

April 2, 1957

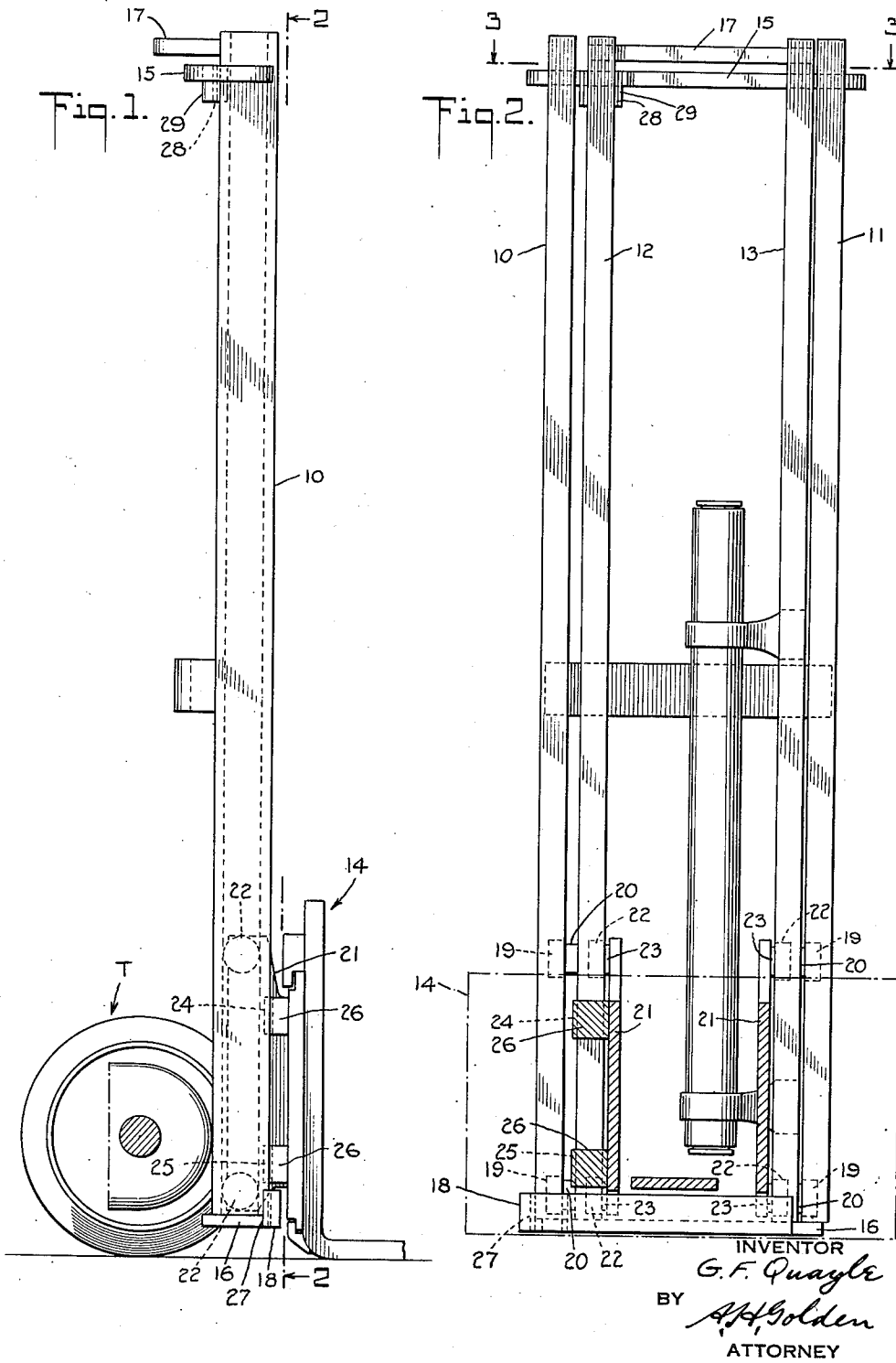
G. F. QUAYLE

2,787,337

GUIDE FOR INDUSTRIAL TRUCK LIFTING MEMBER

Filed July 13, 1953

3 Sheets-Sheet 1



April 2, 1957

G. F. QUAYLE

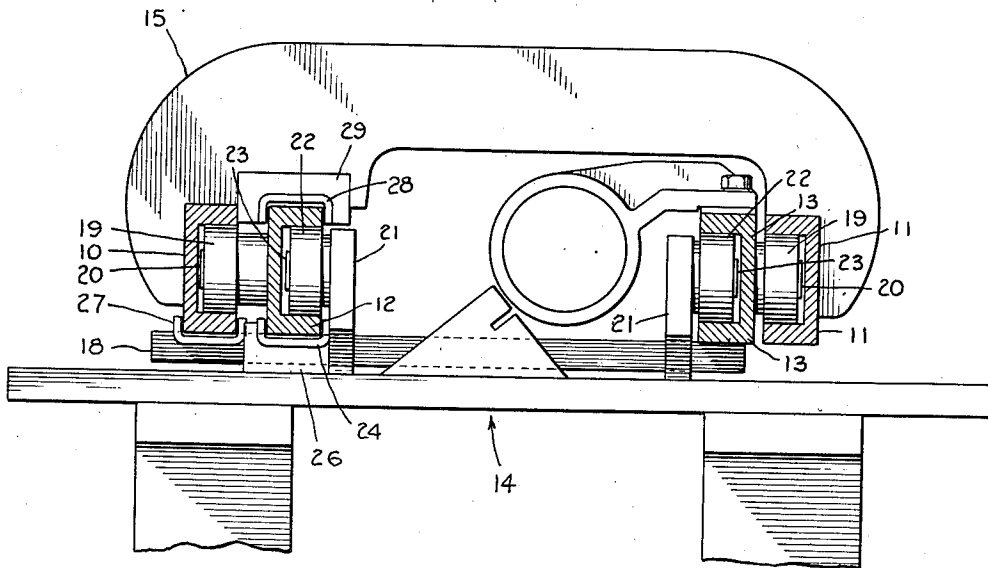
2,787,337

GUIDE FOR INDUSTRIAL TRUCK LIFTING MEMBER

Filed July 13, 1953

3 Sheets-Sheet 2

Fig. 3.



INVENTOR
G. F. Quayle
BY *A. Golden*
ATTORNEY

April 2, 1957

G. F. QUAYLE

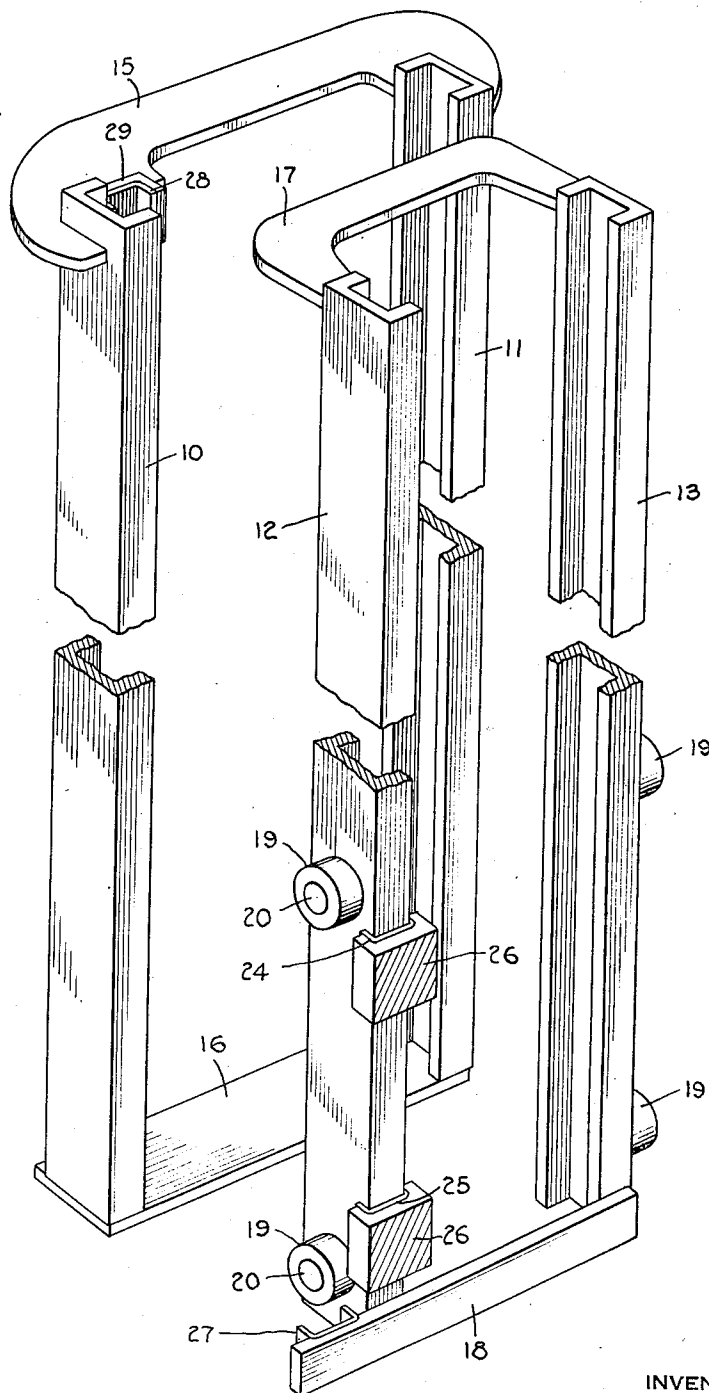
2,787,337

GUIDE FOR INDUSTRIAL TRUCK LIFTING MEMBER

Filed July 13, 1953

3 Sheets-Sheet 3

Fig. 4.



INVENTOR
G. F. Quayle
BY *A. H. Holden*
ATTORNEY

1

2,787,337

GUIDE FOR INDUSTRIAL TRUCK LIFTING MEMBER

George F. Quayle, Philadelphia, Pa., assignor to The Yale & Towne Manufacturing Company, Stamford, Conn., a corporation of Connecticut

Application July 13, 1953, Serial No. 367,504

2 Claims. (Cl. 187—9)

This invention relates to industrial lift trucks. More particularly, my invention relates to means through which a load lifting member, such as a carriage, is mounted for vertical movement on a pair of uprights of a truck of this class.

In trucks of the prior art, the mounting means for the load carriage coact quite effectively with the uprights to support the carriage so that it does not tilt in a fore and aft direction. Thus, it is usual to utilize a series of rollers on the carriage moving in channels formed in the uprights for guiding the carriage and for absorbing all forces incidental to the tendency of the load carriage to cock or tilt in a fore and aft direction. When the load carriage supports a load in a transversely offset position relatively to the pair of uprights, the carriage has a tendency to tilt or cock in a transverse direction. This transverse cocking tendency presses the rollers endwise against the uprights, thereby causing severe transverse bending stresses in the uprights. Also, the endwise pressure of the rollers causes the rollers to bind in the channels of the uprights and may actually prevent vertical movement of the carriage.

To oppose the tendency of the carriage to tilt or cock in a transverse direction, various means have been utilized. In general, means such as additional rollers have been adopted, but because of their relation to the uprights these rollers will, through the cocking of the carriage, apply pressure between both uprights, thus causing severe transverse bending stresses in the uprights. The problem has long existed and has been attacked before. One construction is shown in an application of Ulinski, Ser. No. 346,955, filed April 6, 1953, now Patent No. 2,731,164. In that construction the carriage is locked effectively against cocking relatively to the uprights in all positions of the carriage, thereby preventing the application of bending stresses by the carriage. I believe my invention to be a very considerable improvement over Ulinski because of the comparatively simple means I use to obtain excellent results.

I have conceived novel and most simple means through which only one of the uprights acts to prevent cocking of the load carriage in a transverse direction. This I accomplish by using one upright to prevent the carriage from cocking while holding the carriage free, in a transverse sense, relatively to the other upright. This prevents the use of the carriage as a reacting force between the uprights to bend the uprights. It may here be added that these means do not interfere with the fore and aft support of the carriage on both uprights.

More particularly, I prefer to use upper and lower guides for the load carriage with both of these guides coacting with one upright to prevent any cocking of the carriage relatively to both uprights. Because the carriage cannot apply transverse pressure from one upright to the other upright, it cannot by cocking act as a bending member between the pair of uprights. In effect, the one guiding upright acts as a continuous beam for freely supporting the carriage against cocking.

2

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of my invention, in order to prevent the appropriation of my invention by those skilled in the art.

Referring now to the drawings:

Fig. 1 is a side view showing my invention.

Fig. 2 is a view on the line 2—2 of Fig. 1.

Fig. 3 is a view on the line 3—3 of Fig. 2.

Fig. 4 is a perspective view illustrating my invention with parts thereof in exploded relation.

In the drawings, I show my invention applied to a usual load lifting construction having primary uprights 10, 11 formed as channel members, secondary uprights 12, 13 also formed as channel members, and a load carriage 14. The primary uprights 10, 11 are connected integrally through upper and lower cross members 15, 16, well shown in Fig. 4, and are mounted as a unit upon the front end of a truck that I indicate generally in Fig. 1 by the letter T. The secondary uprights 12, 13 are connected integrally to one another through upper and lower cross members 17, 18, and are positioned between the primary uprights 10, 11, as best shown in Figs. 2 and 3. Each secondary upright 12, 13 has a pair of rollers 19 mounted upon it through stub shafts 20, with these rollers engaged in the channels in the primary uprights 10, 11. Through this arrangement, the secondary uprights 12, 13 are adapted to move vertically as a unit while held against tilting or cocking in a fore and aft direction, as will be well understood by those skilled in the art.

The load carriage 14 is held against fore and aft cocking or tilting relatively to the secondary uprights 12, 13 through a somewhat similar arrangement. Thus, the carriage 14 has a pair of bracket members 21 upon which rollers 22 are mounted through stub shafts 23, with the rollers 22 engaged in the channels of the secondary uprights 12, 13. I do not show particular actuating means for lifting the load carriage 14 or secondary uprights 12, 13, because such actuating means are not important to an understanding of my invention. It is necessary to know merely that the rollers 19 and 22, by their engagement in the channel uprights, act in a conventional way to prevent fore and aft tilting or cocking of the load carriage 14.

I shall now proceed to describe the extremely novel construction whereby I prevent transverse cocking of the load carriage 14. At vertically spaced points upon one side of the carriage 14, I mount a pair of U-shaped guides 24, 25 through mounting members 26, as clearly shown in Figs. 3 and 4. Flanges of each U-shaped guide 24, 25 are positioned at opposed sides of the secondary upright 12 and will naturally hold the load carriage 14 against transverse cocking movement, and in fact against all transverse movement relatively to the upright 12, as the carriage moves vertically.

It is very important to note at this point that the guides 24, 25 hold the carriage 14 in such a position relatively to upright 12, best illustrated in Fig. 3, that the carriage is free from transverse pressure relatively to the other upright 13. More particularly, it will be seen that the rollers 22 and their mounting means are spaced endwise

from the upright 13. Through this arrangement, all forces resulting from a tendency of the load carriage 14 to move or cock in a transverse direction are applied to the single upright 12 through the guides 24, 25. Moreover, because the guides 24, 25 are vertically spaced, the upright 12 acts as a continuous beam in accepting these forces. This action of the upright 12 as a continuous beam, together with the fact that the carriage 14 cannot react against the upright 13 in a transverse direction, prevents the carriage from applying bending stresses between the uprights because of the cocking thereof relatively to the uprights.

Those skilled in the art will understand that the novel arrangement I have just described may be utilized very successfully in trucks having merely a single pair of fixed uprights upon which the load carriage moves. In such a case, the uprights 12, 13 that I describe as secondary uprights would, of course, represent the fixed uprights. However, as actually shown in the drawings, I do utilize my invention for guiding the secondary uprights 12, 13 relatively to the primary uprights that I show at 10 and 11.

In this instance, the pair of secondary uprights 12, 13 may be regarded as the load carrying member, and I prevent transverse cocking of these uprights through means substantially the same as those I have already described. Thus, I utilize a lower U-shaped guide 27 that is mounted on the secondary upright 12 through a transverse extension of the lower cross member 18. This guide 27 preferably is at the same side of the truck as are the guides 24, 25, and has parts positioned at opposed sides of the primary upright 10, as shown clearly in Fig. 3. I provide also an upper U-shaped guide 28 that is mounted relatively to the upper end of the primary upright 10 through a member 29, with parts of the guide 28 positioned at opposed sides of the secondary upright 12. Through the upper and lower guides 27, 28, therefore, the primary upright 10 holds the secondary uprights 12, 13 against transverse cocking movement. Moreover, the guides 27, 28 so position the secondary uprights 12, 13 that the rollers 19 and their mounting means are spaced in a transverse sense, relatively to the other primary upright 11. It will be understood that the primary upright 11, like the secondary upright 13, does not accept transverse forces incidental to the guiding of the vertically moving load. Therefore the load cannot cock and react to bend either of the primary uprights. It is thought that further detailed description of the guide means for the secondary uprights will be unnecessary because of its similarity to the guide means for the load carriage.

I believe that the extremely novel means whereby I guide a load carrying member for vertical movement will now be clearly understood, and that the very considerable value of my contribution will be fully appreciated by those skilled in the art.

I now claim:

1. In a lift truck of the class described, a pair of spaced channeled uprights positioned on the truck with their channels facing one another, a load carrying member, rollers in the channels of said uprights mounting said load carrying member for vertical movement on said uprights with said rollers accepting the fore and aft stresses of said load carrying member relatively to said uprights, vertically spaced guide means on one side only of said load carrying member to hold said load carrying member against transverse cocking relatively to one of said two uprights by accepting the stresses at right angles to said fore and aft stresses, said vertically spaced guide means at said one side of the load carrying member having portions engaging opposite surfaces of said one of the channeled uprights so formed on said one channeled upright that said guide means through bearing against said surfaces hold said load carrying member free from pressure through said rollers relatively to the other of said uprights in a transverse direction and therefore against the wedging of said load carrying member between said uprights.

2. In a lift truck of the class described, a pair of channeled uprights spaced from each other transversely of the truck and with the sides of the channels in alignment with the longitudinal axis of the truck, whereby to position the end surfaces of the channels of said uprights transversely of the truck, a load carrying member, rollers in the channels of said uprights mounting said load carrying member for vertical movement on said uprights with said rollers bearing against the said end surfaces of the channels for accepting the longitudinal fore and aft stresses of said load carrying member relatively to said uprights, vertically spaced guide means on one side only of said load carrying member to hold said load carrying member against transverse cocking relatively to one of said two uprights, said vertically spaced guide means at said one side of the load carrying member having portions engaging opposite surfaces of said one of the channeled uprights so formed on said one channeled upright that said guide means through bearing against said surfaces hold said load carrying member free from pressure through said rollers relatively to the other of said uprights in a direction transverse of the truck and therefore against the wedging of said load carrying member between said uprights.

References Cited in the file of this patent

UNITED STATES PATENTS

854,961	McCarthy	May 28, 1907
1,667,547	Green	Apr. 24, 1928
2,321,029	Johnson	June 8, 1943
2,528,401	Uliniski	Oct. 31, 1950

FOREIGN PATENTS

556,309	France	Apr. 11, 1923
---------	--------	---------------