

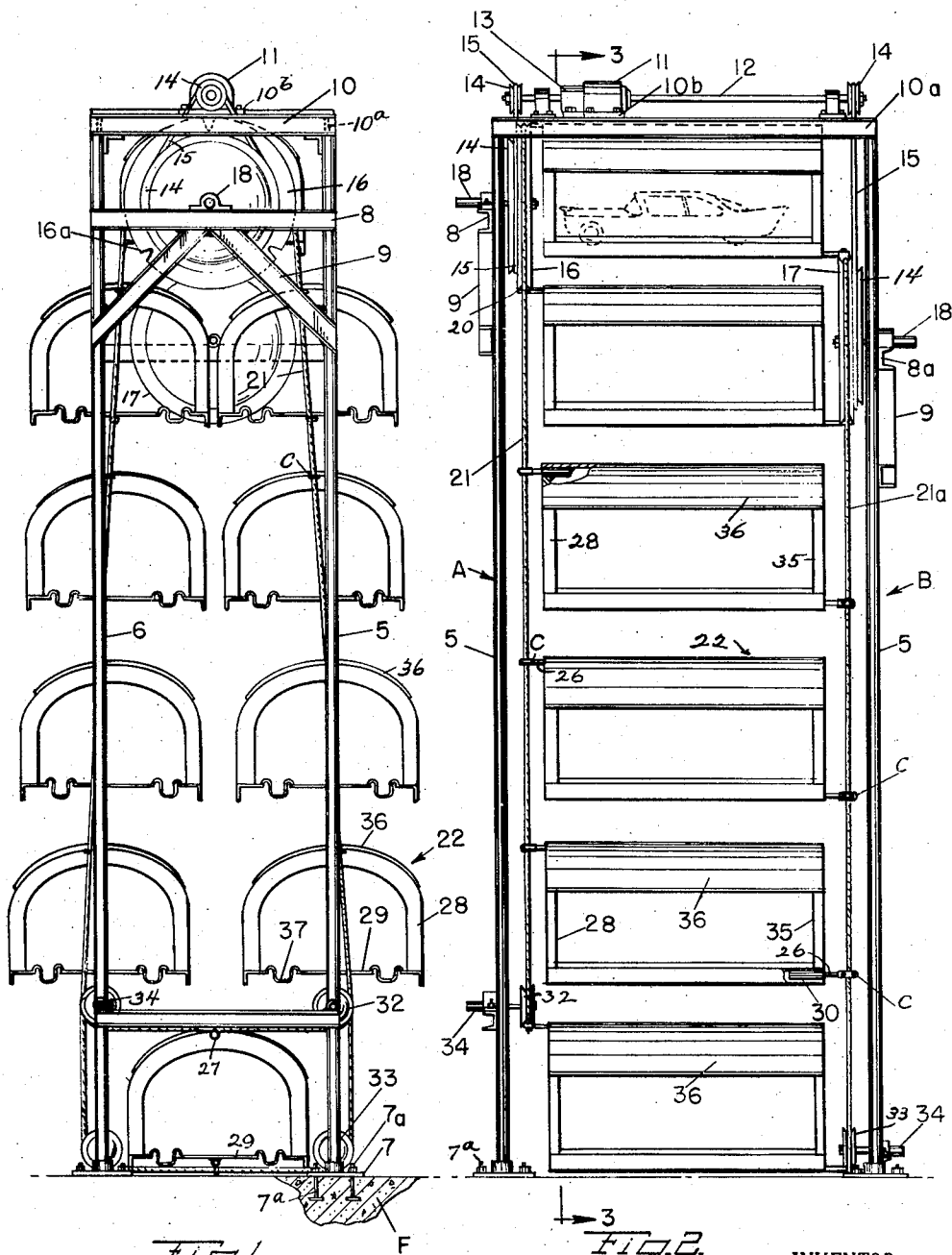
Oct. 11, 1960

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AUTOMOBILE HOISTS

2,955,718

Filed Dec. 3, 1957

2 Sheets-Sheet 1



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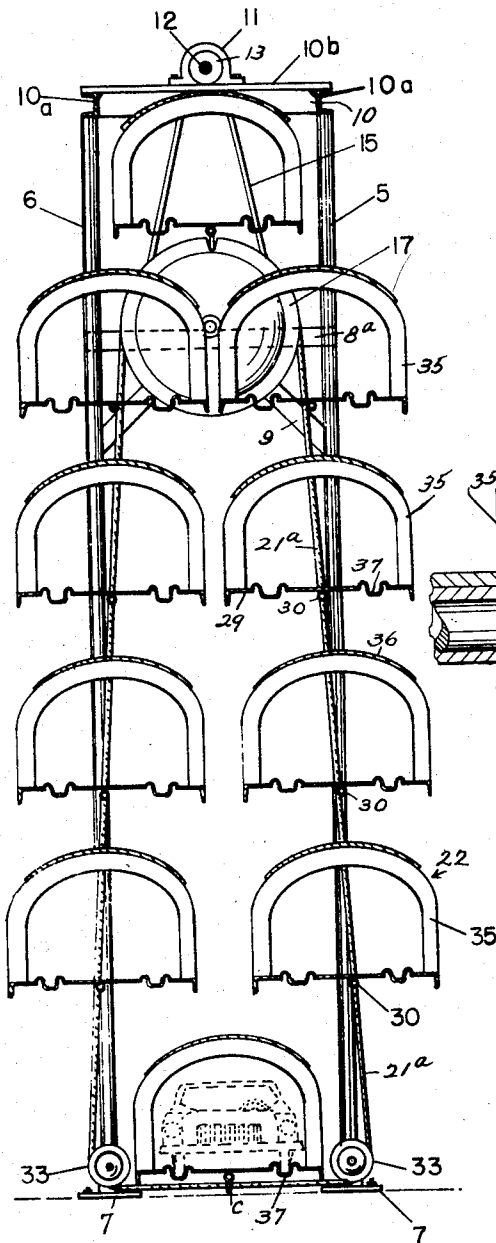


Fig. 3

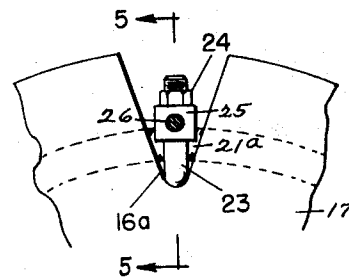


Fig. 4

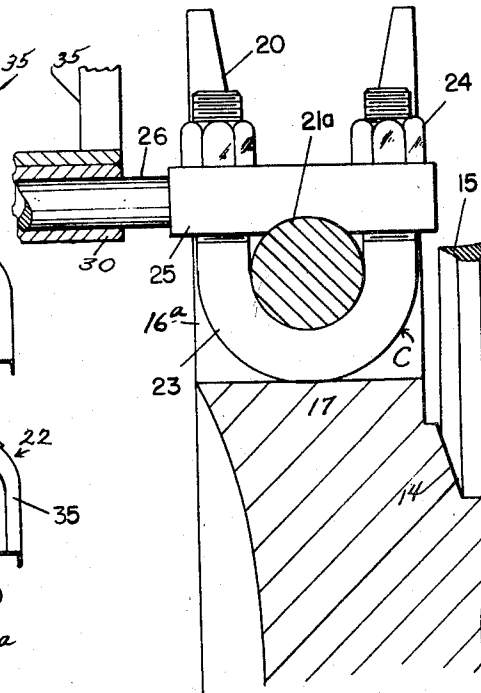


Fig. 5

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AUTOMOBILE HOISTS

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Filed Dec. 3, 1957, Ser. No. 700,514

3 Claims. (Cl. 214—16.1)

This invention relates to an automobile parking hoist. The object of the invention is to provide a simple, very strong, easily operated mechanism adapted to park automobiles in tiers, one above the other and by means of a structure which will occupy a minimum of space, in proportion to the number of cars accommodated.

A further object of the invention is to provide a device of the nature indicated, adapted to be set in place, as a complete unit, with a minimum of labor and expense and so constructed that like units may be placed beside the first unit, whereby to increase capacity, as the business of the operating owner may justify.

Broadly stated the invention comprises a pair of endless conveyers disposed upon opposite sides of an upright shaft, which carry a plurality of car receiving cages, upwardly and downwardly in said shaft, one of the conveyers operating, as a whole, at a level disposed below the level of operation of the other, a distance equal to the height of the said cages, the cages being connected at their tops to the uppermost of said conveyers and at their bottom and opposite side portions, to the other of said conveyers. Means are provided for driving the conveyers in unison and at equal rates of speed, the connections described maintaining the floors of the cages substantially level at all times and the driving of the conveyers in unison causing the conveyers to operate smoothly and without any tendency of any cage to bind in its travel.

The means by which I accomplish these desired objects with facility and at very low cost will be best understood by reference to the accompanying drawings, wherein:

Fig. 1 is a front elevation of the device of the invention;

Fig. 2 is a side view thereof;

Fig. 3 is a vertical section on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary view of a part of one of the supporting guide wheels and a cable clamp engaging the same;

Fig. 5 is a sectional view on line 5—5 of Fig. 4.

Like numerals designate corresponding parts in all of the figures of the drawings.

The form of the invention chosen for purposes of illustration comprises two opposed upright side frame members A and B each of said frames including a pair of spaced, stout, vertical and preferably round tubular elements 5 and 6 of any desired height. At their lower ends these tubular uprights are provided with feet forming plates 7, having openings formed therethrough for the reception of upstanding threaded studs 7a, these studs being placed in concrete footings F prepared in advance and serving to position the upright frames when they are lifted by a crane and lowered upon said studs in the erection of the hoist. The uprights 5 and 6 are tied together by horizontal channel beams 8, 8a. Diagonal braces 9 extend from the channel beams to the uprights and hold the uprights in rigid parallelism. The parts may be welded together or secured in any other conventional way. The tops of the uprights of each

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frame member may further be tied together by channel beams 10. Channel beams 10a extend between the two frames A and B and tie the tops of the two frames A and B together. Beams 10a support a stout cap plate 10b. This cap plate supports an electric or hydraulic motor 11, which motor drives a shaft 12 through a conventional reducing gear, the casing of which is indicated at 13. At its opposite ends the shaft 12 drives through pulleys 14 and belts 15 to the supporting and guide wheels 16 and 17. V belts and pulleys or sprockets and sprocket chains may be employed.

The guide wheels 16 and 17 have central stub shafts which are rotatively engaged in and supported by long bearings 18, said bearings, in turn, being supported by the adjacent channel beams 8, 8a. Guide wheel 17 lies at a much lower level than guide wheel 16, for a purpose hereinafter set forth.

Each of the wheels 16 and 17 is peripherally grooved at 20 to receive the hoisting cables 21, 21a. These are preferably steel wire cables similar to those employed in elevators. I employ cables of such ample diameter that the factor of safety is very great. These cables have automobile receiving cages 22 attached thereto and for the purpose of attaching the cages to the cables I employ means very similar to ordinary cable clamps. These clamps C comprise stirrup members 23 of U shape which embrace the cables and the terminal ends of which are threaded for the reception of nuts 24. These terminal ends are passed through a stout steel bar 25 and when the nuts are tightened the cable is gripped very forcibly between the bar and stirrup. To adapt such a clamp to my purposes I provide a stub shaft extension 26 upon the end of bar 25 or other part of the clamp. This extension enters a bearing sleeve 27 that is carried at the top of the end frame 28 of the car receiving cages. The rims of the guide wheels 16 and 17 are notched as at 16a for the passage of the stub shaft extensions 26. While any suitable form of cage may be employed, I prefer to use the structure shown, wherein the cages comprise a bottom 29 and the stout upstanding left-hand end frames 28. These end frames are of arch formation to leave an opening through which an automobile may pass and they may be of pipe-like, tubular construction. A like bearing sleeve 30 is carried by bottom 29 at that side of the structure remote from end frame 28 and said last named bearing sleeve receives a stub shaft corresponding to stub shaft 26 and which projects from a clamp C that is clamped upon the cable 21a. Thus it will be seen that the cages are attached at their top left-hand corners to the higher cable 21 and at their lower right-hand portions to cable 21a (Fig. 2). The cable 21 passes over guide pulleys 32 and the cable 21a passes over like guide pulleys 33, said guide pulleys being mounted for rotation in bearings 34. The cages further comprise right-hand open end frames 35 and a curved top 36 is supported upon the end frames 28 and 35. These tops 36 protect the automobiles in the several cages from oil drippings from automobiles in cages thereabove.

Since the cables are driven in unison by the motor, it follows that the bottoms of the cages are held substantially level at all times, fore and aft. The bottoms of the cages are bent to form channels 37 for the guidance of the wheels of the automobiles which are driven into and through the cages. It will of course be understood that when an automobile is to be driven into a cage to be lifted to a higher level the cage is lowered to the ground floor level. The automobile may be driven into the cage from one side of the cage and out of the other side, or it may be backed out on the side from which it entered, according to the location of the hoist with respect to other buildings or structures.

I wish to make it clear that the invention is not

limited to the guiding of the lower portions of the cables by the small pulleys. While I use that arrangement to enable me to drive an automobile into one side and out of the other side of a cage I recognize that it would be possible to pass the lower cable around a single large wheel, like 17. This would block passage of a car completely through the structure and therefore I prefer the construction shown. If the upper cable were passed around a single large, centrally located wheel, like 16, at the bottom of the hoist the automobiles could pass beneath said wheel. The structure herein shown is explanatory only. Any additional structural bracing required will be added in accordance with recognized engineering practice. The structure falls in the class where columns, I beams, angle irons, channel beams, etc. are welded together to produce any desired structural steel unit.

I am aware of the fact that it is not new to provide automobile receiving cages carried by vertically traveling conveyers, for the purpose of stacking automobiles one above the other. Most of the devices of this nature with which I am familiar contemplate structures requiring a considerable area of ground for their installation. A primary purpose of the present invention is to provide an automobile lift of such simple construction and comprising so few parts that through its use it may be economically feasible to utilize the many very small plots found scattered through the business district of cities, where free parking space is nonexistent and parking in commercial parking structures is almost prohibitively expensive. My invention lends itself to the accomplishment of the described object for several reasons. One reason is that the structure, except the cages, may be preassembled, carried to the place of use, lifted by a crane and lowered to engage its feet 7, with studs as described. Then the cages may, one-by-one, be engaged with the hoist cables. This may be done by slipping one of the stub shaft extensions into the bearing sleeve of a cage and then applying the U-shaped part of the cable clamp. The whole structure may be set up ready for use in a few hours. Further, the use of wire cables and the utilization of cable clamps as described, by which to attach the cages to the cables, greatly reduces cost, facilitates erection and insures against the delays and expense incident to the breaking of conveyer chains, such as are usually employed in devices of this nature. Where space permits, additional units may be added from time to time. Where only a small space is available, say close to a business establishment, a small inexpensive lift of this type provides means through which the owner of such establishment may park his own cars and trucks. It is well known that lack of parking space is driving many older businesses to the suburbs. My device provides means for protecting the owners of small businesses against this necessity. It is also possible to erect the structure by first placing frame A erect, then frame B and then tying these structures together by the top connecting channels.

Some devices of this general nature have provided cages attached at their tops to a single conveyer chain and have relied upon elements upon the cages, traveling in arcuate trackways, to hold the floors of the cages substantially horizontal. In such an arrangement the driven chain has to drag the element in the trackway along its course. In my device each point of attachment of a cage to a cable is propelled and any tendency of the parts to bind or drag is prevented. The guide pulleys 32 and 33 are quite small in diameter in comparison with the supporting and guide wheels 16 and 17 and said pulleys are mounted close to the line of the vertical frame members A and B, which members with their uniting structural elements constitute a portable tower, adapted to be set in its position of use as a unit, by a crane, as hereinbefore described.

By making the guide pulley of relatively small diameter

and by positioning them at about the line of the vertical uprights of the tower, I provide a space at the bottom of the tower into which the cages successively move laterally in a substantially straight line to have automobiles loaded into them, which space is not obstructed by any vertical run of the flights of the conveyers and in which space the cages are held against swinging. As is shown at the bottom of Fig. 1 that portion of the upper conveyer which travels from one pulley 32 to its companion pulley 32 at the opposite side of the tower, travels in a horizontal path and at a level such that the top of cage being loaded, may be attached thereto, while that portion of the flight of the lower conveyer which passes from one guide pulley 33 to its companion guide pulley 33 also travels in a substantially horizontal plane but in a path low enough that the bottoms of the cages may be attached thereto. Thus, even if the cages are not positioned with great accuracy within the described space at the bottom of the tower there is never any portion of the flight of either conveyer which will prevent the free driving of automobiles into the cages, from one side of the tower and out of the other side of the tower. This is of importance in the case of a portable device of this nature, which frequently must be placed in small ground spaces.

It is to be understood that the invention is not limited to the particular construction shown, but that it includes within its purview whatever changes fairly fall within either the terms or the spirit of the appended claims.

I claim:

1. In an automobile hoist a plurality of upright members constituting an elevator shaft for a pair of vertically travelling endless conveyers, one at each side of the shaft each of the same length and each passing over a relatively large grooved guiding and driving wheel at its top and over a pair of much smaller, laterally spaced guide pulleys at its bottom, means for driving the driving wheels in unison, a plurality of open ended cages, one of said conveyers as a whole lying and operating at level above the other conveyer to a degree substantially equal to the height of said cages, means for pivotally connecting the upper portions of the said cages to that conveyer that is disposed at the higher level, means for connecting the ends of the lower portions of the cages to that conveyer which travels at the lower level, the guide pulleys for the lower run of the uppermost conveyer being disposed at such a level that an automobile may pass therebeneath and the guide pulleys which receive the lower run of the lowermost conveyer being disposed a sufficient distance outside of the vertical axis of the shaft as to leave the space between said guide pulleys wide enough for the passage of an automobile between the descending and ascending runs of the said lowermost conveyer.

2. A portable automobile hoist comprising spaced upright corner members and means for rigidly uniting them to form a tower which constitutes an elevator shaft, a pair of vertically traveling endless conveyers, one at each side of the shaft, comprising cables each of the same length and each passing over a grooved guiding and driving wheel at its top and over a pair of guide pulleys at its bottom, means for driving the driving wheels in unison, a plurality of automobile receiving cages which are open from end to end to permit the passage of automobiles entirely therethrough, which cages extend across the shaft with one of their ends lying adjacent to one of said conveyer cables and with their opposite ends lying adjacent to the other of said cables, one of said conveyers as a whole, including the cable driving wheel and guide pulleys lying and operating at a level below the other conveyer a distance substantially equal to the height of said cages, means for pivotally attaching the end of each of said cages at its top to the cable of the upper conveyer, means for pivotally connecting the lower portions of the cages at their ends, to the cable of the

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lower conveyer, the guide pulleys of the cables being much smaller in diameter than the driving and guiding wheels, said pulleys comprising an upper pair over which the cable of the upper conveyer passes and a lower pair over which the cable of the lower conveyer passes with the pulleys of each pair lying at substantially the same level, those portions of the cables which travel between the pulleys of the respective pairs traveling in substantially horizontal and parallel paths, whereby the lowermost cage may be carried laterally and in a substantially straight path to loading position at the bottom of the tower and held against swinging during its lateral travel and during the loading of an automobile thereon.

3. A structure as recited in claim 1 wherein the means for attaching the cages to the cables comprise an open ended bearing sleeve carried centrally on each cage at the upper end portion of the cage, and additional open ended

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bearing sleeves disposed centrally of the cages and upon the underside of the bottoms thereof at the other end of said cage in obliquely disposed relation to the first named sleeves and clamps upon the two cables which clamps carry stub shafts projecting laterally from the cables and toward the cages which shafts enter the open ends of said sleeves to pivotally mount the cages upon the cables.

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