

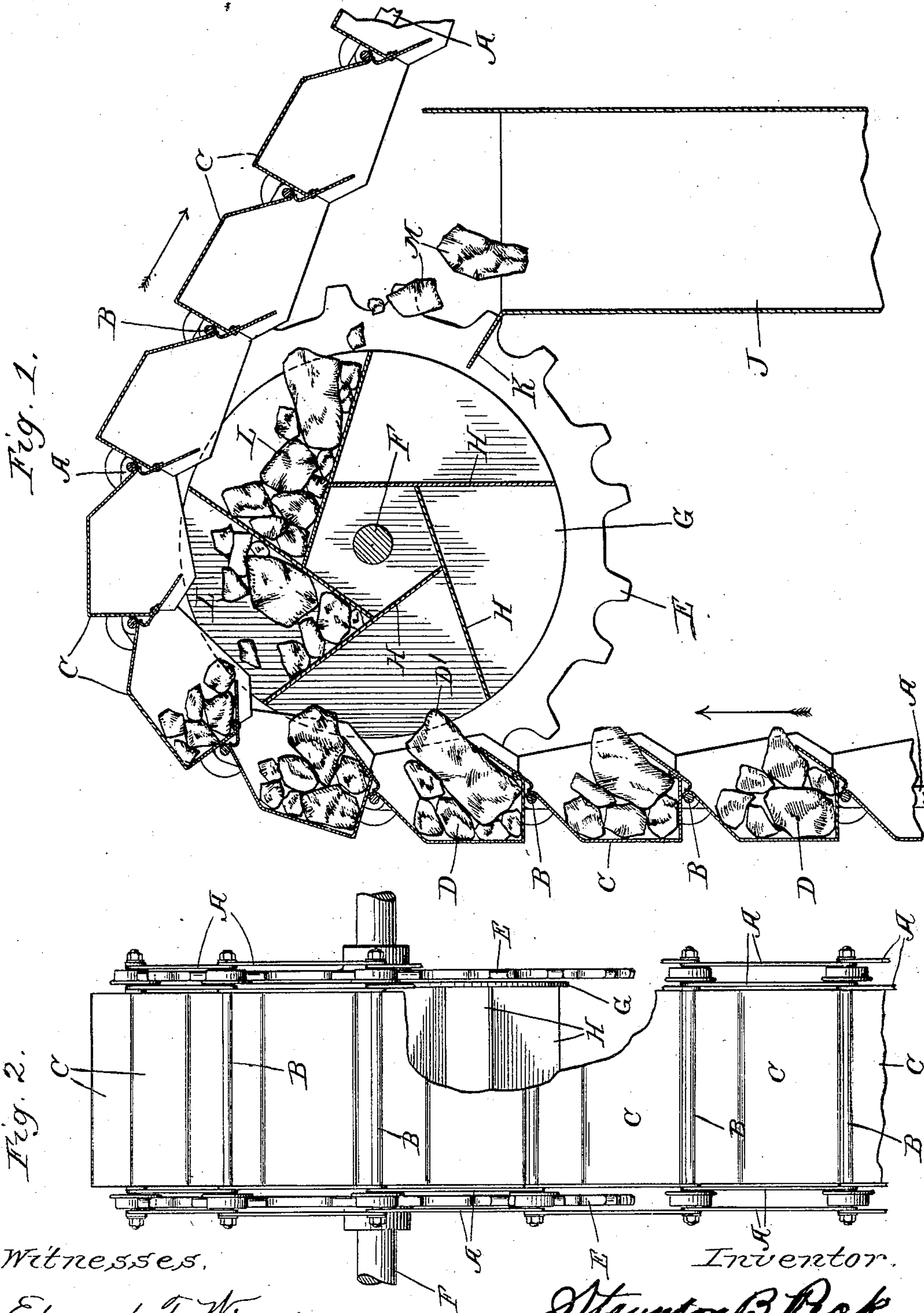
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Patented July 22, 1902.

S. B. PECK.  
ELEVATOR.

(Application filed May 13, 1901.)

(No Model.)



Witnesses.

Edward T. Wray.  
Homer L. Kragh

Inventor.

Staunton B. Peck  
by Parker Carter  
his Attorney.



# UNITED STATES PATENT OFFICE.

STAUNTON B. PECK, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE LINK BELT MACHINERY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 705,290, dated July 22, 1902.

Application filed May 13, 1901. Serial No. 59,931. (No model.)

*To all whom it may concern:*

Be it known that I, STAUNTON B. PECK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Elevators, of which the following is a specification.

My invention relates to bucket elevators, particularly such as are operated by chain belts, and has for its object to provide certain improvements in connection with the head-wheel about which the filled buckets pass.

My improvements are illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical section. Fig. 2 is an end elevation of the device shown in Fig. 1.

Like parts are indicated by the same letter in both figures.

It will be understood that I have simply shown a portion of the device, and the remaining parts, including the remainder of the chain belting, the buckets, the conveyer, the chutes, the wheels, and the supporting-frames, I do not deem it necessary to show, as they form no part of my present invention.

A A are the links, which taken together form a link belt, upon which at the pivot-pins B B are secured the buckets C, adapted each to receive a proper charge of coal or other material D.

E is a sprocket-wheel, which may be called the "head-wheel." There are two of these wheels, one for each set of links, and the buckets pass between such two wheels. These sprocket-wheels are mounted on a shaft F. On the shaft F and rotating therewith, and therefore rotating with the sprocket-wheels and moving with the chain of buckets, is a spool-like structure consisting of the sides G G and containing a series of pockets formed between the sides and by the metal plates H H, which in this case are arranged tangentially to a small circle about the center of the shaft F and which extend each from its intersection with the next behind it to the circumference of the circle, which is preferably substantially coincident with the arc of a circle described by the innermost portions of the buckets as they pass around over the sprocket-wheels. It will be understood that the size

and the lengths and arrangements of these several parts which go to form the pockets may be greatly varied without departing from the spirit of my invention.

J is a chute, preferably having the lip K inwardly projecting between the sprocket-wheels and beneath the vertical tangent to the circle described by the spool as it rotates.

L L represent the charges of coal or other material in the pockets, and M the coal in the process of being discharged down or toward the chute. There is no necessary relation between the length of the arc formed at the outside of the rotating pocket and the length of a bucket, though it would be desirable to so adjust these parts with reference to each other that projecting objects, like the lump of coal, (indicated at D',) would not engage the outer end of one of the plates H as it rose toward its horizontal position, for in that case there would be danger of injury to the parts in the case of heavy and hard lumps of coal or other such material. It will be possible to so adjust these several parts as that the outer extremity of the plate H could extend beyond the circumference of the circle referred to and take under the inwardly-projecting end or edge of the bucket; but the construction which I have preferred is the one shown in the drawings.

The use and operation of my invention are as follows:

I have arranged the parts so that two buckets discharge into each succeeding pocket; but of course this is not a necessary form of construction. As the sprocket-wheels rotate on or with the shaft F the chain belt is carried forwardly and upwardly in the direction indicated by the arrows, and the buckets filled with the material which is being elevated are carried upwardly. The top bucket, as shown in Fig. 1, has emptied its load into the first pocket L, and the next bucket to the left has emptied a part of its load and is about to empty the remainder into the same pocket. As the parts move forwardly—the pockets by rotation, the buckets by traveling around the center of the axis of rotation of the pockets—the next two buckets will in due course of time deposit their loads in their associated



pocket. The upper pocket to the right is discharging its load into the chute, the preceding pocket having already discharged its entire load into the chute. From the chute the material can be carried to any desired point. In such an apparatus or with such an arrangement of parts the material in the ascending buckets though in large and irregular lumps and projecting beyond the face of the buckets is nevertheless not in danger of causing injury to the parts by its engagement with the receiving or supporting parts associated with the head-wheels. Again, all fixed guides, chutes, or associated parts are dispensed with by the substitution of the pockets, and these pockets become not means for holding the material in the buckets as the buckets pass around the wheels, but they actually receive the material from the buckets, which buckets are thus entirely emptied of their load before they pass over the vertical line. At the same time the receiving-pockets discharge the load into the chute, and this they easily do without any danger of discharging the coal back into the machinery or apparatus, for the chute or its lip can be placed at any desired position under the rotating pockets. There is no danger of the material falling back into the machinery or upon the lower buckets, because it is at all times securely retained in appropriate receptacles, first the buckets and then the pockets, until it has been discharged into the chute, whence it is led by proper ways to the bins for use.

As shown in the drawings, each pocket is the space intervening between two of the plates H H on the ascending side. The lower plate forms the receiving-bottom and the upper plate the top; but when this pocket has been carried around and is on the descending side the first-named plate forms the top and the second one the discharging-bottom. The buckets are placed as closely together as possible, as indicated in the drawings. This is what is meant by placing them in contiguity, and one of the problems solved by me was the coöperation of rotating pockets with a series of such buckets thus in contiguity or close relation to each other. The result is to form, as it were, a continuous stream of material, and the greatest possible amount of material is moved for a conveyer having a given cross-section in the ascending branch. As indicated in the drawings, these buckets open inwardly or toward the pockets; otherwise they could not empty into the pockets, and this presented another difficulty to be solved by my invention and one which is suggested above. If the buckets open inwardly, then in the case of large lumps, as shown and described, they project beyond the buckets and into the line of rotation of the pockets, and the difficulties flowing from these conditions have been solved by my present invention.

As shown, for example, in Fig. 1, the pockets and buckets are so spaced and timed that the bottom of the pocket follows the bottom of the bucket, and hence any projecting pieces in the buckets will project into the pockets and cannot come into contact with the bottom of such pockets so as to injure them.

I claim—

1. In an elevator, the combination of a series of buckets, each opening inwardly and traveling about a certain axis of rotation, with a series of receiving-pockets rotating about said axis of rotation and formed by side flanges and two substantially flat plates set each at a tangent to an inner circle about the axis of rotation.
2. In an elevator, the combination of a series of buckets, each opening inwardly and traveling about a certain axis of rotation, with a series of deep and wide-mouthed receiving-pockets rotating about said axis of rotation, each provided with a bottom inclined so that when its outer edge has reached on its ascending motion the horizontal line through the axis of rotation, the bottom of such pocket is inclined inwardly to hold the load which falls into it from the bucket above.
3. In an elevator, the combination of the elevating chain and buckets with a series of rotating pockets, each composed of side walls and two substantially flat plates, which form respectively the top and bottom of such pocket and which are joined together near the axis of rotation of such pockets.
4. In an elevator, the combination of the elevating chain and buckets, adapted each to discharge its load inwardly as it ascends, with a series of rotating pockets, each composed of side walls and two substantially flat plates, which form respectively the top and bottom of such pocket and which are joined together near the axis of rotation of such pockets.
5. In an elevator, the combination of a suitable driving-chain with a series of contiguous buckets, opening at the side and which travel around a certain axis, with a series of pockets, rotating about the same axis and opening outwardly, with wide unobstructed mouths to receive the material which projects from the side openings of the buckets, said pockets formed by thin partitions and presenting to the buckets in the line of rotation only the sharp edges of such partitions.
6. In an elevator, the combination of a suitable driving-chain with a series of contiguous buckets, opening at the side and which travel around a certain axis, with a series of pockets, rotating about the same axis and opening outwardly, with wide unobstructed mouths to receive the material which projects from the side openings of the buckets, said pockets formed by thin partitions and presenting to the buckets in the line of rotation only the sharp edges of such partitions, said partitions placed tangentially so as to present an in-



wardly-inclined bottom when the outer edge is in the horizontal line on the ascending side.

7. In an elevator, the combination of an elevating-chain with a series of contiguous buckets thereto attached and opening inwardly toward the axis about which the chain and buckets travel, a series of pockets rotating about such axis and opening outwardly to receive the contents of the buckets, said chain and buckets departing from the pockets on the descending side and said pockets discharging beneath such chain and buckets on the descending side and at one side of the vertical line through the axis of rotation.

8. In an elevator, the combination of the elevating chain and buckets with a series of rotating pockets, each composed of side walls and two substantially flat plates, which form respectively the top and bottom of such pocket and which are joined together near the axis of rotation of such pockets, the receiving-bottom of each of such pockets placed tangentially so that when such pocket is on its ascending side, its bottom will have a downward and inward dip when its outer edge is in a horizontal line with the axis of rotation.

9. In an elevator, the combination of the elevating chain and buckets with a series of rotating pockets, each composed of side walls and two substantially flat plates, which form successively the receiving and discharging bottoms of such pocket and which are joined together near the axis of rotation of such pockets, the discharging-bottom of each of such pockets placed tangentially so that when such pocket is on its descending side, its bottom has an outward and downward dip when its outer edge is in a horizontal line with the axis of rotation.

10. In an elevator, the combination of the elevating chain and buckets, adapted each to discharge its load inwardly as it ascends, with a series of rotating pockets, each composed of side walls and two substantially flat plates, which form respectively the top and bottom of such pocket and which are joined together near the axis of rotation of such pockets, the receiving-bottom of each of such pockets placed tangentially to a circle concentric with the axis of rotation.

11. In an elevator, the combination of the elevating chain and buckets, adapted each to discharge its load inwardly as it ascends, with a series of rotating pockets, each composed of side walls and two substantially flat plates, which form respectively the top and bottom of such pocket and which are joined together near the axis of rotation of such pockets, the discharging-bottom of each of such pockets placed tangentially to a circle concentric with the axis of rotation.

12. In an elevator, the combination of a series of contiguous ascending buckets adapted to travel around an axis of rotation at a certain point, with a series of carrying-pockets adapted to rotate about the same axis of ro-

tation and receive the material from the ascending buckets.

13. In an elevator, the combination of a series of contiguous ascending buckets opening inwardly and adapted to travel around an axis of rotation at a certain point, with a series of carrying-pockets opening outwardly and adapted to rotate about the same axis of rotation and receive material from the ascending buckets.

14. In an elevator, the combination of a series of contiguous, continuously-traveling, carrying-buckets, with a series of continuously-rotating, carrying-pockets, the same associated so that the load of the buckets is discharged into the pockets while the buckets are ascending.

15. In an elevator, the combination of a series of contiguous, continuously-traveling carrying-buckets with a series of continuously-rotating carrying-pockets, the same associated so that the load of the carrying-buckets is discharged into the carrying-pockets, said carrying-pockets shaped so as to hold the load, carry it partially around the axis of rotation and discharge it.

16. In an elevator, the combination of a series of buckets, each opening inwardly and traveling about a certain axis of rotation, with a series of carrying-pockets rotating about said axis of rotation, opening outwardly, the inner edges of the buckets and the outer edges of the pockets traveling in substantially the same circle.

17. In an elevator, the combination of a series of buckets, each opening inwardly and traveling about a certain axis of rotation, with a series of carrying-pockets rotating about the same axis of rotation opening outwardly, the inner edges of the buckets and the outer edges of the pockets traveling in substantially the same circle, the inner edges of the buckets being somewhat in advance of the outer edges of the pockets in such circle.

18. In an elevator, the combination of a series of buckets, each opening inwardly and traveling about a certain axis of rotation, with a series of carrying-pockets rotating about said axis of rotation and opening outwardly, the inner edges of said buckets being somewhat in advance of the outer edges of the pockets in such circle.

19. In an elevator, the combination of a series of buckets, each opening inwardly and traveling about a certain axis of rotation, with a series of carrying-pockets rotating about said axis of rotation and opening outwardly, said buckets adapted to discharge their loads while ascending and said pockets adapted to discharge their loads while descending.

20. In an elevator, the combination of a series of contiguous, laterally-discharging elevator-buckets traveling about a certain axis of rotation, with a series of receiving-pockets rotating about such axis of rotation, the speed of such travel and rotation being



such as to keep the buckets and the pockets in the same relative position while they are traveling about the same axis of rotation.

21. In an elevator, the combination of means for elevating the material vertically and discharging it laterally, with carrying-pockets adapted to receive the material from the means for elevating the same, said means for elevating the material and said rotating carrying-pockets adapted to retain their relative positions during the period of their travel about the same axis of rotation.

22. In an elevator, the combination of a series of laterally-discharging elevating-buckets, with a series of carrying-pockets, both traveling in the same direction for at least a portion of their travel and adapted to retain their relative positions during the period of such travel.

23. In an elevator device, the combination of a series of ascending carrying-buckets with a series of rotating carrying-pockets around which the buckets pass, each pocket triangular in cross-section and located so as to receive and hold its load while traveling upwardly and means for driving and rotating the buckets and pockets together.

24. In an elevator device, the combination of a series of ascending carrying-buckets with a series of rotating carrying-pockets, each pocket triangular in cross-section and located so as to receive and hold its load while traveling upwardly the pockets and buckets so spaced and timed that the bottom of the pocket follows at a greater or less interval the bottom of the bucket, and means for driving and rotating the buckets and pockets together, said carrying-pockets also shaped and located so as to carry the load over the axis of rotation and discharge it while such pockets are descending.

25. In an elevator, the combination of means for elevating material with rotating carrying-pockets around which the elevating device passes and adapted to receive and hold the material at one side of the axis of rotation, retain it until it has been carried across the axis of rotation and discharge it at the other side of the axis of rotation beyond the vertical tangent to the circle described by the outer edges of such pockets.

26. In an elevator, the combination with the elevating chain and buckets of a series of rotating carrying-pockets, around which the buckets pass and adapted to receive the contents of the buckets and carry it over a vertical line through the axis of rotation and to freely discharge the same to one side of the path of rotation of the pockets.

27. In an elevator, the combination with the elevating chain and buckets of a series of rotating carrying-pockets, around which the buckets pass and adapted to receive the contents of the buckets at one side of the path of rotation of the pockets and carry it over a vertical line through the axis of rotation and

to freely discharge the same to the other side of the path of rotation of the pockets.

28. In an elevator, the combination with the elevating chain and buckets, adapted each to discharge its load inwardly as it ascends, of a series of rotating carrying-pockets, adapted to receive the contents of the buckets and carry it over a vertical line through the axis of rotation and to freely discharge the same to one side of the path of rotation of the pockets.

29. In an elevator, the combination with the elevating chain and buckets, adapted each to discharge its load inwardly as it ascends, of a series of rotating carrying-pockets, adapted to receive the contents of the buckets at one side of the path of rotation of the pockets and carry it over a vertical line through the axis of rotation and to freely discharge the same to the other side of the path of rotation of the pockets.

30. In an elevator, the combination of a suitable driving-chain with a series of contiguous buckets, opening at the side and which travel around a certain axis, with a series of carrying-pockets, rotating about the same axis and opening outwardly, with wide unobstructed mouths to receive the material which projects from the side openings of the buckets.

31. In an elevator, the combination of means for elevating the material vertically and discharging it laterally, with carrying-pockets adapted to receive the material from the means for elevating the same, said means for elevating the material and said rotating carrying-pockets adapted to retain their relative positions during the period of their travel about the same axis of rotation, said carrying-pockets forming parts of the pulley over which the ascending carrying-buckets pass.

32. In an elevator, the combination of a series of laterally-discharging elevating-buckets, with a series of carrying-pockets, both traveling in the same direction for at least a portion of their travel and adapted to retain their relative positions during the period of such travel, said carrying-pockets forming parts of the pulley over which the ascending carrying-buckets pass.

33. In an elevator device, the combination of a series of ascending carrying-buckets with a series of rotating carrying-pockets, each pocket triangular in cross-section and located so as to receive and hold its load while traveling upwardly, and means for driving and rotating the buckets and pockets together, said carrying-pockets forming parts of the pulley over which the ascending carrying-buckets pass.

34. In an elevator device, the combination of a series of ascending carrying-buckets with a series of rotating carrying-pockets, each pocket triangular in cross-section and located so as to receive and hold its load while traveling upwardly, and means for driving and rotating the buckets and pockets together,



said carrying-pockets also shaped and located so as to carry the load over the axis of rotation and discharge it while such pockets are descending, said carrying-pockets forming parts of the pulley over which the ascending carrying-buckets pass.

35. In an elevator, the combination of means for elevating material with rotating carrying-pockets adapted to receive and hold the material at one side of the axis of rotation, retain it until it has been carried across the axis of rotation and discharge it at the other side of the axis of rotation beyond the vertical tangent to the circle described by the outer edges of such pockets, said carrying-pockets forming parts of the pulley over which the ascending carrying-buckets pass.

36. In an elevator, the combination with the elevating chain and buckets of a series of rotating carrying-pockets, adapted to receive the contents of the buckets and carry it over a vertical line through the axis of rotation and to freely discharge the same to one side of the path of rotation of the pockets, said carrying-pockets forming parts of the pulley

over which the ascending carrying-buckets pass.

37. In an elevator, the combination with the elevating chain and buckets of a series of rotating carrying-pockets, adapted to receive the contents of the buckets at one side of the path of rotation of the pockets and carry it over a vertical line through the axis of rotation and to freely discharge the same to the other side of the path of rotation of the pockets, said carrying-pockets forming parts of the pulley over which the ascending carrying-buckets pass.

38. In an elevator, the combination of a series of elevating-buckets with a series of carrying-pockets, both traveling in the same direction for at least a portion of their travel, said carrying-pockets associated with a pulley over which the ascending carrying-buckets pass.

STAUNTON B. PECK.

Witnesses:

HOMER L. KRAFT,  
FANNY B. FAY.