(No Model.)

W. JACKSON.

AUTOMATIC SHIFT FOR CARS.

No. 539,518. Patented May 21, 1895.

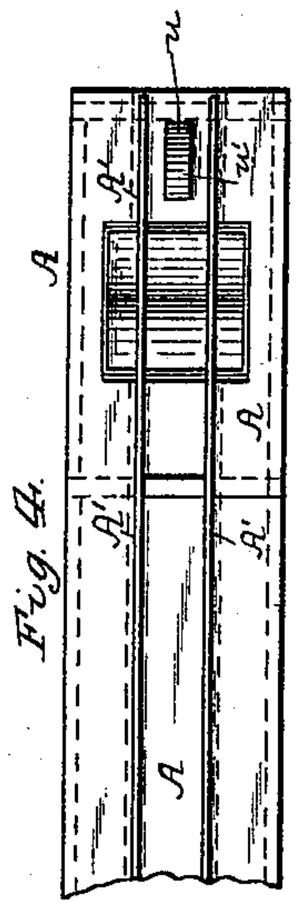

Fig. 4.

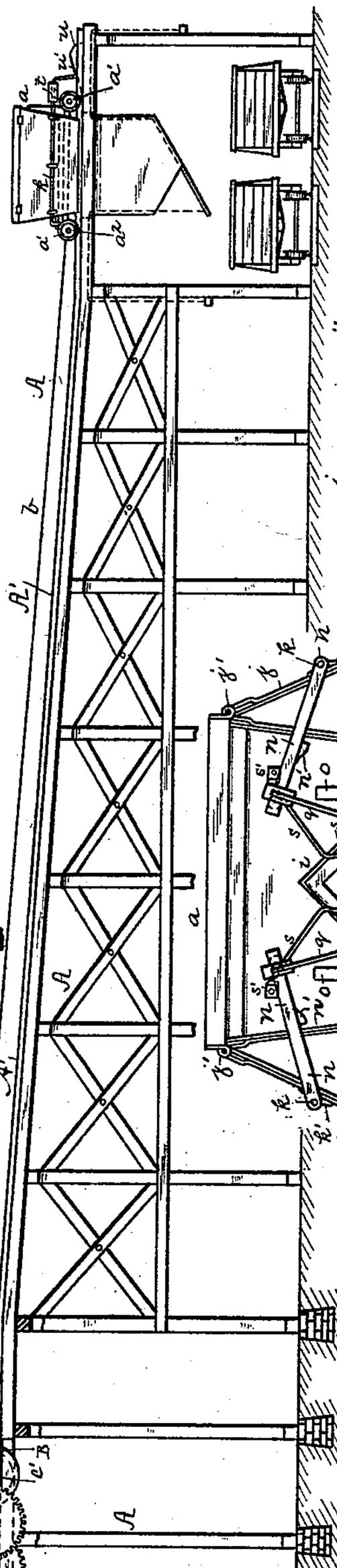

Fig. 1.

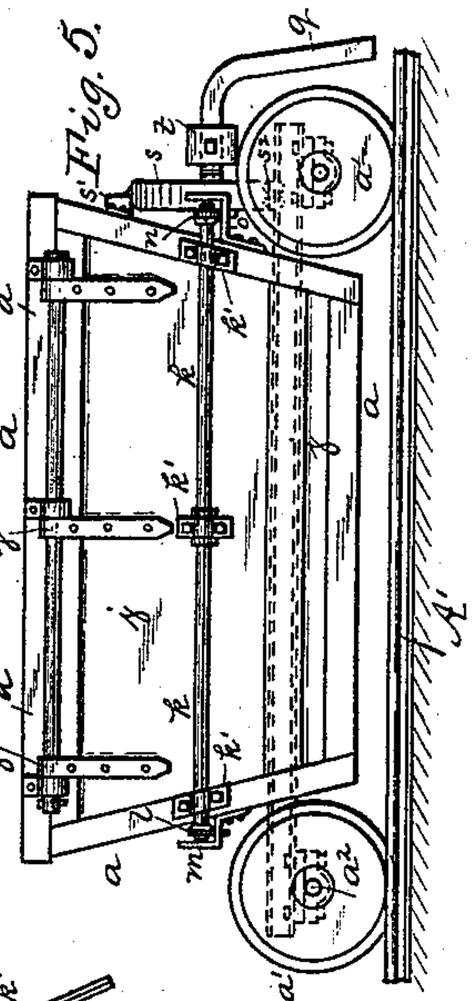

Fig. 5.

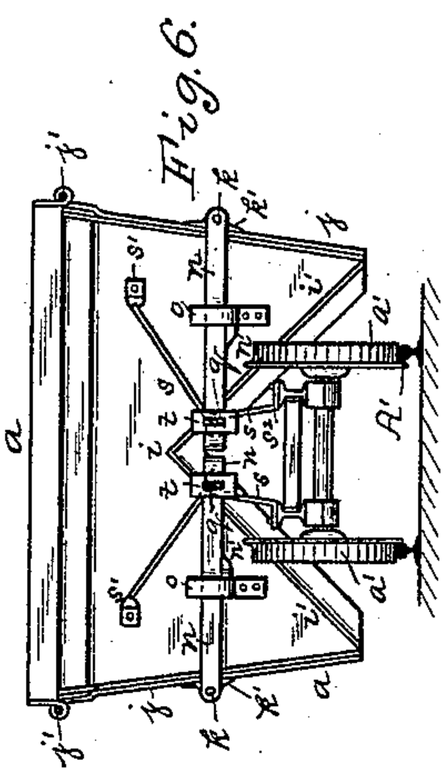

Fig. 6.

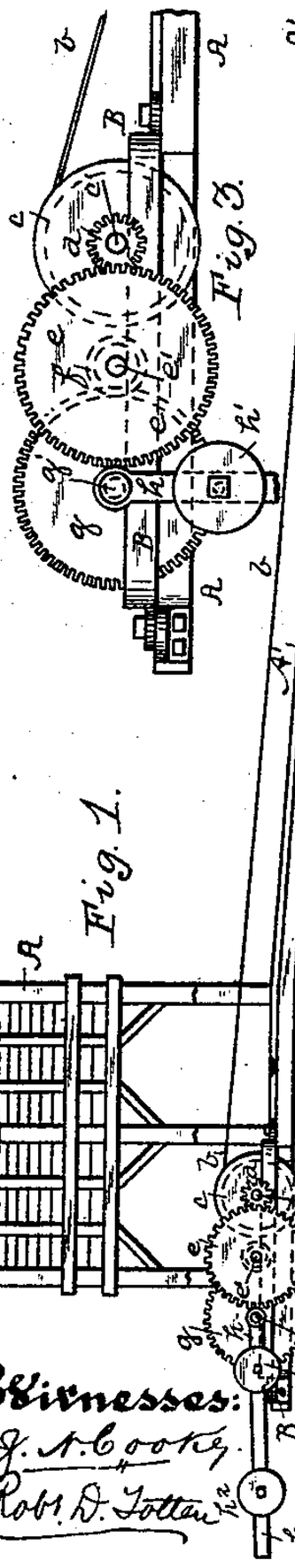

Fig. 3.

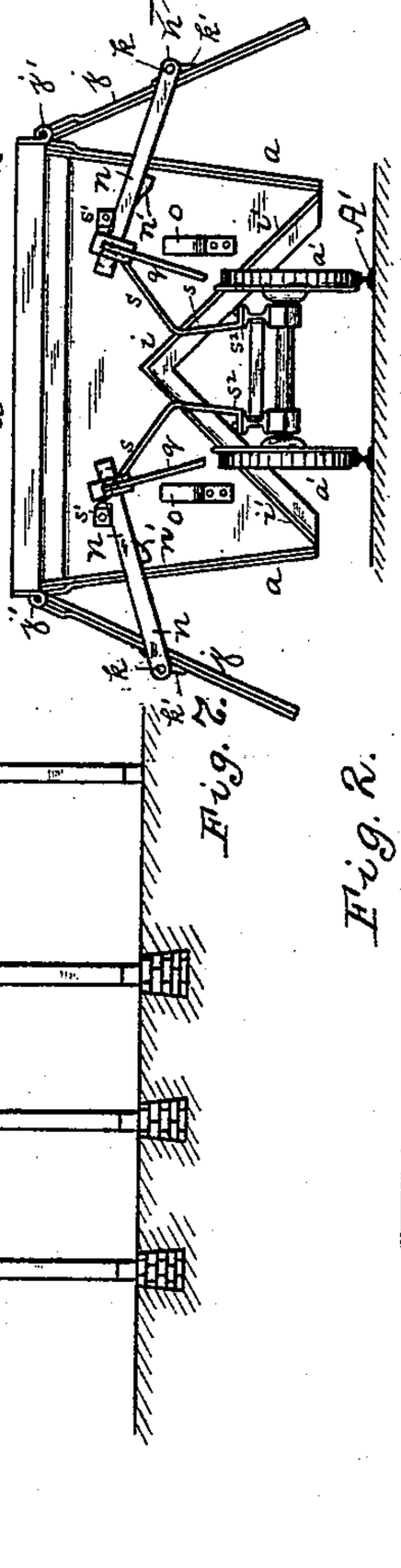

Fig. 2.

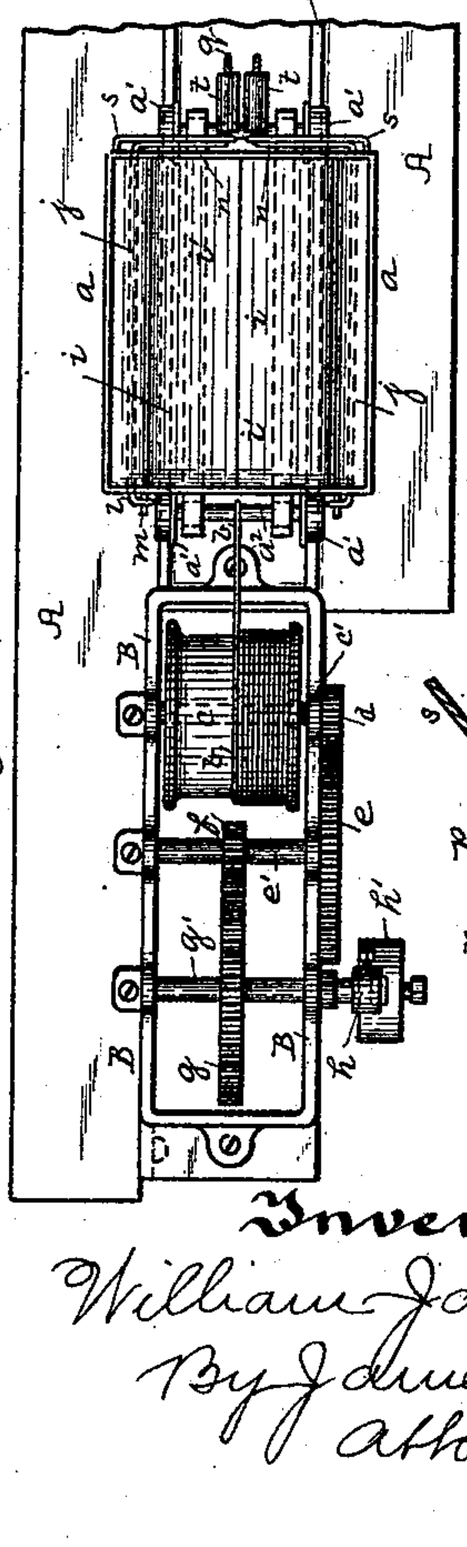

Fig. 10.

Fig. R.

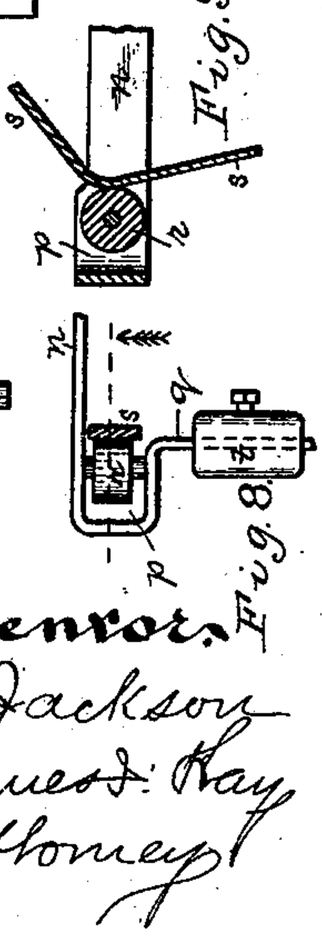

Fig. 9.

Fig. 8.

Witnesses:
J. A. Cooke.
Robt. D. Tolton

Inventor:
William Jackson
By J. Dueed & Kay
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM JACKSON, OF ALLEGHENY, PENNSYLVANIA.

AUTOMATIC SHIFT FOR CARS.

SPECIFICATION forming part of Letters Patent No. 539,518, dated May 21, 1895.

Application filed October 9, 1890. Serial No. 367,574. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JACKSON, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Automatic Shifts for Cars; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to an automatic shift for cars, that is, to a form of apparatus by which coal, ores or other materials may be transported in cars or other receptacles down an inclined plane, and having deposited their load at the lower terminus thereof, may be automatically drawn back to the original starting point, the head of the incline, to be again refilled.

A further object of my invention is to provide such a form of apparatus in which the car descends and again ascends automatically with a rapid yet positive movement devoid of sudden starts and jerks, which in all mechanical contrivances are to be avoided as productive of strains and undue wear on the parts of the apparatus.

It further relates to the mechanism for automatically relieving the car of its contents when it has reached the lower extremity of the incline.

To these ends my invention consists, generally stated, in conjunction with an incline plane, of a car or other receptacle, whose descent and ascent on said incline is regulated by the power exerted by a weighted lever situated at the upper end of said incline and connected to a revolving drum by suitable gearing mechanism; so that when the car has been loaded and permited to descend the incline, the weighted lever will confine its movement to a certain fixed rate of speed, and when the car has been relieved of its load on reaching the terminus of the incline, the said lever exerts sufficient power to draw the car back to its original starting point.

It also consists in certain other improvements in connection with the operation of the car, and the automatic discharging of the load thereof as will be hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a side view of an incline plane with a car thereon and my improved automatic shift applied thereto. Fig. 2 is an enlarged plan view of the weighted lever and the mechanism connecting it to the car, with the lever in the position assumed by it when the car is at the upper end of the incline. Fig. 3 is a side view of the same. Fig. 4 is a detail plan view of the lower terminus of the incline, showing the block which operates to relieve the car of its load. Fig. 5 is an enlarged side view of the car. Figs. 6 and 7 are enlarged end views of the car, showing the closed and open positions of the car. Figs. 8 and 9 are detail views of parts of the locking mechanism of the car, and Fig. 10 is a detail view of lock in rear of the car.

Like letters indicate like parts in each.

My invention is illustrated in connection with an incline plane A of that style constructed to transport cars from a mine or other source of supply of coal, ores, &c., to the point of consumption of same, or for reloading such materials to be transported to distant points. The car *a* is adapted to travel on the tracks of said incline A and when at the upper terminus thereof, the wheels *a'* of said car rest upon the track, the car being held in place by any suitable retaining device which will prevent the car from descending until it has been loaded to its full capacity.

Secured to the rear axle a^2 of the car or to any other suitable point thereon is the rope or cable *b* which passes from the car to and winds around the drum *c*. The drum *c* has its shaft *c'* journaled in suitable bearings in the frame B at the upper terminus of the incline A. A pinion *d* is secured to the shaft *c'* of the drum *c* which gears with the large gear wheel *e* on the shaft *e'* journaled in the frame B. Another pinion *f* is secured to the shaft *e'* at about the mid-point thereof, said pinion meshing with a large gear wheel *g* secured to the shaft *g'* also journaled in the frame B.

Secured to the outer end of the shaft *g'* is the weighted lever *h*, said lever having the weights h' h^2 thereon adapted to be adjusted

at different points thereon, according to the weight of the car and the speed at which it is desired to lower and raise the same.

It is evident that the drum *c* can be made of any desired size and that the train of gearing can be extended as required to obtain through the lever the necessary power to operate the drum and draw back the car according to the length of the inclined way.

The car *a* is preferably constructed of metal to withstand the wear and tear to which it is subjected, and to make provision for the discharge of its contents the bottom *i* is made double inclined or convex in form, presenting the inclined faces *i* down which the contents of the car will travel when the sides have swung apart as will more fully appear. The sides *j* of the car are hinged as at *j'* to the upper rim *a'* of said car and as the frame of the car is made outwardly flaring the sides *j* when in their normal position will present an inclined interior face.

In order to hold the sides *j* in their normal or closed position, rocking bars *k* are journaled at about the mid-point of the sides *j* in suitable journals *k'*, and to lock the rear ends of said sides in position, locking arms *l* are secured to the rear ends of the side bars *k*, said locking arms having the shoulders *l'* formed thereon.

Brackets *m* are secured to the ends of the car and extend out therefrom with which the shoulders *l'* of the locking arms *l* engage, thus serving to hold the rear portions of the sides in their closed position. To lock in like manner the front ends of the sides *j*, locking arms *n* are secured to the forward ends of the rocking bars *k*, said locking arms *n* having the shoulders *n'* formed thereon engaging with the brackets *o* extending out from the front end of the car *a*. The locking arms *n* beyond the shoulders *n'* are first bent to form recesses *p* and then again bent to form the supplementary arms *q* integral with and at right angles to the original locking arms *n*. Within the recesses *p* formed in the manner described are journaled the rollers *r*, said rollers bearing on the faces of the inclined bars *s* which are secured at *s'* to the body of the car and as s^2 to I-bars resting on the car axles, the locking arms *n* fitting between said inclined bars and the body of the car. Secured to the supplementary arms *q*, which are rigid with the locking arms *n*, are the weights *t*.

In order to raise the supplementary arms *q*, by which operation the locking arms at the front and rear of the car are released to permit the sides to swing open, I construct at the lower terminus of the incline what I have termed the cam block *u*, said block having the cam or inclined face *u'*. Any other suitable form of block or releasing device may, however, be employed.

The practical operation of my improved automatic shift is as follows:—The length of the lever *h* and the size of the weights h' h^2 and diameter of the drum are to be determined by the capacity of the car *a*, as well as the distance and rate of speed at which it is to travel. Assuming that such provision has first been made, the car *a* at the upper end of the incline is at a stand-still with its wheels *a'* resting on the track A', being held at such point in any suitable manner until the car is ready to make the descent. In this position the car is loaded with the coal, ore or other material, the rope or cable *b* being wound around the drum *c*, while the lever *h* will be in the perpendicular position shown in Fig. 2. When the car *a* has been filled, said car is released from the retaining device which has held it in place, and as a consequence the car begins its descent, the weight of the car when loaded being sufficient to overcome the resistance to its descent due to the weighted lever *h*. Force of gravity and the momentum it gains in its descent will carry the car down the incline and unwind the cable *b* on the drum *c*, thereby causing the rotation of the pinion *d* and through it the operation of the gearing mechanism consisting of the gear wheels *e*, *f* and *g*, this movement on the part of the said gearing mechanism operating to gradually raise the lever *h* fulcrumed at *g'*. During such operation the increasing resistance offered by the weights h' h^2 as the lever *h* is raised toward a horizontal position, will check the force of gravity and overcome the natural increased momentum which impels the car and will regulate its speed at a positive rate. When the lever *h* has reached its horizontal position, as previously determined, the car will have reached the lower terminus of the incline where it comes to a standstill. When the car has traversed the length of the incline upon reaching the lower terminus, the supplementary arms *q* of the tripping mechanism will first come in contact with the cam block *u* and traveling up the face *u'* of said cam block will raise them with the locking arms *n*. This elevation of the locking arms *n* will release the shoulders *n'* from engagement with the brackets *o*, while at the same time through the side rocking bars *k*, this elevation of the locking arms *n* will also serve to release the rear locking arms *l* from engagement with the brackets *m*. It is apparent that at the moment the several locking arms *n* and *l* have been released, the weight of the material within the car, assisted by the inclined faces *i'* composing the bottom of said car, will force apart the free ends of the sides *j* and make its escape to any suitable chute below. As the slides *j* are forced apart, the rollers *r* journaled in the locking arms *n* will travel up the inclined bars *s* carrying with them the weighted supplementary arms *q*. When the car has

discharged its contents the sides *j*, with the momentum acquired by their swing, together with the aid of the weights *t* on the arms *q*, will cause the rollers *r* to travel rapidly down the inclined faces *s* until the said sides *j* resume their closed position, and the shoulders *n'* and *l'* of the respective locking arms *n* and *l* will again engage with their respective brackets *o* and *m*. The weight of the weighted arms *q* adds impetus to the descent of the rollers *r* on the inclined bars *s* and insures the locking of the sides *j*, the said rollers *r* relieving the friction. As soon as the load passes from the car it is then of much lighter weight than the power exerted by the weighted lever *h* at the upper terminus of the incline, and which by the descent of the car has been brought to the horizontal position as illustrated in Fig. 1. Just as soon therefore as the car is emptied, the weighted lever *h* will descend of its own weight and being fulcrumed at *g'*, it will cause the rotation of the gear wheel *g* and through the mechanism described will rotate the drum *c*, and through the rope draw back the car, the car being drawn back away from the cam block *u* before the sides *j* swing back to place, and the weights *t* on the levers *q* are therefore free to draw the swinging sides against the car body so that the locking arms *l* and *n* may engage therewith. In this manner the car *a* will ascend with a gradual positive movement, the cable *b* again winding around the drum *c* until the car has reached the upper terminus of the incline and the weighted lever *h* has dropped to its vertical position, when the car comes to a full stop and is in position to be again refilled and allowed to descend in the manner described. The length of the lever *h* and the position of the weights h' h^2 thereon are previously adjusted with such nicety that the power exerted by said lever ceases the moment the car reaches the head of the incline, and as the power which said lever exerts decreases as said lever approaches its vertical position, the car comes to a stand-still gradually and without a sudden jerk.

The above described construction enables me to provide a very simple, yet most efficient automatic shift, the weighted lever exerting a positive power, while the rigid connection between said lever and car prevents sudden starts and jolts in the ascent or descent of the car.

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

1. In an automatic shift, the combination with an incline plane of a car or like receptacle traveling thereon, a revolving drum at the head of said incline said car being secured by rope or cable to said revolving drum, a rigid, weighted lever, and gearing mechanism between said drum and said rigid weighted lever adapted to return the car, substantially as and for the purposes set forth.

2. In an automatic shift, the combination with an incline plane, of the car or like receptacle, the rope or cable *b*, drum *c*, the pinion *d* meshing with the gear wheel *e*, the pinion *f* meshing with the gear wheel *g*, and the weighted lever *h* secured to the shaft *g'*, substantially as and for the purposes set forth.

3. In an automatic shift, the combination with an incline plane, of a car having an upwardly inclined bottom, hinged sides and locking arms secured thereto engaging with suitable locking devices, the locking arms having rollers journaled therein and supplementary arms engaging with a cam or like tripping device at the foot of said incline operating to release the locking arms, and an inclined face upon which the said rollers travel when the locking arms are raised, substantially as and for the purposes set forth.

4. In an automatic shift, the combination with an incline plane of the car *a* having the inclined bottom *i*, the sides *j* hinged at *j'*, the bars *k* journaled in said sides, the locking arms *l* and *n* engaging with the brackets *m* and *o*, respectively, said locking arms *h* having the rollers *r* journaled therein and traveling on the inclined bars *s*, the levers *q* with weights *t* thereon, and the cam *u*, substantially as and for the purposes set forth.

In testimony whereof I, the said WILLIAM JACKSON, have hereunto set my hand.

WILLIAM JACKSON.

Witnesses:
ROBT. D. TOTTEN,
J. N. COOKE.