C. O. PEARSON.

TRACTION ELEVATOR.

APPLICATION FILED JAN. 21, 1909.

1,164,115. Patented Dec. 14, 1915.

Fig. 1,

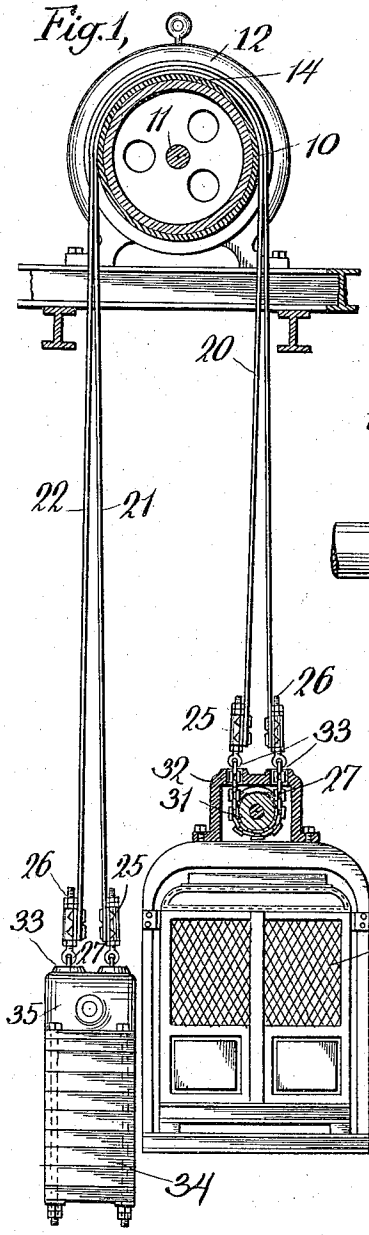


Fig. 2

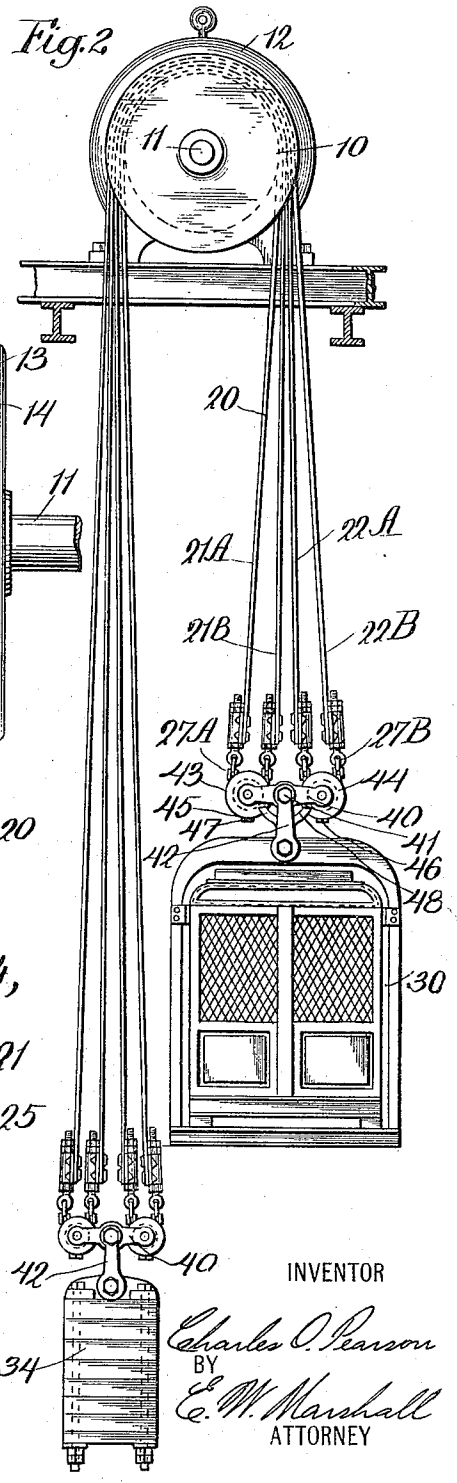


Fig. 3,

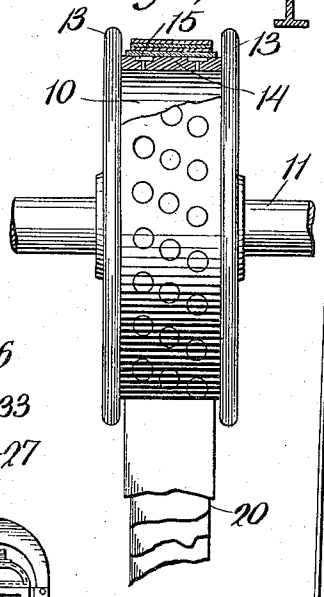
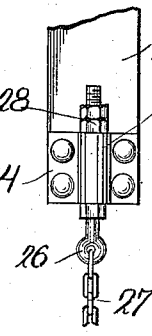


Fig. 4,



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TRACTION-ELEVATOR.

1,164,115. Specification of Letters Patent. Patented Dec. 14, 1915.

Application filed January 21, 1909. Serial No. 473,504.

To all whom it may concern:

Be it known that I, CHARLES O. PEARSON, a citizen of the United States, and a resident of the borough of Brooklyn, in the county of Kings, city and State of New York, United States of America, have invented certain new and useful Improvements in Traction-Elevators, of which the following is a specification.

My invention relates to improvements in traction elevators and especially to a substitute for the usual ropes or cables which connect the car with the driving sheave, and to a novel arrangement for equalizing the strains upon the various parts of such a device.

Referring to the drawings, Figure 1 is a side elevation, partly in section, of a simple form of traction elevator with my invention applied thereto. Fig. 2 is a side elevation of a similar elevator installation, with its various parts connected in another form and by another arrangement which are also parts of this invention. In Fig. 3 an elevation of a driving sheave as shown with a part broken away to more clearly illustrate its construction. This figure also shows a portion of a novel metallic belt which forms a part of this invention. Fig. 4 is an end view of the end of one of the metallic strips which form the belt, showing the manner in which it may be adjustably fastened to an anchorage.

Like characters of reference designate corresponding parts in all of the figures.

10 designates a driving sheave which is mounted upon a shaft 11. This shaft and sheave may, if desired, be driven by a motor 12.

13, 13 designate the flanges of the sheave. Between these flanges the peripheral surface of the sheave may be covered with leather or other yieldable material as is shown at 14. This covering for the sheave may be affixed thereto in any desired manner, as, for example, by bolts or rivets 15.

The belt or driven member is designated by 20 and is built up of a plurality of strips of flexible metal of substantially flat cross-section. The first of these may be somewhat thicker than the others and is preferably of a width somewhat less than the space between the flanges 13, so that it will not buckle. This strip 21 is adapted to come in frictional contact with the sheave 10 or the covering 14 thereon. In the form of my invention which is shown in Fig. 1, another flexible metallic strip 22 is placed upon the inner strip 21. This outer strip may be both thinner and narrower than the inner strip, or may be of substantially the same dimensions. The ends of these strips are connected together in some desired manner, as, for example, that shown in Figs. 1 and 4. In these figures 24 designates brackets one of which may be riveted onto the end of each strip and have a threaded boss 25 for the reception of threaded eye-bolts 26. 27 is a chain extending from one of these eye-bolts to a similar one on the adjacent end of the other strip. Lock-nuts 28 may be provided to hold the eye-bolts against turning.

30 designates an elevator-car to the top of which is firmly secured a pivoted grooved wheel 31, the shaft of which is securely affixed to a housing 32. On the upper surface of this housing are two hollow lugs 33. The chain 27 is passed under the wheel 31 and up through these lugs before being affixed to the eye-bolts.

34 is a counterweight, to the upper end of which is secured a housing 35 similar to that shown at 32. This housing 35 supports a pivoted grooved wheel similar to 31, by means of which the opposite ends of the strips 21 and 22 are connected with the counterweight in a manner similar to that above described for their connection with the car. The openings through the lugs 33 are not large enough to allow the brackets 24 to pass through them.

In operating belts of the general type herein described there is a certain amount of creeping of the metallic strips over each other which, without some means for compensating, puts undue strains upon the strips. It is to prevent such undue strain that I have provided the arrangement of parts herein shown and described. It is evident that the grooved wheels will rotate about their axes a sufficient amount to equalize the strains on the metallic strips 21 and 22 so that each will bear the same amount of the load.

One of the advantages of the kind of belt herein shown is that each strip may be arranged to sustain the entire load, so that if one of them breaks the car will not drop. In order to retain this valuable feature I have arranged the parts as described so that

the anchorage brackets 24 cannot pass through the lugs 33. Then, if one of the strips breaks, its anchorage brackets 24 will be pulled down against the lugs 33 until arrested thereby. The other strip will then sustain the car and the counterweight.

When it is desired to use more than two of the metallic strips, some such arrangement as that shown in Fig. 2 may be used. In this case the belt 20 is made up of four flexible metallic strips designated by 21^A, 21^B, 22^A and 22^B. These are run over a driving sheave 10 as in the previous case, and are connected with the car and with the counterweight.

40 designates a tilting arm which is pivoted at 41 to a link 42 which is affixed to the car. A pair of grooved chain-wheels 43 and 44 are pivotally supported by the arm 40 at either side of the pivot. The ends of strips 21^A and 21^B which are nearest the car are connected together by a chain 27^A which is fastened thereto in any desired manner such, for example, as that previously described. This chain passes under the grooved wheel 43 and is affixed thereto at 47. Another chain 27^B which passes under and is affixed to the sheave 44 at 46 connects the ends of the strips 22^A and 22^B together and to the car 30.

Projecting from the link 42 are two side-arms 47 and 48 which are arranged to limit the tilting movement of the arm 40. All the connecting elements above described in conjunction with the car 30 are duplicated in conjunction with the counterweight 34. It may be seen that the varying strains upon the different metallic strips arising from any cause will be equalized by the tilting of the arms 40 and the movement of the grooved wheels 43 and 44 about their pivots. It may also be seen that because the chains are affixed to their respective wheels, and because the movement of the tilting arms is limited, any or all but one of the metallic strips may break without allowing the car to drop. In other words, each of the strips is independently and positively connected with both the car and counterweight, but in such a way as to be relatively movable thereto a limited amount.

In the arrangement shown in Fig. 2 the adjustable connections between the strips and their respective chains may be so manipulated whenever the strips stretch unequally as to bring them into proper position for each strip to bear its correct proportion of the entire load and the amount of tension on the strips may be seen by the position of the tilting arms and of the revoluble grooved wheels.

This invention is shown in conjunction with a friction drive or traction elevator as it largely increases the effectiveness and safety of this type of mechanism. It may, of course, be applied to other devices without departing from the spirit of my invention.

More than one form of apparatus are illustrated in order to show that I do not limit myself to any specific form or embodiment of the invention.

I am aware that I am not the first to have invented a traction elevator in which a plurality of superposed belt sections are connected with the car, with a motor driven friction pulley in engagement with one of the belt sections, and with a tension device for equalizing the tension of the belt section.

What I claim is.—

1. In a traction elevator, a car, a counterweight, a driven belt comprising a plurality of flat metallic strips superimposed upon one another, each of said strips connecting and arranged to support the car and counterweight, a wheel pivotally supported upon the car, a chain under the wheel and connected with said strips; another wheel pivotally supported upon the counterweight and a chain under said wheel and also connected with said strips.

2. In a traction elevator, a car, a counterweight, a belt comprising a plurality of flat metallic strips superimposed upon one another, each of said strips connecting and arranged to support the car and counterweight, a tilting-arm upon the car, wheels pivotally supported therein, chains under said wheels, the ends of said chains being connected with the ends of said strips; a tilting-arm upon the counterweight, wheels pivotally supported therein, and chains under said wheels and connected with the opposite ends of said strips.

3. In a traction elevator, a car, a counterweight, a belt comprising a plurality of flat metallic strips superimposed upon one another, each of said strips connected and arranged to support the car and counterweight, a tilting-arm upon the car, wheels pivotally supported therein, chains passing under and affixed to said wheels, the ends of said chains being adjustably connected with the ends of said strips; a tilting-arm upon the counterweight, wheels pivotally supported therein, chains passing under and affixed to said wheels, the ends of said chains being adjustably connected with the opposite ends of said strips, and means for limiting the movement of the tilting-arms.

4. In a traction elevator, a car, a counterweight, a motor, a driving sheave having flanges, a flat leather facing affixed to the sheave, a belt arranged to run over said sheave, said belt comprising a plurality of flat metallic strips of less width than the distance between said flanges, said strips being superimposed upon one another, and each connecting and arranged to support the car and the counterweight, a wheel pivotally

supported upon the car, a chain under the wheel and connected with said strips, another wheel pivotally supported upon the counterweight, and a chain under said wheel and also connected with said strips.

5. In a traction elevator, a car, a counterweight, a motor, a driving sheave having flanges, a flat leather facing affixed to the sheave, a belt arranged to run over said sheave, said belt comprising a plurality of flat metallic strips of less width than the distance between said flanges, said strips being superimposed upon one another, and each connecting and arranged to support the car and the counterweight, a tilting-arm upon the car, grooved wheels pivotally supported therein, chains passing under and affixed to said wheels, the ends of said chains being adjustably connected with the ends of said strips; a tilting-arm upon the counter-weight, grooved wheels pivotally supported therein, chains passing under and affixed to said wheels, the ends of said chains being adjustably connected with the opposite ends of said strips, and means for limiting the movement of the tilting-arms.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES O. PEARSON.

Witnesses:
ERNEST W. MARSHALL,
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