G. SANFORD.

Movement for Elevating and Conveying.

No. 213,695. Patented Mar. 25, 1879.

Fig 1.

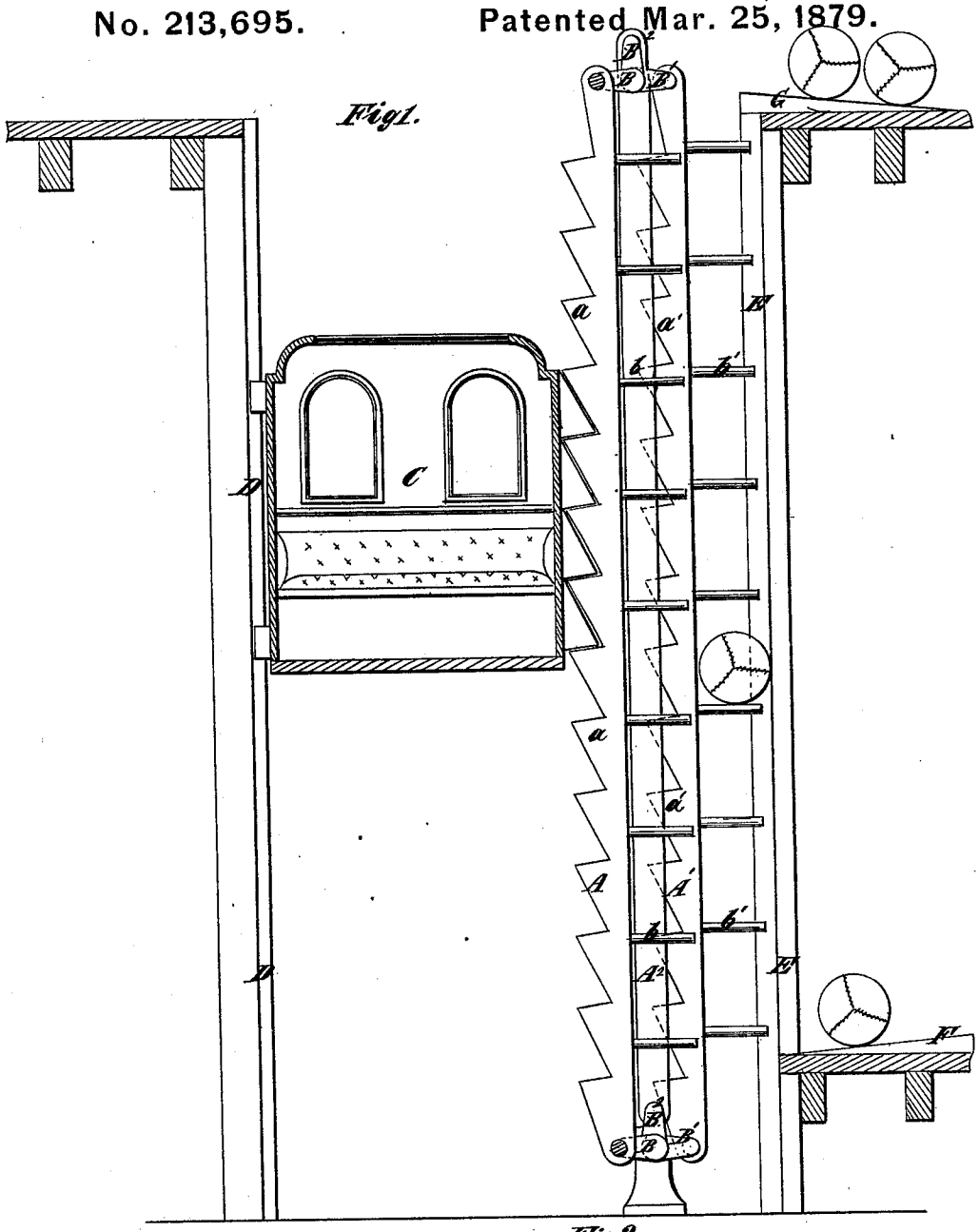


Fig 3.

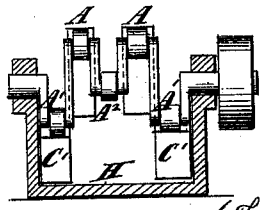
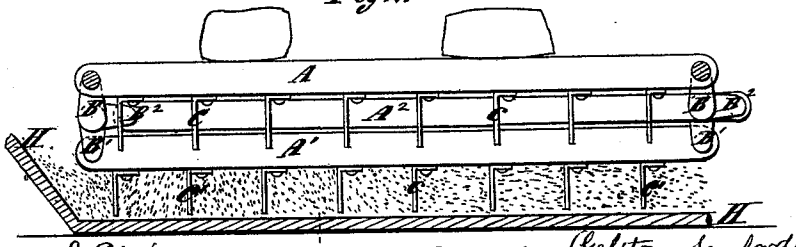


Fig 2.



Witnesses: Thomas E. Birch. Edw. P. Jessup.

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UNITED STATES PATENT OFFICE

GELSTON SANFORD, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN MOVEMENTS FOR ELEVATING AND CONVEYING.

Specification forming part of Letters Patent No. **213,695**, dated March 25, 1879; application filed January 21, 1879.

To all whom it may concern:

Be it known that I, GELSTON SANFORD, of Brooklyn, in Kings county and the State of New York, have invented a new and Improved Movement, useful especially for conveying apparatus, of which the following is a specification:

My invention consists in the combination of two series of bars and cranks, or their equivlents, imparting to them vibratory and longitudinal movements, so that one series of the bars work forward and upward at the same time that one series of them work rearward and downward, whereby articles to be transported from place to place may be moved along the faces of said base continuously, and with a positive motion.

The invention also consists in various combinations of parts, and in details hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a vertical section of an apparatus embodying two forms or modifications of my invention. Fig. 2 represents a horizontal section of an apparatus embodying two other forms or modifications of my invention, and Fig. 3 is a transverse view of the latter.

Similar letters of reference designate corresponding parts in all the figures.

Referring to Fig. 1, A A^1 designate two series of bars, connected to cranks B B^1, or their equivalents, set so that when revolved they will impart to the bars respectively connected to them a vibratory and a longitudinal movement, the bars A of one series moving forward and upward, and the bars A^1 of the other series moving at the same time backward and downward. These bars are shown as provided with teeth or projections *a a'*, having abrupt upper faces, and as engaging with reversely-shaped teeth arranged on an elevator cab or car, C, working along suitable guides or ways on a hoistway, D. As the bars of the different series move forward, their teeth *a* engage with the teeth of the cab or car, and as they move upward they impel the cab or car upward. The reverse movement of the cranks and bars will permit of the descent of the cab or car.

It will be understood that as the different series of bars move reversely they operate independently and intermittently on the cab or car.

This mechanical movement for operating an elevator cab or car has the advantage of being absolutely positive, and serving as a stop or safety apparatus, precluding the accidental descent of the cab or car, because one series or the other series of said bars is always in engagement with the cab or car.

The bars may be actuated by power applied to but one—for instance, the lower series of cranks, B B^1, or their equivalents—in which case the bars will transmit motion to the upper series of cranks. Another bar, A^2, connected to cranks B^2, set at right angles to the others, will then preferably be employed to avoid "dead-centers."

Power may be applied to the shaft upon which the cranks are arranged in any suitable manner.

On the rear side of the bars A A^1 are, in the present instance, shown pins *b b'*, constituting another form or modification of my invention. In connection with these pins I have also shown guides E, between which and the bars articles, such as barrels or rolls of material, may be transported. These guides may not be necessary when the bars are arranged on such an incline as to preclude the articles during transportation from rolling or falling off them.

It will be understood that as the bars of the different series operate their pins alternately they come in contact with the under side of the articles to be transported, and impel them along on their course.

A conduit, F, slanting downwardly toward the bars, may be used to convey the articles to the bars and their pins, and a conduit, G, slanting downwardly away from the bars, may be used to convey the articles from the bars and their pins.

Turning now to Figs. 2 and 3, A A^1 designate two series of bars, operated by cranks B B^1, or their equivalents, similarly to those before described, but in a horizontal, or nearly horizontal, position. This form or modification of my invention is designed for transporting bales, boxes, or like articles from place to place. Each series of bars alternately supports the articles, carries them forward,

and deposits them on the other series of bars, which in turn treats them similarly.

On the lower faces of the bars are buckets or blades C C′, which, working in connection with a trough or ways, H, transport or impel forward grain or other loose material.

The arrangement of the series of bars relatively to each other, in all the forms or modifications of my invention, may be seen clearly by reference to Fig. 3.

Of course the bars may be duplicated length after length indefinitely, for any desired purpose.

It will be seen that by my invention I provide a very simple, effective, and positive mechanical movement for conveying purposes, such as conveying barrels, bags, boxes, bales, wood, dredged material, and for elevators; that the bars therein counterbalance each other, rendering their operation easy, and that one series of articles may be transported upward and the other downward simultaneously, so as to counterbalance each other.

I am aware that a set or series of cranks set at different angles have been connected to another set or series of cranks, for the purpose of transmitting rotary motion from one shaft to another situated at a considerable distance therefrom. I am also aware that eccentrics have been employed in such an apparatus as that just described in lieu of one set or series of cranks. Furthermore, I have knowledge that reciprocating rack-bars having longitudinal movements without transverse motion for effecting their engagement with and disengagement from devices to be acted on by them have been utilized for operating an elevator-platform. None of these do I now claim as my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The mechanical movement consisting in the combination of two series of bars and cranks, or their equivalents, for imparting to them a vibratory and longitudinal movement, in such manner that one series of bars move forward and upward, and one series of bars simultaneously move backward and downward, substantially as and for the purposes specified.

2. The combination of bars provided with teeth, pins, or blades, and cranks, or their equivalents, for imparting to them a vibratory and longitudinal movement, to one or more a forward and upward, and to one or more a backward and downward, movement simultaneously, substantially as specified.

3. The combination, with two series of bars and cranks, or their equivalents, for imparting to them vibratory and longitudinal movements, and a bar connected to cranks set at, or nearly at, right angles to the other cranks, for obviating dead-centers, substantially as specified.

4. The combination of two series of bars and cranks, or their equivalents, connected to their end portions, for imparting to the said bars vibratory and longitudinal movements, to one series a forward and upward, and to one series a backward and downward, movement simultaneously, and means arranged on the shaft of one series of cranks for driving said bars, substantially as specified.

5. The combination, with two series of bars and cranks, or their equivalents, for imparting to them vibratory and longitudinal movements, to one series a forward and upward, and to one series a backward and downward, movement simultaneously, of guides or ways for articles to be transported by said bars, substantially as specified.

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Witnesses:

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