(No Model.)

2 Sheets—Sheet 1.

Z. S. HOLBROOK.

CARRYING SYSTEM.

No. 282,893.

Patented Aug. 7, 1883.

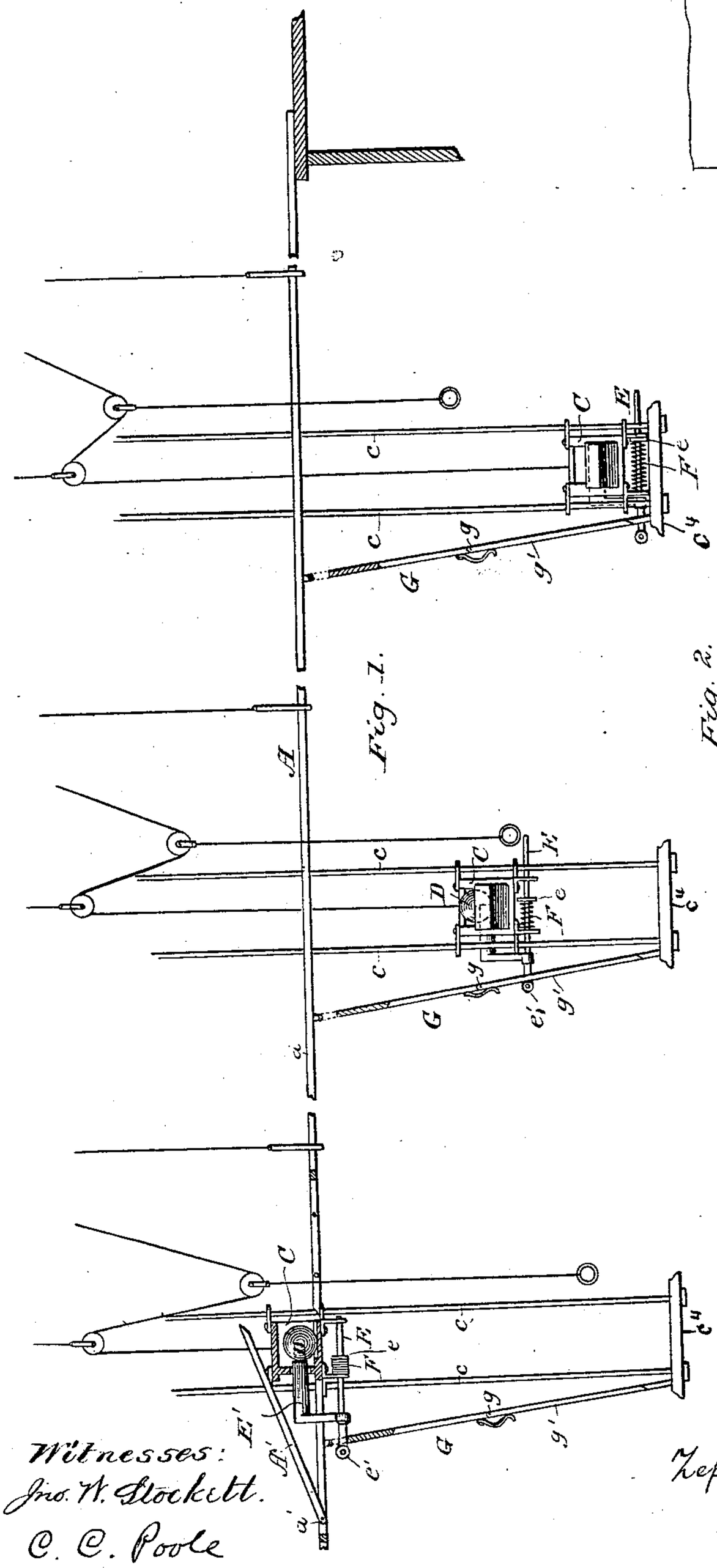

Fig. 1.

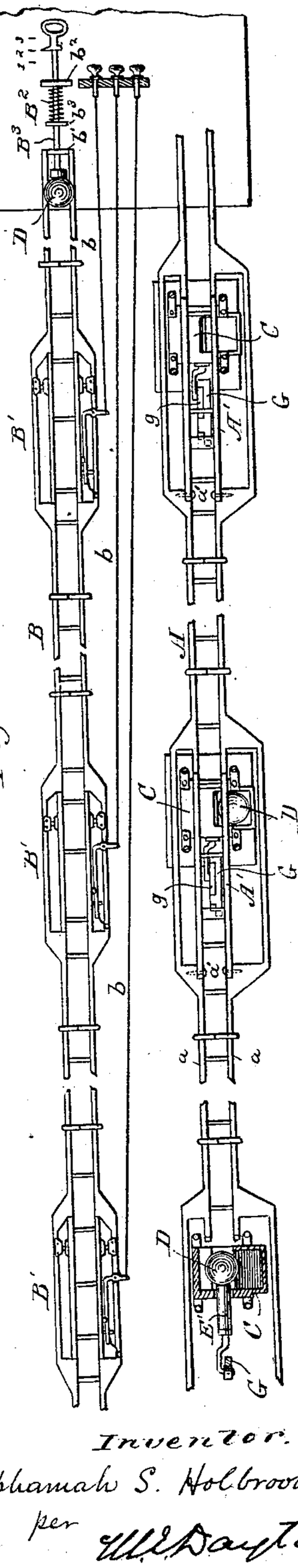

Fig. 2.

Witnesses:
Jno. N. Stockett.
C. C. Poole

Inventor.
Zephaniah S. Holbrook
per W. W. Dayton
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(No Model.) 2 Sheets—Sheet 2.

Z. S. HOLBROOK.

CARRYING SYSTEM.

No. 282,893. Patented Aug. 7, 1883.

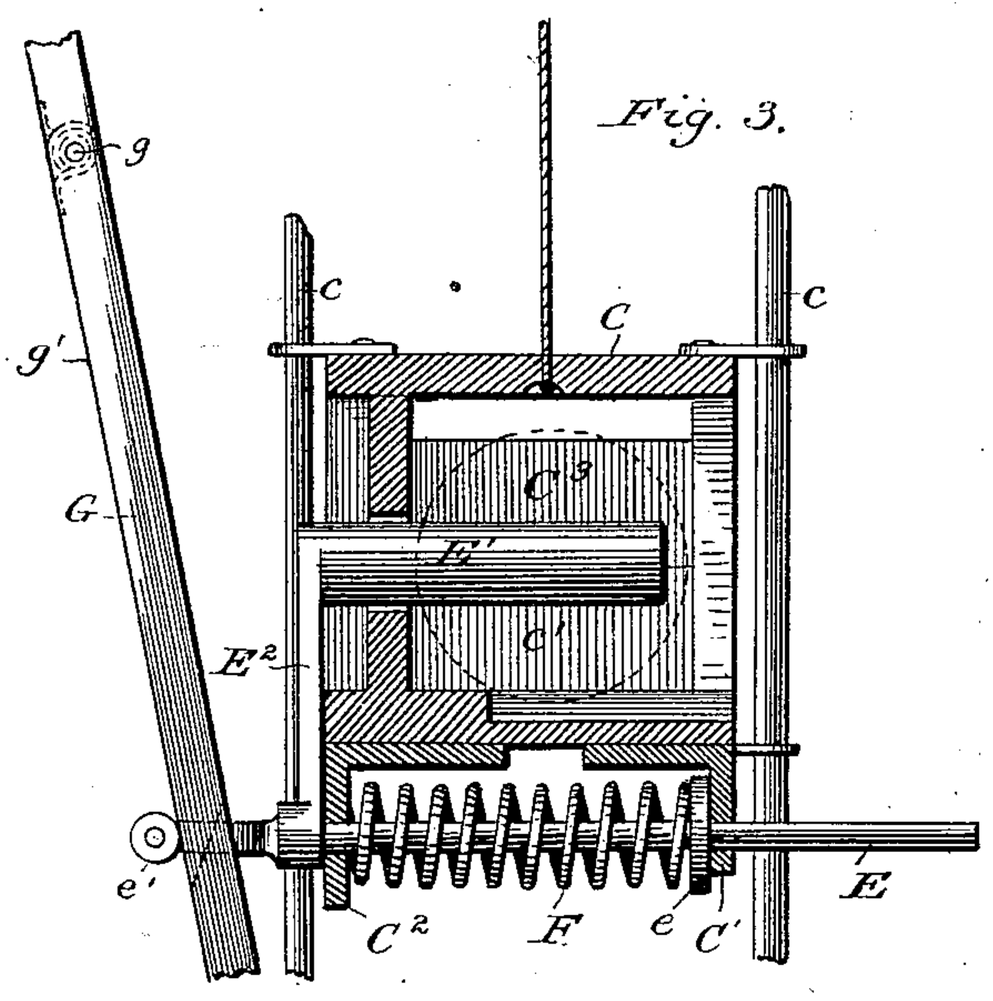

Fig. 3.

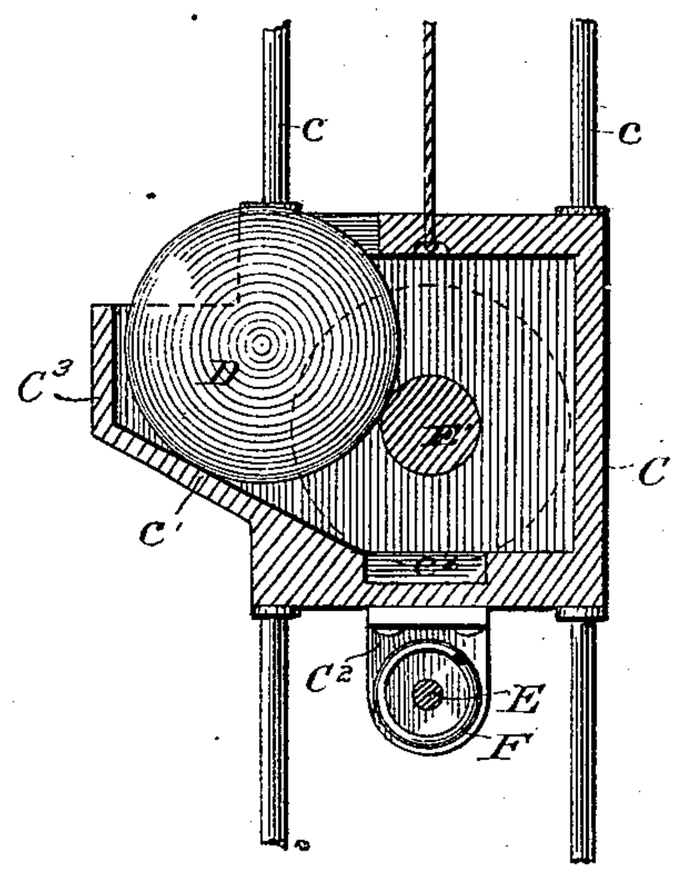

Fig. 4.

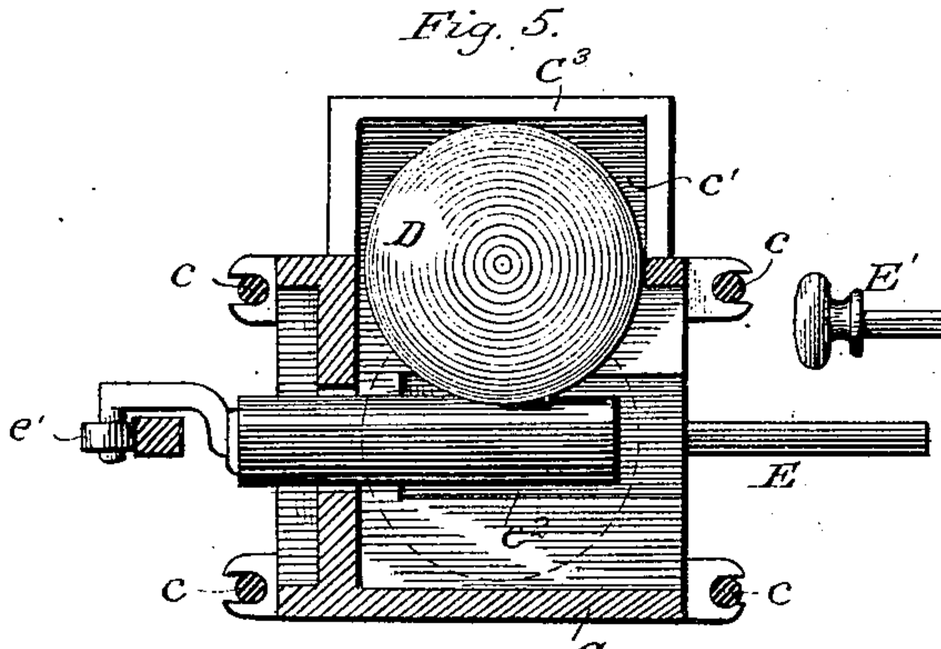

Fig. 5.

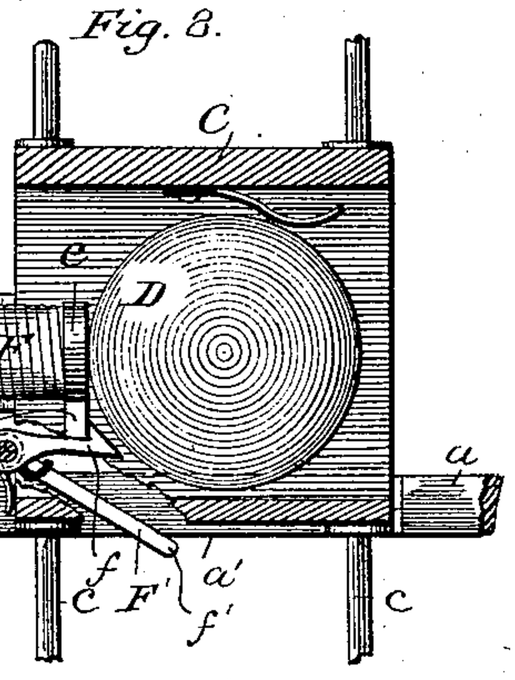

Fig. 8.

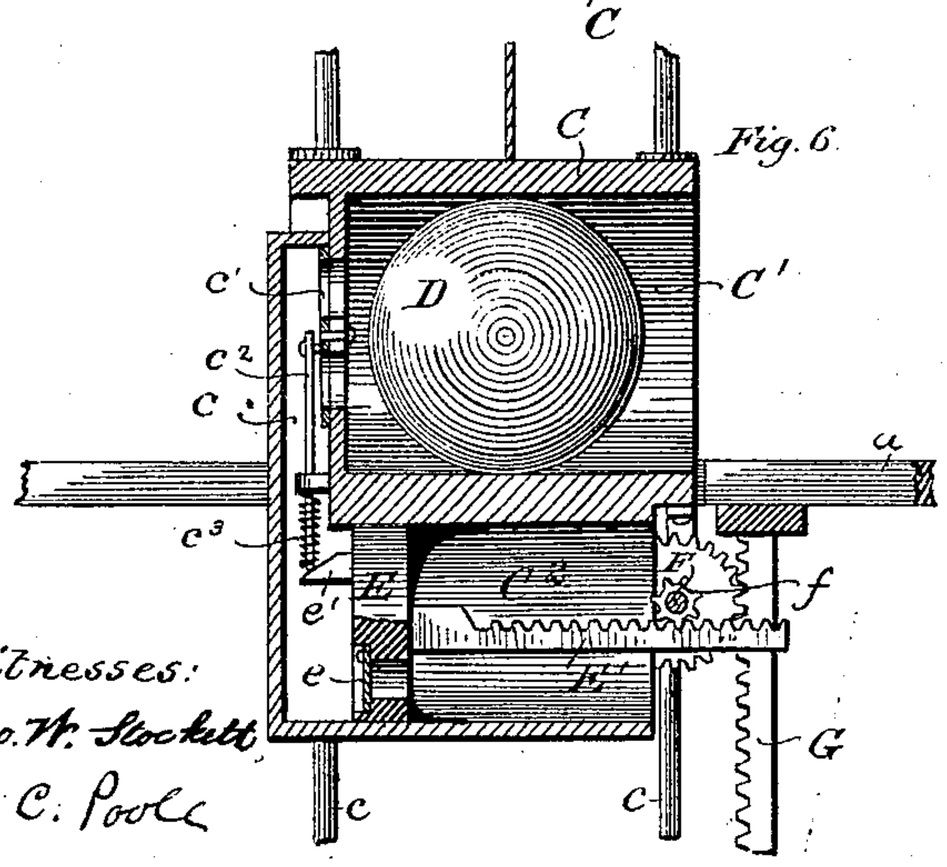

Fig. 6.

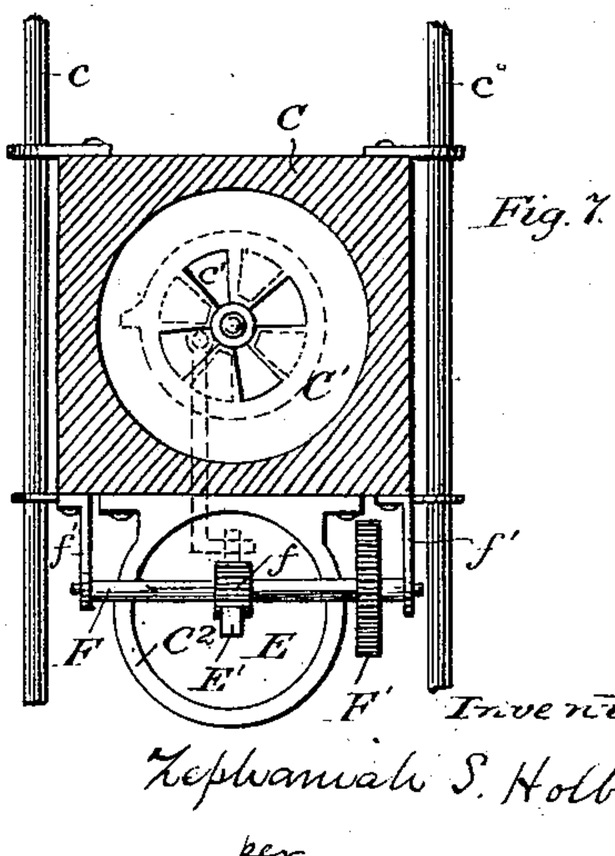

Fig. 7.

Witnesses:
Jno. W. Stockett
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Inventor:
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UNITED STATES PATENT OFFICE.

ZEPHANIAH S. HOLBROOK, OF CHICAGO, ILLINOIS.

CARRYING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 282,893, dated August 7, 1883.

Application filed February 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, ZEPHANIAH S. HOLBROOK, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carrying Systems; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to carrying systems more particularly adapted for store service, having ways extending from a cashier's desk or main station to a number of subordinate stations, carriers adapted to move on said ways, and devices at the several stations for delivering the carrier from the said way at desired points. It relates more particularly to means for propelling or moving the carriers on the way. Heretofore the carriers have been moved by a continuously-acting force, as by gravity, in the use of an inclined plane, by a motor attached to the carrier itself, or by a moving rope or chain to which the carriers are attached.

The object of this invention is to provide means for propelling or moving the carriers on the way without the use of such continuously-acting force; and it consists in the matters hereinafter described, and pointed out in the claims.

The invention consists, essentially, of means for projecting the carriers along the track from a starting point or station, or, in other words, for giving them an initial impetus sufficient to carry them to any point desired on the way.

As a means of carrying out my invention, I have provided, at stations on the way from which it is desired to send the carriers, a spring which may be compressed, or other device in which power may be stored, so that it may be suddenly exerted to drive the carrier, and such spring may be compressed, or power otherwise stored, either by the operator, by the surplus force exerted in raising an elevator to the track, or from any other available source of power. Means are also provided for graduating the impetus given to the carriers at the several stations according to the distance to be traversed by them.

For the purpose of illustrating my invention I have shown it in connection with a track or way upon which hollow spherical carriers are arranged to move, in which carriers the article to be conveyed is placed; and I have shown, in connection with such track, an elevator at each station on the way for raising the carriers to the track. Means are also shown, in connection with such elevator, for compressing a spring in the operation of raising the elevator to the track, and automatic devices for releasing the spring, so as to project the carrier when it has reached the track.

In the drawings, Figure 1 is a side view of a portion of a way, showing a cashier's desk or main station and three subsidiary stations, and means for projecting the carriers as proposed by my invention. Fig. 2 is a plan view of two ways—one for the passage of carriers from the main station to the several subordinate stations, and the other for the passage of carriers from the subordinate stations to the main station. Figs. 3, 4, and 5 are enlarged detail views of the devices at one of the stations, as shown in Figs. 1 and 2. Figs. 6 and 7 are views of the devices at one of the stations in which the carrier is impelled by compressed air. Fig. 8 is a similar view, showing a device for operating the spring by hand.

A and B, Figs. 1 and 2, are tracks or ways leading from the main station past the several subordinate or salesmen's stations, the track A being used for the passage of carriers from the subordinate stations to the main station, and the track B for the return of said carriers to the station from which they are sent.

For the purpose of delivering carriers returning from the main station from the track B at their appropriate stations, switches B′ are used, which may be opened by wires *b* from the main station in the manner shown in Fig. 2, or in any other desirable or convenient manner. The devices shown in said figure for discharging the carriers from the way at their appropriate stations have been described and claimed in an application for a patent previously made by me, and form no part of this invention.

For the purpose of impelling carriers from the cashier's desk to the several stations on the track B, I have provided at the said cashier's desk a spring, B^2, Fig. 2, which is constructed to act by its expansion to give an im-

petus to the carriers sufficient to carry them to the station for which they are intended. Said spring, as shown in said figure, is placed upon a sliding rod, B^3, having bearings in standards b' b^2, and is arranged between a disk, b^3, on said rod B^3 and one of the standards, b^2, so that by drawing said rod back the spring is compressed. In the operation of the device shown the rod is drawn back by the hand, the carrier placed in front of it on the way, and the rod released. The amount of compression in the spring is indicated by a scale, as shown, so that the force exerted in its expansion will correspond with the distance to be traversed by the carrier. A suitable catch may be provided, if preferred, to hold the rod B^3 back until the carrier has been placed in position, which catch may be moved so as to release the spring at any moment desired.

In Figs. 1, 2, 3, 4, and 5 is shown a device for impelling the carriers, in which the power for the purpose is stored in a spring which is compressed by the operation of raising the elevator to the track. At each station on the way A is placed a vertically-movable elevator-box, C, which slides on rods *c c*, and in which the carriers to be elevated to the track are placed. D is one of the spherical carriers, which is supported by and rolls upon the rails *a a* of the track A.

Upon the bottom of the elevator-box C are two downwardly-projecting brackets, C' C^2, which form the bearings of a sliding rod, E. Upon said rod is a disk, *e*, between which disk and the bracket C^2 is placed a coiled spring, F.

At the rear of the elevator-box, and outside of the bracket C^2, upon the rod E, is an upwardly-projecting arm, E^2, to the upper end of which arm, and parallel with the rod E, is attached a forwardly-projecting rod or plunger, E′. The said plunger projects centrally through the interior of the elevator-box when the spring is expanded, as shown in Fig. 3, and when the rod E is drawn back and the spring compressed its front end is flush with the back wall of said box, so that a carrier placed in said box will rest near or against said end. The rear end of the rod E is extended rearwardly beyond the arm E^2, and is provided at its extremity with a friction-roller, *e′*, Figs. 3 and 5. Said roller is arranged to act upon an inclined piece, as shown in Figs. 1 and 3, so that when the elevator is raised the spring will be drawn back thereby. The inclined piece G is attached to the footboard c^4 at its lower end, and is attached to the track structure at its upper end. The portion of such inclined piece against which the roller *e′* rests terminates below the track, and in such position that the said roller will pass from the end of the same and release the spring at the moment the bottom of the elevator-box reaches the level of the track.

In order to allow the roller *e′* to pass to the outside of the incline G when it descends, the portion of such incline upon which the roller rests is pivoted at *g*, forming a gate, *g′*, which is kept closed, so as to make the incline continuous, by a spring, *f′*, but which will open by the pressure of the said roller against its reverse side, and allow said roller to pass through it. The springs F are made of varying strength or stiffness at the different stations, so that those at the stations more remote from the main station will exert a greater force in projecting the carrier than those nearer to the said main station.

As the plunger E′ is in its forward position when the elevator-box is at the lower limit of its movement, the carrier cannot at such time be placed in position in front of it. I have therefore placed upon the elevator-box a laterally-projecting pocket, C^3, in which the carrier is placed while the elevator is being raised, and from which it will roll into the proper position in front of the plunger E′ when the said plunger is drawn back. The pocket C^3 has a transversely-inclined bottom, *c′*, sloping toward the bottom of the elevator-box, and the carrier, when placed in said pocket, rests against the side of the plunger E′, as shown in Fig. 4, until, by the withdrawal of said plunger, it is free to roll down said incline to its position in front of the plunger. The bottom of the elevator-box is preferably provided with a recess, c^2, in which the carrier rests, in order to retain it in place laterally, and the sides of said recess are arranged in line with the inner sides of the rails *a a*, so that the carrier, when acted upon by the expansion of the spring, will roll smoothly from the elevator-box to the said rails. As the elevator rises through and in line with the rails of the track, it is necessary to provide a means of making the track continuous when the elevator is lowered, in order to allow the passage of carriers past the station. For this purpose I have provided a section of track, A′, which is pivoted at one end at *a′*, and which is arranged to be lifted by the elevator, when said elevator is raised to the track, and which falls when the elevator is lowered, so as to make the track continuous. Such pivoted section is shown at the station at the left hand in Fig. 1 as open and at the other station as closed.

In Figs. 6 and 7 means are shown for impelling the carrier by the action of compressed air, the air being compressed by the upward movement of the elevator. In these figures, C is the elevator-box, which is provided with a cylindrical aperture, C′, in line with the track, and in which the spherical carrier fits. Beneath the elevator-box C is placed a cylinder, C^2, which is provided with an air-tight piston, E, and is connected at its closed end with the aperture C′ by means of a passage, *c*. Between the passage *c* and the aperture C′ is placed a valve, *c′*, which is operated by a vertical rod, c^2, and is kept normally closed by a spring, c^3, on said rod. To the piston E is attached a toothed rod, E′, which projects beyond the open end of the cylinder C^2, and en-

gages a pinion, *f*, upon a cross-shaft, F, placed in bearings *f' f'* on the elevator-box. Upon the shaft F is also a spur-wheel, F', which meshes with a vertical rack-bar, G, extending from the vicinity of the track to a point near the lower limit of the movement of the elevator-box. The piston E is provided with an inwardly-opening valve, *e*. When the elevator-box is lowered, the piston is drawn out by the gearing described acting on the rack G, and air enters the cylinder through said valve *e*. Upon raising the elevator-box the piston is pushed in and the valve *e* is closed, thus compressing the air in the cylinder. Upon the inner face of the piston D is a projecting piece, *e'*, having an inclined upper surface, which is constructed to strike the lower end of the rod c^2 and open the valve *c'* at the moment that the elevator-box reaches the track. The carrier is placed in the aperture C' before the elevator-box is raised to the track, and the air, being released from the cylinder C^2 and entering behind it, drives it forcibly out and along the said track to its destination.

In Fig. 8 an elevator is shown which is provided with a spring arranged to be compressed by the operator when the elevator-box is at the lower end of its movement. In the said figure the elevator-box C is provided at its rear side with a cross-bar, C', through which passes a rod, E, having upon its end a disk, *e*, between which disk and the bar C' the spring D is compressed. A knob or handle, E', is provided on the opposite end of the rod E, by which it may be drawn back, and upon the disk *e* is a downwardly-projecting portion, *e'*, which is constructed to engage a spring-detent, *f*, placed upon a pivoted shaft, F, upon the rear of the elevator-box. The end of the shaft F is formed into a crank-arm, F', which is bent downwardly and forwardly, and has a laterally-projecting end, *f'*, which is arranged to strike the under side of the side pieces, *a'*, of the track structure at the moment the bottom of the elevator-box reaches the level of the track, thereby throwing the detent *f'* down and releasing the rod E.

The air in the cylinder shown in Figs. 6 and 7 may be compressed by the operator in the manner described in connection with the spring F; or means other than those mentioned may be used for compressing either the springs described or air, either when the elevator is at the bottom of its movement or when raised to the track.

Instead of attaching the devices for giving an initial impulse to the carriers to the elevator-box, as described and shown in the several figures, such devices may be attached to the track at each of the stations, and operated either directly by the operator, by the raising of the elevator, or by any other means of applying power to accomplish the purpose, as may be found desirable or convenient.

Instead of using a spiral spring, as shown and described, either on the elevator or upon the track structure, any other form of spring or weight may be used; and instead of giving an initial impulse by means of power stored in a local device, such impulse may be given by power applied at any station from a distance, or from a convenient point of supply to all stations, as by pneumatic or steam pressure.

A straight track is shown in Figs. 1 and 2, upon which the spherical carriers described move. In case the track is curved I place suitable guards or strips upon the outside edge of the track, against which the carriers run, and which prevent them from leaving the track at such curve.

Although I have illustrated my invention as applied to a carrying system using spherical carriers and tracks adapted to receive them, yet my invention can as well be applied to other carrying systems, as where a single rail is used and the carriage suspended from a wheel or wheels resting on said rail.

I claim as my invention—

1. In a carrying system, the combination, with a horizontal track or way and carriers adapted to move on said way, of means for giving an impetus to said carriers, for the purpose of impelling them upon said way, substantially as described.

2. In a carrying system, the combination, with a way and carriers adapted to move on said way, of means constructed to give an initial impetus to said carriers graduated according to the distance to be traversed by said carriers, substantially as described.

3. In a carrying system, the combination, with a way and carriers adapted to move on said way, of a stationary spring constructed and arranged to give an impetus to said carriers, for the purpose of impelling them on the said way, substantially as described.

4. In a carrying system, the combination, with a way and carriers adapted to move on said way, of a spring placed at a point or station on said way, and constructed and arranged to impel the carriers thereon, together with means for graduating the effect of said spring according to the distance to be traversed by the carriers, substantially as described.

5. In a carrying system, the combination, with a way and carriers adapted to move on said way, of springs constructed to give an impetus to said carriers, placed at one or more stations or points on said way, and graduated according to the distance to be traversed by the carriers, substantially as described.

6. In a carrying system, the combination, with a way and carriers adapted to move on said way, of a stationary spring constructed to impel said carriers on the way, means for compressing said spring, and means for releasing it, substantially as described.

7. In a carrying system, the combination, with a horizontal track or way, carriers adapt-

ed to move on said way, and elevators for raising said carriers to the way, of means operated by the movement of the elevator for impelling the carriers on the way, substantially as described.

8. In a carrying system, the combination, with a way, carriers adapted to move on said way, and an elevator for raising said carriers to the way, of a spring constructed to impel the carriers, means for compressing the spring operated by the movement of the elevator, and means for releasing the spring, substantially as described.

9. In a carrying system, the combination, with a way, carriers adapted to move on said way, and an elevator for raising said carriers to the way, of a spring attached to said elevator, and constructed to impel a carrier therefrom by its expansion, means operated by the movement of said elevator for compressing said spring, and means for releasing said spring, substantially as described.

10. In a carrying system, the combination, with a way, carriers constructed to move on said way, and an elevator for raising the carriers to the way, of a plunger, a spring for actuating the plunger, and an incline constructed to retract said spring and plunger and release them when the carrier reaches the way, substantially as described.

11. In a carrying system, the combination, with a way, carriers constructed to move on said way, and an elevator for raising the carriers to the way, of a spring, a plunger connected therewith, an incline constructed to retract said spring and plunger, and a rod connected to said spring and arranged to engage said incline, substantially as described.

12. In a carrying system, the combination, with a way, carriers constructed to move on said way, and an elevator for raising the carriers to the way, of a spring, a plunger connected therewith, an incline constructed to retract said spring and plunger, a rod connected to said spring and arranged to engage the incline, and a pivoted gate, *g'*, in said incline, substantially as and for the purpose set forth.

13. In the elevator of a carrying system, substantially as described, the combination, with a spring-actuated plunger, of a lateral incline, C', substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

ZEPHANIAH S. HOLBROOK.

Witnesses:
C. CLARENCE POOLE,
JESSE COX, JR.