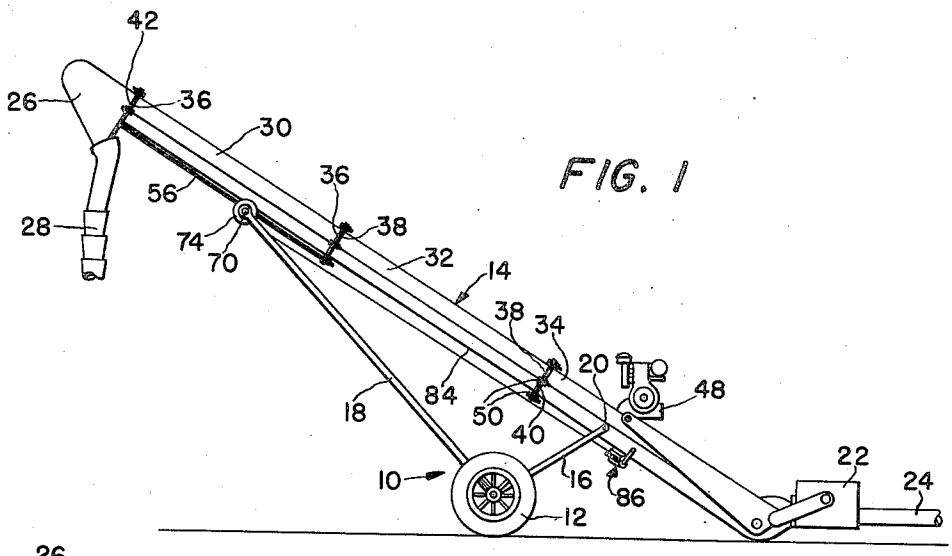


FIG. 1

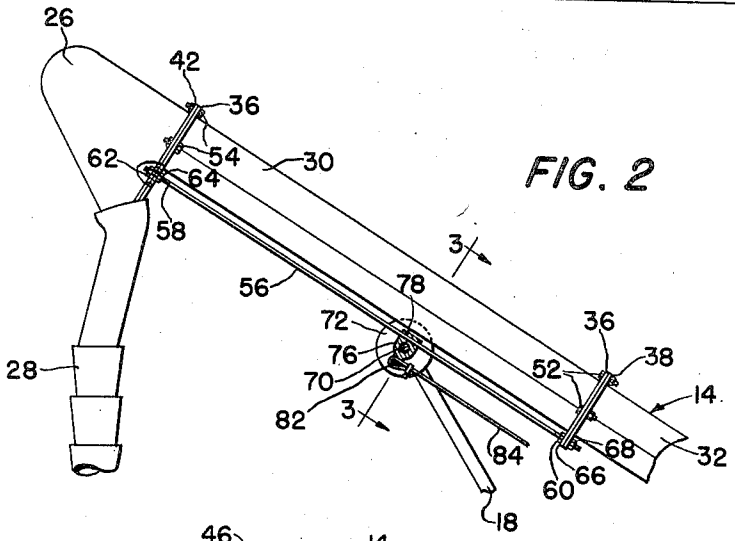


FIG. 2

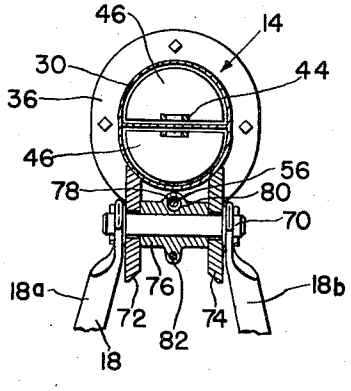


FIG. 3

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GUIDE ROD FOR SMALL GRAIN ELEVATORS

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5 Claims. (Cl. 198—121)

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This invention relates to a material-handling device and more particularly to an elevator for the handling of small grain or similar material. Specifically, the invention resides in improved guide or control means for maintaining the relationship between the inclined elevator element or tube and the supporting means therefor.

A grain elevator of one well-known type comprises a supporting base adapted to rest upon the ground or a floor and carrying an inclined elongated elevator element having an upper or delivery end positionable at different levels. The adjustable support for the elevator element comprises a boom or derrick angularly swingable about a transverse horizontal axis and engageable with the elevator element and movable therealong to position the latter at selected levels. Ordinarily, the relationship between the support or boom and the elevator tube is effected by a pair of rollers on the boom which slide lengthwise of the elevator element. Heretofore, the maintenance of this relationship depended upon the weight of the elevator element. However, it was found that dependence on this characteristic could be had only at the sacrifice of stability and safety.

According to the present invention, there is provided means in the form of a guide rod running lengthwise of the elevator element and cooperable with a guide carried by the upper end of the support, the structure being such that, although the upper end of the boom or support is movable lengthwise of the element, such movement is guided or controlled by the guide rod. Hence, the boom and elevator tube are held against vertical displacement. Further, opposite ends of the guide element or rod provide spaced-apart stops for limiting the range of movement of the upper end of the support relative to the elevator tube, so that extreme and unsafe positions cannot be obtained. It is a further object of the invention to provide the elongated elevator element in the form of a plurality of sections, each having opposite ends flanged and joined to end flanges of a neighboring section, spaced-apart pairs of these flanges being apertured to receive opposite ends of the guide rod, whereby these flanges serve as spaced-apart stops and the guide serves both as a guide and as a compression and tension member forming a structural part of the elevator construction.

The foregoing and other important objects and desirable features inherent in and encompassed by the invention will become apparent as a complete disclosure is made of a preferred embodiment of the invention in the following detailed

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description and accompanying sheet of drawings, in which

Figure 1 is a side elevational view of one well-known type of elevator equipped with the invention;

Figure 2 is a fragmentary enlarged view, partly in section, of the upper portion of the elevator with which the improved guide rod is associated; and

Figure 3 is an enlarged transverse sectional view taken substantially on the line 3—3 of Figure 2.

The elevator chosen for the purposes of the present illustration comprises a base or supporting means designated generally by the numeral 10. This base is adapted to rest upon the ground or a floor by means of a pair of wheels 12 (only one of which appears in the drawings). An elongated elevator element designated generally by the numeral 14 is carried by the base and operatively assumes a position inclined to the horizontal. The support of the elevator element on the base 10 is accomplished by means of a first support or reach 16 and a second support in the form of a derrick or boom 18, the lower ends of each of which are pivoted to the base, preferably on the axis of the wheels 12. The upper or other end of the reach 16 is pivoted at 20 to the sides of the lower portion of the elevator element 14.

The lower end of the elevator element 14 constitutes a material-receiving end and for this purpose may be provided with any suitable hopper or receiving means, such as the hopper indicated at 22 and the inlet tube indicated at 24. These details are relatively unimportant in so far as the present invention is concerned. The upper end of the elevator element constitutes a discharge end and for that purpose is provided with a hood section 26 to which is attached a depending flexible discharge spout 28.

The elevator element is preferably of tubular construction (see Figure 3); although, it obviously may be of any other design. In the present instance, the tubular structure includes a plurality of interconnecting sections, one of which comprises the hood section 26, another of which is an elongated tubular section 30, another is a similar tubular section 32, and the lower of which is a tubular section 34 at the receiving end of the elevator element. The sections 26, 30, 32 and 34 are arranged in end-to-end relationship to form the elongated elevator structure. The section 30 is flanged at 36 at its opposite ends, the section 32 is similarly flanged at opposite ends

at 38, the section 34 is flanged at 40 at one end, and the hood section 26 is flanged at 42.

The housing or tubular elevator structure contains appropriate conveying means, such as an endless chain 44, which is equipped with paddles 46 (Figure 3) for conveying grain upwardly from the hopper 22 to the discharge hood and spout 26—28. Any suitable source of power may be provided for driving the conveying means. In the drawing, an internal combustion engine 48 has been illustrated for this purpose.

In the preferred elevator construction, the flange 40 at the upper end of the lower section 34 is paired with and joined to the lower flange 38 on the intermediate section 32. The junction of the flanges 38—40 is completed by a plurality of bolts 50 (Figure 1).

The flange 38 at the upper end of the intermediate section 32 is paired with and joined to the lower flange 36 on the upper end section 30. These two flanges are secured together, in part, by a plurality of bolts 52 (Figure 2). The upper flange 36 of the section 30 is paired with and joined to the flange 42 on the hood section 26 and the assembly includes securing means in the form of a plurality of bolts 54 (Figure 2). The pair of flanges 36—42 is thus spaced lengthwise of the elevator element 14 from the pair of flanges 36—38. Each pair of flanges projects transversely (in the present case downwardly at least) from the elevator element 14.

According to the present invention, a guide rod or equivalent elongated element 56 parallels the underside of the section 30 and has its opposite ends respectively threaded at 58 and 60. The paired flanges 36—42 are apertured to receive the threaded end 58 and the spaced pair of flanges 36—38 are similarly apertured to receive the other threaded end 60. The threaded end 58 of the rod carries a pair of nuts 62 and 64, one at either side of the paired flanges 36—42. These nuts and the rod serve, in addition to connecting the rod 56 to the flanges, as means for additionally securing the flanges 36 and 42 together. In other words, the upper end of the rod, including the nuts 62 and 64, complements the securing means comprising the bolts 54. The relationship of the opposite end of the rod 56 to the flanges 36 and 38 is similar, this end of the rod including a pair of nuts 66 and 68.

As previously mentioned, the upper end of the support or boom 18 engages and is movable lengthwise along the underside of the elevator element 14. Specifically, the upper end of the boom 18 is provided with a pair of spaced-apart members 18^a and 18^b between which is carried a short transverse shaft 70. This shaft carries rotatably thereon a pair of spaced-apart rollers 72 and 74, the rollers engaging and rolling on the underside of the section 30. The rod 56 is intermediate the underside of the section 30 and the shaft 70.

A spacer member 76 is interposed between the rollers 72 and 74 and the shaft 70 passes therethrough. This spacer includes, preferably as an integral part thereof, a guide member 78 which is apertured at 80 to slidably receive the rod 56. The construction of the guide member 78 (Figure 3) is such that it hooks over the guide rod 56, thus confining the rod 56, and consequently the elevator element 14, against upward displacement away from the boom 18, since the latter is connected to the guide member 78 by the parts 76—70.

The underside of the spacer 76 includes an eye 82, preferably formed integral therewith, which receives one end of a cable 84. The other end of the cable is wrapped on winch means, designated generally by the numeral 86 (Figure 1).

It will be seen from the description that the winch and cable 84—86 may be utilized to move the upper end of the boom lengthwise along the section 30. This results in elevating or depressing the discharge end of the elevator element 14. Lengthwise movement of the upper end of the boom relative to the elevator element is accomplished by the slidable relationship between the guide rod 56 and the apertured guide member 78. The range of movement of the upper end of the boom is confined to the length of the rod, opposite end portions of the rod and their connections to the section 30 (58—62—64 and 60—66—68) providing spaced-apart stops. It will be seen that the rod 56, in addition to its guiding function, serves also as a member that is in both compression and tension and thus provides a structural component of the upper part of the elevator element.

Of primary importance with respect to the structure including the rod 56, the spaced-apart stop means, and the apertured guide element, is the relationship by means of which the structure confines the components against undesired relative movement. For example, since the rod 56 passes through the guide member 78, there can be no upward displacement of the elevator element 14 away from the boom 18. Thus, the elevator element cannot jump off the rollers 72 and 74, thus adding to the general safety of the elevator. Further, engagement of the guide member 78 with the lower stop (60—56—68 and the flanges 36—38) prevents the operator from inadvertently elevating the elevator element to a dangerous height. It will be noted that extreme movement of the upper end of the boom 18 to the right or toward the lower end of the elevator element would cause the entire elevator to be overbalanced toward the left. Not only would this upset the elevator, but it is possible that the reach 16 could fold completely over on the boom 18, and the entire structure would collapse.

Other advantages and features of the invention not specifically enumerated above will undoubtedly occur to those skilled in the art, as will numerous modifications and alterations in the preferred construction illustrated, all of which may be achieved without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A grain elevator or the like having a base adapted to rest on the ground or a floor, an elongated elevator element inclining upwardly from the base and carried by the base for selective positioning at different angles to the horizontal, and a support carried by the base for adjustment through various angles relative to the horizontal and having an upper portion engaging and movable along the underside of the elevator element to vary the angular position of said element, characterized in that: the elevator element includes a plurality of sections arranged in end-to end relationship, each section having an end flange projecting below the underside of the elevator element and paired with and joined to an end flange of a neighboring section, certain pairs of said joined flanges being spaced apart lengthwise of the elevator element with the upper portion of the support therebetween;

means is carried on said upper portion of the support including a guide member proximate to the underside of the elevator element and having an aperture generally on an axis paralleling the length of the elevator element; and a single guide rod extends beneath and parallel to the underside of the elevator element, is slidable through the guide member aperture and is secured at only opposite end portions thereof respectively to the aforesaid pairs of spaced-apart, joined flanges.

2. The invention defined in claim 1, further characterized in that: the upper portion of the support includes a shaft transverse to the elevator element and a pair of rollers spaced apart axially of the shaft and engaging the underside of the elevator element at opposite sides of the guide rod, and the apertured guide member is carried by the shaft between the rollers.

3. The invention defined in claim 1, further characterized in that: the opposite ends of the guide rod are threaded and said paired flanges are apertured so that said threaded ends respectively pass therethrough, and securing elements are respectively threaded on said threaded ends and engaging said joined flanges.

4. The invention defined in claim 1, further characterized in that: each pair of said joined flanges is apertured so that the respective end of the guide rod passes therethrough; and means are provided at each end of the guide rod engaging the respective joined flanges from both sides so that said guide rod serves to secure the flanges together and also constitutes both a compression and a tension member between said spaced-apart pairs of joined flanges.

5. A grain elevator or the like having a base adapted to rest on the ground or a floor, an elongated elevator element inclining upwardly from the base and carried by the base for selective positioning at different angles to the horizontal,

and a support carried by the base for adjustment through various angles relative to the horizontal and having an upper portion engaging and movable lengthwise along the elevator element to vary the angular position of said element, characterized in that: the elevator element includes a plurality of tubular sections arranged in end-to-end relationship, each section having an end flange paired with and joined to an end flange of a neighboring section, certain pairs of said joined flanges being spaced apart lengthwise of the elevator element with the upper portion of the support therebetween; means is carried on said upper portion of the support including a guide member proximate to the elevator element and having an aperture generally on an axis paralleling the length of the elevator element; and a single guide rod extends parallel to the elevator element, is slidable through the guide member aperture and is secured at only opposite end portions thereof respectively to the aforesaid pairs of spaced-apart, joined flanges.

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