No. 649,791. Patented May 15, 1900.

F. E. ALLEN.

EXCAVATING AND ELEVATING APPARATUS.

(Application filed Nov. 29, 1899.)

(No Model.) 2 Sheets—Sheet 1.

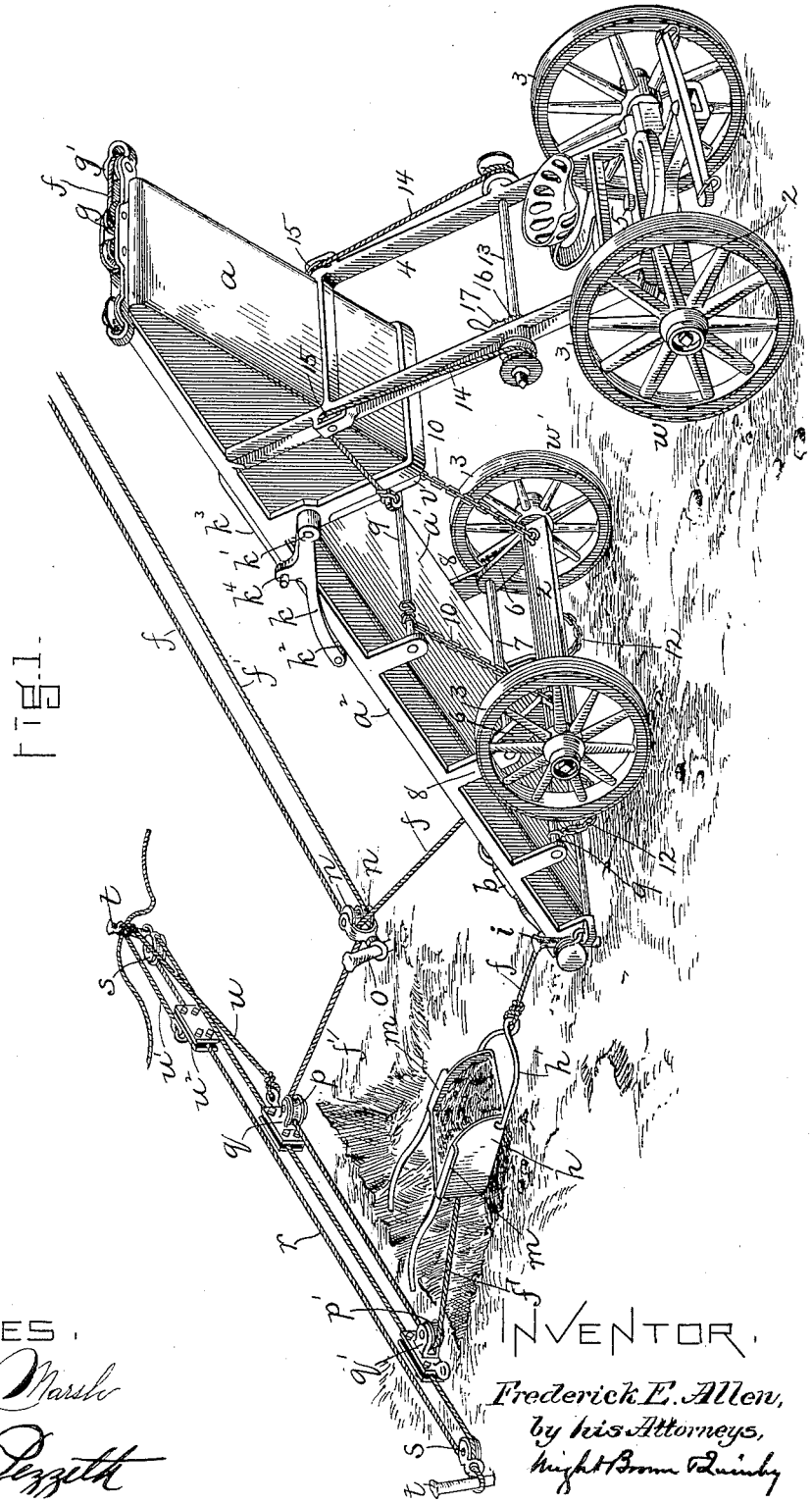

FIG. 1.

WITNESSES.

T. Henry Marsh

Peter G. Pezzeth

INVENTOR.

Frederick E. Allen,

by his Attorneys,

Wright Brown & Quinby

No. 649,791. Patented May 15, 1900.

F. E. ALLEN.

EXCAVATING AND ELEVATING APPARATUS.

(Application filed Nov. 29, 1899.)

(No Model.) 2 Sheets—Sheet 2.

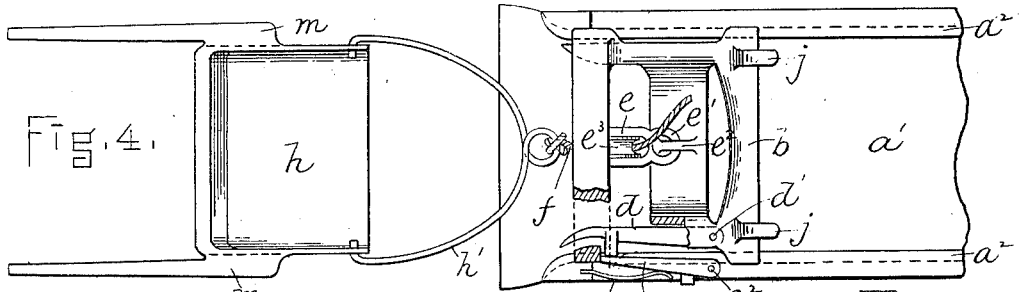

Fig. 4.

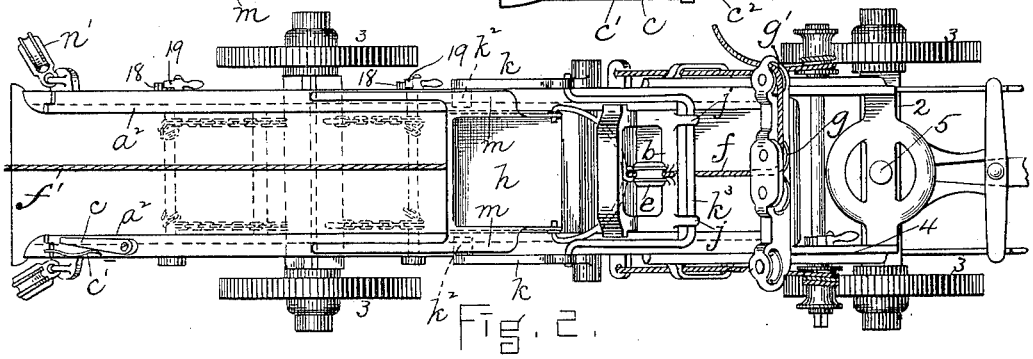

Fig. 2.

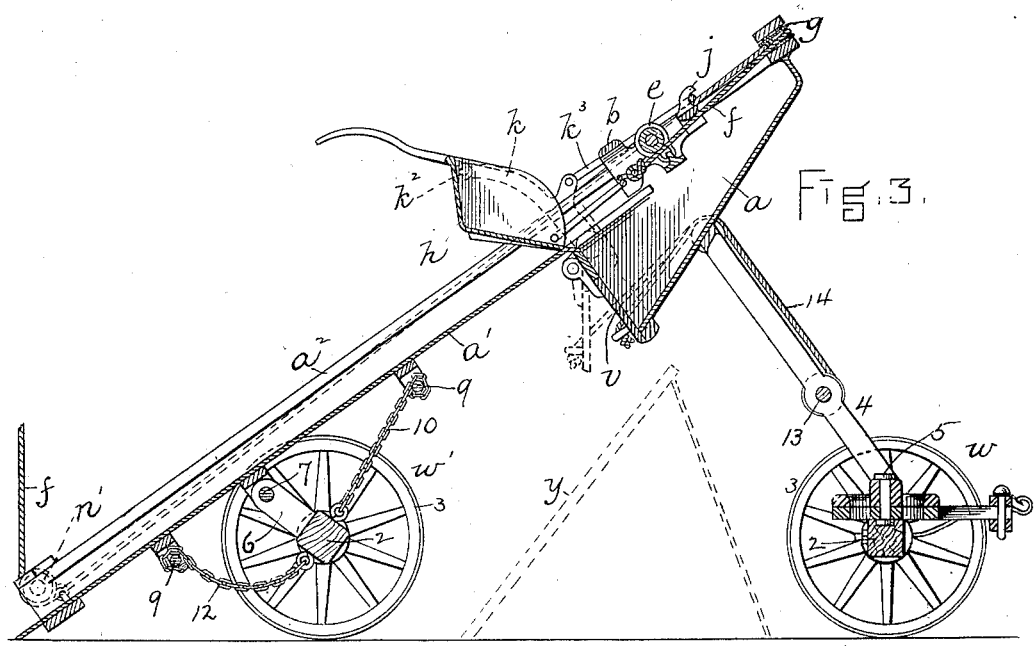

Fig. 3.

WITNESSES

R. Henry Marsh

Peter J. Quigley

INVENTOR.

Frederick E. Allen,

by his Attorneys,

Wright Brown & Quinby

UNITED STATES PATENT OFFICE.

FREDERICK E. ALLEN, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO FRANK E. H. GARY, OF SAME PLACE.

EXCAVATING AND ELEVATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 649,791, dated May 15, 1900.

Application filed November 29, 1899. Serial No. 738,672. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK E. ALLEN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Excavating and Elevating Apparatus, of which the following is a specification.

This invention has for its object to provide a portable apparatus adapted to be conveniently located on a pavement or other surface adjacent to the spot where the excavation is to be made and to enable the earth to be conveniently removed and elevated to a convenient position for release into a cart.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a perspective view of an excavating and elevating apparatus embodying my invention. Fig. 2 represents a top plan view of the same, showing the scoop or scraper elevated to its dumping position. Fig. 3 represents a longitudinal central section through Fig. 2. Fig. 4 represents a top view of a portion of the apparatus, showing the scraper at the lower end and outside of the inclined guiding-body.

The same letters and numerals of reference indicate the same parts in all of the figures.

My improved excavating and elevating apparatus comprises an inclined body, at the upper end of which is a receptacle *a*, the said body, as here shown, being composed of an inclined bottom *a'* and parallel inclined flanged guides a^2 a^2 at opposite edges of the bottom, the said guides extending from the lower end of the body to the upper end of the receptacle.

b represents a slide which is grooved at its ends to engage the guides a^2 and is adapted to move on said guides, and thus travel up and down the incline. Means are provided for locking the slide to the body when at the lower end of its movement, as shown in Fig. 4, said means, as here shown, comprising a locking-dog *c*, pivoted at c^2 to the body and normally held by a spring *c'* in position to engage a face or shoulder on the slide and prevent upward movement of the slide.

A tripping-arm *d* is pivoted at *d'* to the slide and is arranged to be moved by the bail of the scraper or scoop hereinafter described, the tripping-arm when so moved displacing the locking-dog and releasing the slide, so that it is free to move upwardly along the guides. To the slide is loosely jointed a snatch-block *e* by means of an eye *e'* on the block and an ear or staple e^2 on the slide. The pulley e^3 of the snatch-block guides a rope *f*, which extends from the drum of a hoisting-engine or other power device around guide-pulleys *g g'*, mounted in fixed bearings at the upper end of the inclined body.

h represents a scoop or scraper having a bail *h'*, which is affixed to the lower extremity of the rope *f* and is formed to slide on the inclined bottom *a'* between the guides a^2 a^2. When the inclined body *a* is anchored or confined in suitable proximity to the area from which earth is to be excavated—for example, by stakes *i* driven into the ground, as shown in Fig. 1—the scraper may be drawn from various points in said area toward the lower end of the inclined body by means of the rope *f*, the snatch-block *e* by its loose connection with the slide permitting the rope to assume various angles with the guides a^2 when pulling the scraper toward said guides, the locking-dog *c* at this time holding the slide and snatch-block, so that they cannot move upwardly on the guides. When the scraper reaches the lower end of the body, it enters the space between the guides, (the lower ends of the latter being preferably somewhat flaring, as shown in Figs. 2 and 4, to guide the scraper into said space,) and the bail strikes the tripper *d* and forces it laterally, thus forcing the dog *c* out of engagement with the slide, so that when the scraper enters the inclined body the slide is released and moves with the scraper along the inclined body.

Means are provided for automatically tipping the scraper to the position shown in Fig. 3 when it reaches the receptacle *a*, said means being as follows:

On the forward portion of the slide *b* are forwardly-projecting ears or hooks *j j*.

k k are arms pivoted at *k'* to the inclined body and having rolls k^2 at their swinging ends. Said arms normally stand in the posi-

tion shown in Fig. 1, the rolls k^2 projecting inwardly over and in close proximity to the upper edges of the guides a^2.

k^3 is a bail which is pivoted to ears k^4 on the arms k, the cross-bar of said bail extending across the space between the guides a^2 a^2 and being normally in position to engage the hooks j j on the slide. On the sides of the scraper h are formed outwardly-projecting flanges m m, which when the scraper approaches the upper end of its movement project over and are in close proximity to the rolls k^2, the latter being then in the position shown in Fig. 1. The flanges m m reach the position last described just before the hooks j j on the slide engage the bail k^3. The engagement of said hooks with the bail k^3 causes the continued upward movement of the slide to exert an upward pull on the arms k k through the bail k^3, thus swinging said arms upwardly, as shown in Fig. 3, and causing the rolls k^2 to engage the flanges m m, and thus tip the scraper upwardly, as shown in Fig. 3, the contents of the scraper being thus dumped into the receptacle a. At this point the upward movement of the slide and scraper is arrested by stopping the rotation of the drum or other device that exerts the upward pull on the rope f, after which the slide and scraper may be returned to the lower end of the inclined body either by gravitation or by a positive backward pull exerted by a rope f', connected with the rear end of the scraper, the said rope f' being connected with a drum of the hoisting-engine adapted to exert a pull thereon in the desired direction.

Owing to the fact that the flanges m project outwardly from the upper portions of the sides of the scraper, the said scraper is steadied when elevated or tilted by the arms k, owing to the fact that the said arms k are in contact with the sides of the scraper throughout substantially their entire vertical height.

It may be here noted that the ropes f and f' may be arranged as shown in Fig. 1, in conjunction with a suitable system of pulleys, it being supposed that the broken ends of the ropes f f' (shown at the right of Fig. 1) extend to drums of a hoisting-engine. (Not shown.) At n n are guiding-pulleys mounted in a yoke which is anchored by means of a stake o, the rope f passing from this yoke around a loose pulley n', connected with the lower end of the inclined body, and from this loose pulley to the guide-pulley g' at the upper portion of the said body. The rope f' extends around the pulleys p p', which are secured to yokes q q', clamped to an endless rope r, which is supported by pulley-blocks s s, connected to stakes t t. The endless rope r enables the blocks q q' to be adjusted so as to vary the starting-point of the scraper from time to time as the work may require. The said blocks q q' may be held at any desired adjustment by means of ropes u u', one attached to the block q and the other to a clamp u^2, attached to the end of the rope r. The said ropes u and u' may be made fast to the stake t or other fixed support and prevent the movement of the endless rope r in either direction. As will be seen by reference to Figs. 1 and 2, the guide-pulleys g g' and the loose guide-pulley n' are duplicated at each side of the body, so that the hoisting-engine may be at either side of the apparatus.

It will be seen that by the described apparatus an excavation of considerable depth and length may be made in the earth, the material excavated being elevated and dumped into the receptacle a, which is of sufficient height to enable a cart to be located under it and receive the material from it, the lower portion of the receptacle a being provided with an outlet closed by a trap or gate v, which is closed and released by means presently described.

The inclined body may be supported by any suitable means, the preferred means being the forward and rear trucks w w', each of said trucks comprising an axle 2 and wheels 3 3. The axle of the forward truck may be fitted with a suitable draft appliance, so that horses may be connected thereto, and is connected with the inclined body by means of an elongated inclined frame 4, the lower portion of which is connected with the axle of the forward truck by a suitable king-bolt 5. The axle of the rear truck preferably has a swinging connection with the inclined body, said connection enabling the axle to be swung or adjusted relatively to the inclined body, thus permitting the lower end of the body to be depressed in contact with and close proximity to the ground when the apparatus is in use and raised sufficiently from the ground to permit transportation. The axle 2 of the rear truck is here shown as provided with upwardly-projecting standards 6 6, rigidly attached to the axle and jointed, by means of a pivoted rod 7, to downwardly-projecting ears 8 8, affixed to the body.

9 9 represent shafts extending across the body and journaled in ears affixed thereto.

10 10 represent chains extending from one of said shafts to the rear axle 2, and 12 12 represent chains extending from the other shaft to the said axle. It will be seen that by winding up the chains 10 and unwinding the chains 12 the rear axle 2 will be moved sidewise relatively to the body, or it may be said that the body will be moved endwise relatively to the axle, the movement being such as to depress the rear end of the body and bring its bottom into contact with the ground, as shown in Figs. 1 and 2, so that the scraper can readily enter the lower portion of the body. When it is desired to transport the apparatus, the chains 12 are wound up and the chains 10 slackened, this operation raising the rear end of the body from contact with the ground sufficiently to permit transportation.

The shafts 9 9 may be rotated by means of cranks or keys applied to squared portions

of said shafts, each shaft being provided with a ratchet 18 and a locking-dog 19 to prevent its rotation when desired.

The means which I have shown for opening and closing the door *v* of the receptacle *a* are as follows: 13 represents a shaft journaled in the supporting-frame 4, and 14 14 represent flexible connections, such as ropes or chains, extending from drums on the shaft 13 over guide-pulleys 15 15 to ears on the door *v*. When the shaft 13 is rotated to loosen the cords, the door swings open, as indicated by dotted lines in Fig. 3, and when the shaft is rotated in the opposite direction the cords pull the door to its closed position. The shaft 13 may have a squared end adapted to engage a crank, whereby it may be rotated. A ratchet 16 and pawl 17 hold the shaft against rotation when the door is closed.

I do not limit myself to the details of mechanism herein shown and described and may variously modify the same without departing from the spirit and scope of my invention.

It will be observed that the space between the trucks and under the inclined body may be utilized to receive a screen *y*, which may be placed in position to sift the material discharged from the receptacle *a*.

I claim—

1. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper end, a snatch-block adapted to move lengthwise of said body, a draft-rope guided at the upper portion of said body and by the said snatch-block, a scraper adapted to move on said body, means for locking the snatch-block to the lower portion of the body, and means operated by the scraper in approaching the snatch-block for releasing the latter and permitting the block and scraper to move together to the receptacle.

2. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper end, a slide adapted to move lengthwise of the body, a snatch-block connected loosely with the slide, a draft-rope guided at the upper portion of the body and by the snatch-block, a scraper adapted to move on said body, means for locking the slide to the lower portion of the body, and means operated by the scraper in approaching the snatch-block for releasing the slide.

3. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper end, a slide adapted to move lengthwise of the body, a snatch-block connected loosely with the slide, a draft-rope guided at the upper portion of the body and by the snatch-block, a scraper adapted to move on said body, means for locking the slide to the lower portion of the body, a locking-dog on the body adapted to engage the slide when the latter is at the lower end of its movement, and a tripping device on the slide adapted to be moved by the approaching scraper to displace the locking-dog.

4. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper end and guides extending from the lower portion of the body to said receptacle, a scraper movable on said guides, means for moving the scraper toward the receptacle levers for engaging said scraper to raise its rear end, and means for operating said levers by the movement of the scraper toward the receptacle.

5. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper end, and guides extending from the lower portion of the body to said receptacle, a slide movable on said guides and provided with a draft-rope guide, a draft-rope running on said guide, a scraper movable with the slide and attached to the draft-rope, and scraper-dumping mechanism comprising coacting parts or members mounted respectively on the body, the slide and the scraper, and operated by the movement of the scraper toward the receptacle.

6. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper end, and guides extending from the lower portion of the body to said receptacle, a slide movable on said guides and provided with a draft-rope guide, a draft-rope running on said guide, a scraper movable with the slide and attached to the draft-rope, said scraper having flanges, arms pivoted to the body and having rolls or projections adapted to engage said flanges, and means operated by the upward movement of the slide for raising said arms and tipping the scraper.

7. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper end, and guides extending from the lower portion of the body to said receptacle, a slide movable on said guides and provided with a draft-rope guide, a draft-rope running on said guide, a scraper movable with the slide and attached to the draft-rope, said scraper having flanges, arms pivoted to the body and having rolls or projections adapted to engage said flanges, a bail pivoted to said arms and extending across the path of the slide, and projections on the slide arranged to engage said bail and exert a lifting pull on the arms through the bail.

8. A scraper having outwardly-projecting flanges on the upper portions of its sides adapted to be engaged by dumping-arms.

9. An apparatus of the character specified, comprising an inclined portable body having a receptacle at its upper portion, means for guiding a scraper toward and from the said receptacle, a draft-rope guide located on the body, and a draft-rope guide such as *e* having a sliding connection with the body, and movable toward and from the receptacle.

10. An apparatus of the character specified, comprising an inclined portable body having a receptacle at its upper portion, means for guiding the scraper toward and from the said receptacle, a draft-rope guide located on the

body, a draft-rope guide such as *e* having a sliding connection with the body and movable toward and from the receptacle, a draft-rope engaged with said guides, a scraper connected with the draft-rope, a return-rope connected with the scraper, and adjustable means for guiding the return-rope.

11. An apparatus of the character specified, comprising an inclined portable body having a receptacle at its upper portion, means for guiding a scraper toward and from the said receptacle, a draft-rope guide located on the body, and draft-rope guide such as *e* having a sliding connection with the body, and movable toward and from the receptacle, a draft-rope engaged with said guides, a scraper connected with the draft-rope, a return-rope connected with the scraper, guides *n*, *q*, and *q'* for the draft and return ropes, and means for adjusting the return-rope guides *q q'*.

12. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper portion, and means for guiding a scraper toward and from the said receptacle, and supports for said body, the supports and body being arranged to provide a cart-receiving space under the body and receptacle, the said receptacle having an inclined bottom with an outlet at its lower end and a door or gate for said outlet and means for opening and closing said door or gate.

13. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper portion, and means for guiding a scraper toward and from the said receptacle, an elongated support for the forward portion of the body, a truck connected with said support, a truck supporting the rear portion of the body, and wheels on the axles of said trucks, said trucks, support, and body being permanently connected for transportation on the wheels of the truck, and arranged to provide a cart-receiving space between the trucks and under the body.

14. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper portion, and means for guiding a scraper toward and from the said receptacle, an elongated support for the forward portion of the body, a truck connected with said support, a rear truck supporting the rear portion of the body and having an adjustable connection with the body, and means for adjusting the rear truck to vary the height of the rear end of the body.

15. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper portion, and means for guiding a scraper toward and from the said receptacle, an elongated support for the forward portion of the body, a truck connected with said support, a rear truck supporting the rear portion of the body, upwardly-projecting standards on the axle of the rear truck, jointed above the axle to the body, whereby the said axle may be swung sidewise to vary the height of the rear end, shafts journaled on the body at opposite sides of the said axle, and flexible connections between the said shafts and axle.

16. An apparatus of the character specified, comprising an inclined body having a receptacle at its upper portion, and means for guiding a scraper toward and from the said receptacle, said receptacle having an outlet and a door or gate therefor, an elongated support for the forward portion of the body, a truck connected with said support, door opening and closing devices comprising a shaft journaled in the frame, ropes extending from the shaft to the door, and guides for said ropes, and a truck supporting the rear portion of the body.

In testimony whereof I have affixed my signature in presence of two witnesses.

FREDERICK E. ALLEN.

Witnesses:
C. F. BROWN,
A. D. HARRISON.