Dec. 30, 1947. G. E. HULSE 2,433,697

ELEVATOR BOOT CONSTRUCTION

Filed April 6, 1945 3 Sheets-Sheet 1

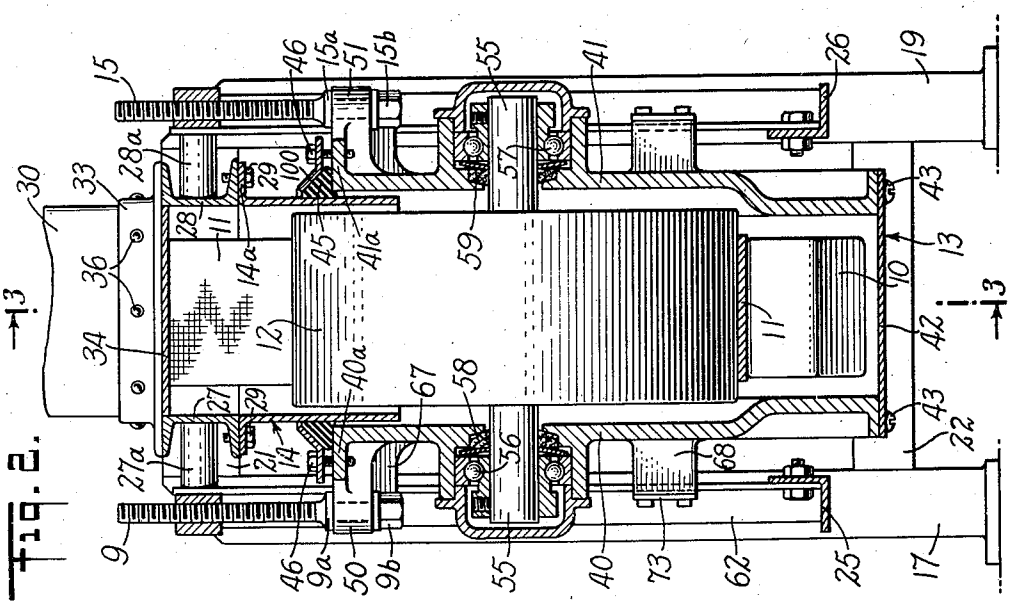

Fig. 2.

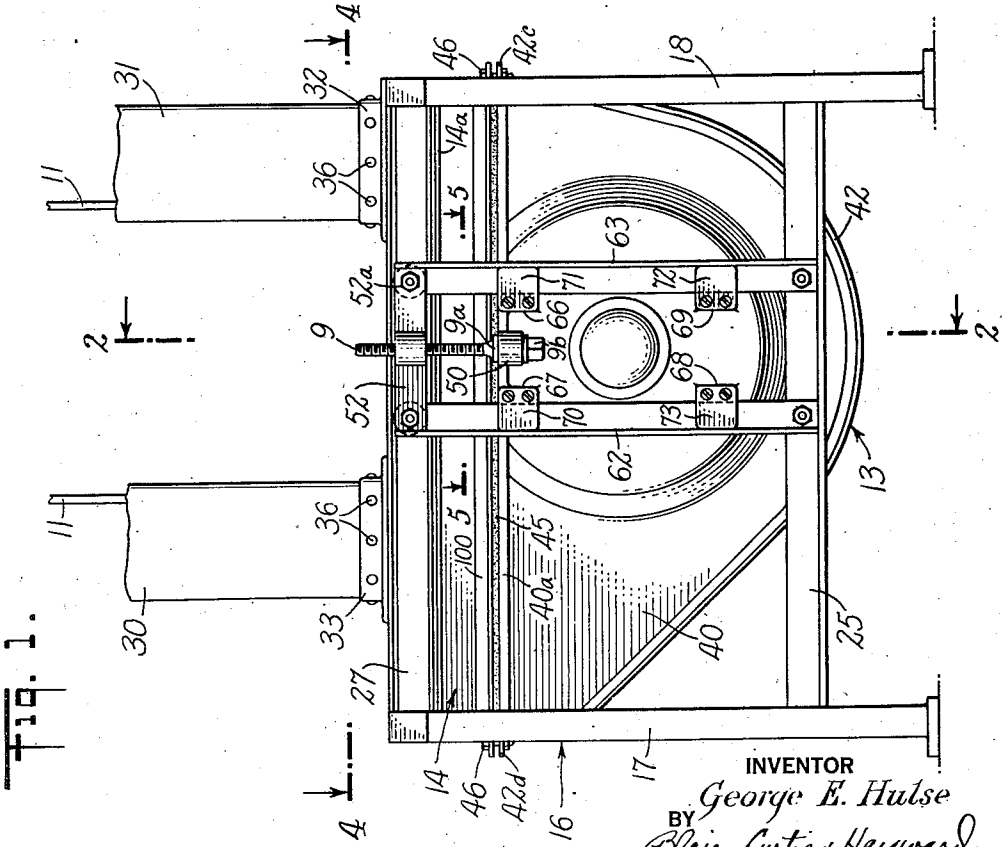

Fig. 1.

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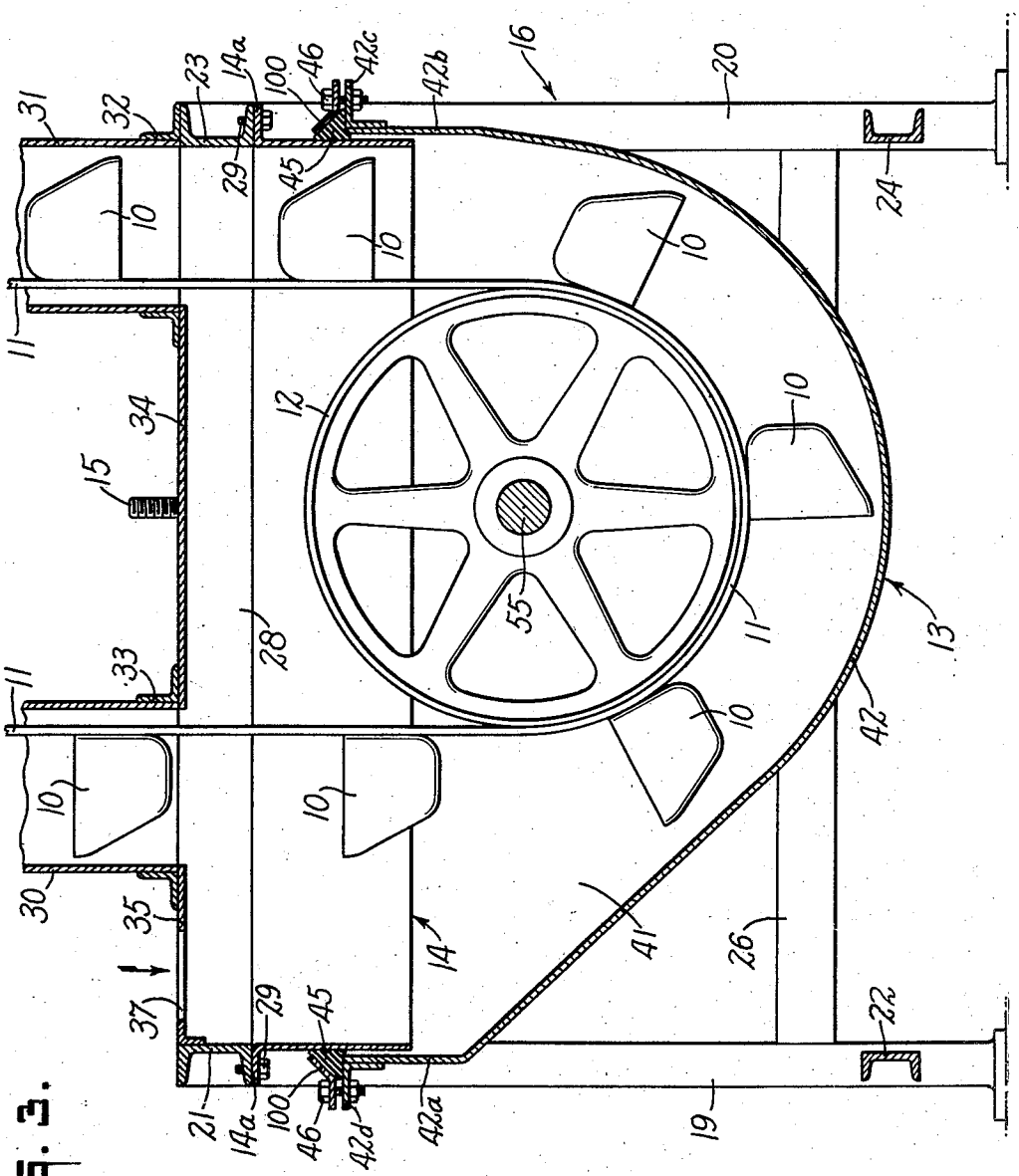

Fig. 3.

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Fig. 4.

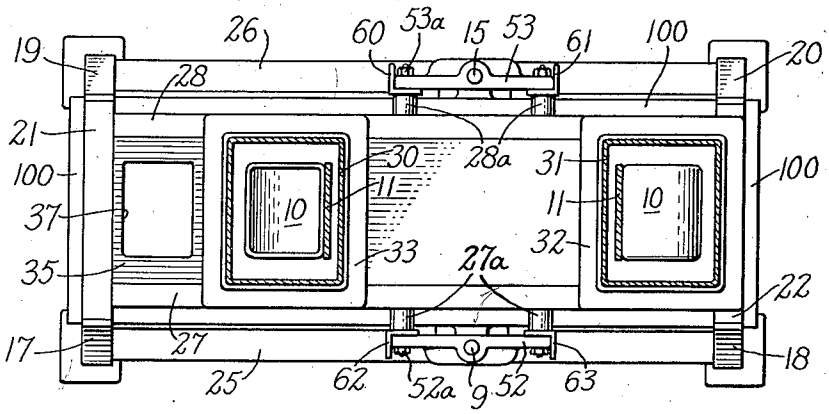


Fig. 5.

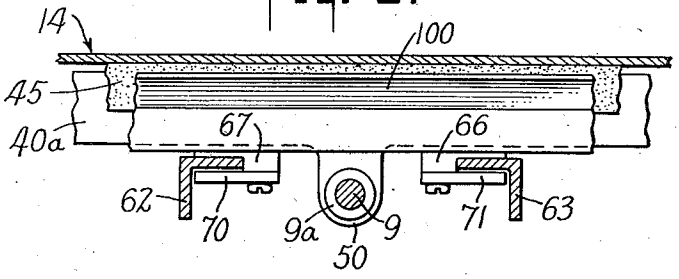
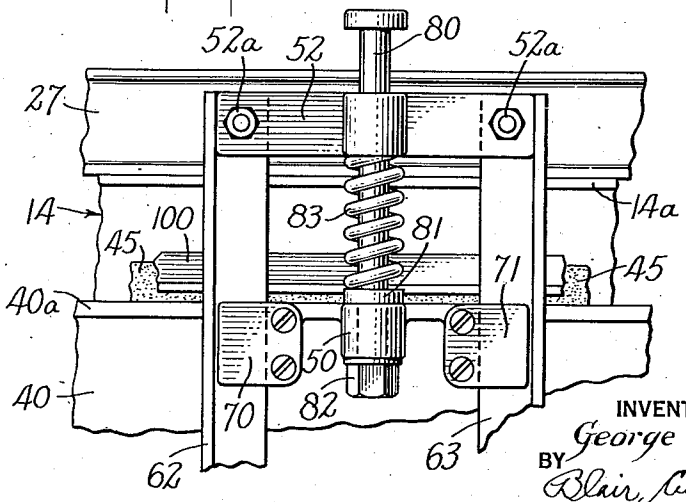


Fig. 6.



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ELEVATOR BOOT CONSTRUCTION

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5 Claims. (Cl. 198—207)

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This invention relates to elevator boot construction.

One of the objects of this invention is to provide an elevator boot construction which is simple, practical, and thoroughly durable. Another object is to provide a construction of the above character which will be sturdy and well able to withstand the strain of hard usage. Another object is to provide a construction of the above character, the manufacture of which will be economical both from the standpoint of labor and materials used. Another object is to provide a construction of the above character which may be quickly and easily adjusted to compensate for changes in length of the elevator belt. Another object is to provide a construction of the above character wherein the boot and pulley are automatically adjusted to changes in the length of the belt. A further object is to provide a construction of the above character in which the boot is at all times so positioned with respect to the buckets that the material being elevated cannot accumulate at the bottom of the boot. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, all as will be illustratively described herein, and the scope of the application of which will be indicated in the following claims.

Referring now to the accompanying drawings in which is shown one of the various possible embodiments of this invention,

Figure 1 is a side elevation of the elevator boot construction;

Figure 2 is a vertical section taken on the line 2—2 of Figure 1;

Figure 3 is a vertical section taken on the line 3—3 of Figure 2;

Figure 4 is a horizontal section taken on the line 4—4 of Figure 1;

Figure 5 is a horizontal section of a portion of the machine shown in Figure 1 taken on the line 5—5 of Figure 1; and,

Figure 6 is a side elevation of a portion of the construction shown in Figure 1 in modified form.

Similar reference characters refer to similar parts throughout the several views of the drawings.

As conducive to a clearer understanding of certain features of this invention, it might here be pointed out that considerable difficulty has been experienced with elevator boots used in connection with the bucket type of elevator belts be-

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cause of the fact that the material being elevated, such as flour, accumulates in the boot and thus makes an ideal spot for the propagation of insect life. The reason that a space exists in which the material accumulates is directly attributable to the fact that use causes elevator belts to stretch. Due to this fact, space is provided between the bottom of the buckets and the boot to permit the lower pulley over which the belt runs to be adjusted downwardly as the belt stretches. Accordingly, when the belt is new, there is considerable clearance between the buckets and the bottom of the boot and the material being elevated, such as flour, accumulates in the bottom of the boot where the buckets cannot reach it. The insect life in the flour then propagates and this point in the elevator becomes an infestation center from which infestation spreads into the flour passing through the elevator and thus through the mill with resultant damage to the product being produced. It is another object of this invention to overcome the above-mentioned difficulties as well as many others.

In general, material is elevated by buckets 10 (Figure 3) mounted on an endless elevator belt 11. Belt 11 runs on pulley 12 which is mounted on a boot, generally indicated at 13. Boot 13 overlaps and is vertically adjustable with respect to a casing, generally indicated at 14, and vertical adjustment between the boot and casing is made by screws 9 and 15 (Figure 2). Accordingly, as pulley 12 is mounted on boot 13 whenever pulley 12 is lowered to tension belt 11, the bottom of buckets 10 always clear the bottom of the boot (Figure 3) by the same amount.

Referring now to the drawings in detail, casing 14 (Figures 1, 2, and 3) is of rectangular shape and is mounted on a framework, generally indicated at 16. This framework includes four corner posts 17, 18, 19, and 20, the feet of which are preferably connected to the floor. At the ends of the construction, posts 17 and 19 are connected by a pair of channel-shaped structural members 21 and 22 (Figure 3) and posts 18 and 20 are connected by structural members 23 and 24. At the bottom of the sides of the construction, posts 17 and 18 and posts 19 and 20 are connected by structural members 25 and 26, while at the top, a pair of channel-shaped structural members 27 and 28 (Figures 1 and 3) extend between and are connected to transverse structural members 21 and 23 (Figure 3). The inner faces of members 27 and 28 are parallel and are spaced from each other a distance equal to the width of casing 14 (Figure 2).

Casing 14 has a flange 14a extending outwardly from its upper edge and through this flange it is secured by screws 29 (Figures 2 and 3) to the under surface of structural members 21, 23, 27, and 28. The casings 30 and 31 through which the buckets and belt move are rectangular in cross section and are connected by angle brackets 32 and 33 which are fixed to the casing by rivets 36 and which are connected to the respective structural members 23, 27, and 28. The space between casings 30 and 31 is closed by a plate 34 supported by brackets 32 and 33. The space to the left of the lower end of casing 30, as viewed in Figure 3, is closed by a plate 35 which is connected to structural member 21 in any suitable manner and to casing 30 by bracket 33. Plate 35 is provided with a suitable opening 37 through which the material to be elevated is fed.

The boot 13 includes a pair of side plates 40 and 41 (Figures 1, 2, and 3) which are connected by the bottom 42 of the boot. The bottom 42 is connected to the lower edges of side plates 40 and 41 in any suitable manner, such as by screws 43 (Figure 2). The upper portions 42a and 42b (Figure 3) of the bottom of the boot are vertical with respect to the framework and parallel with respect to each other, and these portions of the bottom plus the upper portions of side walls 40 and 41 (Figure 2) form a mouth for the boot which is rectangular in cross section. The internal dimensions of this mouth are slightly greater than the external dimensions of casing 14, thus permitting the mouth of boot 13 to slide over the casing.

To seal the opening between the inner surface of the boot and the outer surface of casing 14, a gasket 45 (Figures 2 and 3) is provided. This gasket is held in position by a retaining ring 100 of rectangular shape which is bolted by bolts 46 to flanges 40a, 41a, 42c, and 42d extending outwardly from the upper edges of side plates 40, 41, and bottom 42. This gasket effectively prevents leakage of the material being elevated between the boot and casing 14.

Pulley 12 (Figures 2 and 3) is mounted on boot 13 by a shaft 55. The ends of this shaft are mounted on roller bearings 56 and 57 mounted in turn on the side walls 40 and 41 of boot 13. Gaskets 58 and 59 are preferably provided to prevent the lubricant used on bearings 56 and 57 from entering the boot. As is best shown in Figures 2 and 3, pulley 12 is of a size and shaft 55 is so positioned that the bottom of each bucket just clears the bottom of the boot. Because of the fact that the pulley is mounted on the boot in a permanent position with respect thereto, this predetermined clearance is always maintained when the belt is properly tensioned.

Boot 13 is supported by and adjusted with relation to casing 14 by screws 9 and 15. These screws extend through holes in bosses 50 and 51 (Figure 2) extending outwardly from boot side plates 40 and 41 and thread into threaded holes in supporting members 52 and 53. Supporting members 52 and 53 are secured by screws 52a and 53a to studs 27a and 28a welded to structural members 27 and 28 (Figures 2 and 4). Screws 9 and 15 are provided with enlarged portions 9a and 15a (Figure 2) immediately above bosses 50 and 51, and thus, when these screws are turned to move boot 13 and thus pulley 12 downwardly to tighten belt 11, these screws act between supporting plates 52 and 53 and the upper surfaces of bosses 50 and 51 to move the boot downwardly. When it is desired to remove the belt prior to the installation of a new one, screws 9 and 15 are screwed in the opposite direction and the boot is raised, the heads 9b and 15b of screws 9 and 15 carrying the weight of the boot.

To guide the boot as it is adjusted with respect to casing 14 and thus maintain the motion between these portions of the construction rectilinear, a pair of guide bars in the form of angle bars are mounted on the framework. Each pair of guide bars coacts with bosses on the side of the boot adjacent to them to guide the boot as it moves upwardly and downwardly. Guide bars 60 and 61 (Figure 4) at their tops are connected by screws 53a to studs 28a and at their lower ends are connected to structural member 26 (Figure 2). Guides 62 and 63 are connected by screws 52a (Figure 4) to studs 27a and to structural member 25.

The bosses 50 and 51 on each of the sides 40 and 41 of the boot are similarly positioned (Figures 1 and 2) and are of similar construction. Each of the bosses 66, 67, 68, and 69 (Figure 1) on side 40 has a recessed portion (see also Figure 5) in which the respective portions of the guide bars 62 and 63 are positioned. The guide bars are maintained in this position by cap plates 70, 71, 72, and 73 which are secured to the bosses by screws. Thus, as the boot is raised or lowered with respect to casing 14, the guide bars and the bosses on the side plates guide the boot so that it moves with rectilinear motion with respect to casing 14.

Referring to Figure 6, in which a modification of a portion of the construction is shown, a rod 80 is used on each side of the construction instead of screws 9 and 15. These rods extend through holes in the supporting members, such as member 52, and are secured to the boot bosses similar to boss 50 by nuts 81 and 82. Springs, such as spring 83, are mounted on the rods to exert resilient pressure between the under surface of the supporting members and the bosses and thus resiliently press the boot down downwardly. Accordingly, as the belt 11 stretches, the springs automatically move the boot downwardly thus maintaining the belt under constant tension.

Thus, it will be clear that an efficient and practical elevator boot construction has been disclosed in which the buckets always clear the bottom of the boot by the same predetermined amount, thus preventing the accumulation at the bottom of the boot of the materials being elevated. Furthermore, the construction described permits the tension on the elevator belt to be quickly and easily adjusted as the belt stretches during use. Accordingly, the objects hereinabove mentioned as well as many others, have been successfully accomplished.

As many possible embodiments may be made of the above invention all without departing from the scope of the invention, it is to be understood that all matter hereinbefore set forth, or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

The invention claimed is as follows:

1. In an elevator construction, the combination of, a rectangular frame including four vertical corner posts and a plurality of horizontal frame members, two pairs of vertical guide bars fixed to said frame whereby parallel guideways are formed along two opposite sides of said frame, a fixed casing structure mounted on said frame and including a horizontal top wall portion and

a downwardly projecting skirt portion, a boot positioned within said frame beneath said fixed casing structure and having an open top which telescopes with said skirt portion, said boot having two parallel side portions positioned respectively adjacent said guideways and each having an integral bearing sleeve which is positioned substantially centrally with respect to its bearing sleeve, bracket means projecting from the side of each of said side portions and engaging the respective guideways whereby the boot may be moved vertically and yet held in upright position, and means to adjust the vertical position of said boot with respect to said skirt portion.

2. A construction as described in claim 1 which includes, bearing means within each of said bearing sleeves, and a pulley carried by said bearing means.

3. A construction as described in claim 2 wherein the means for adjusting the position of the boot comprises, a pair of brackets fixed to the opposite sides of said frame substantially above the respective bearing means, a pair of brackets fixed respectively to the opposite sides of said boot directly beneath the respective fixed brackets, and a pair of rods extending respectively through each fixed bracket and its associated bracket.

4. A construction as described in claim 3 which includes a sealing strip fixed to the upper edge of the boot and projecting into engagement with the skirt portion.

5. An elevator construction as described in claim 4 which includes a pair of springs positioned respectively around said rods between the respective brackets, thereby to urge the boot downwardly.

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