No. 608,506. Patented Aug. 2, 1898.

# N. K. BOWMAN.

## MINE GATE.

(Application filed Nov. 20, 1897.)

(No Model.) 4 Sheets—Sheet 1.

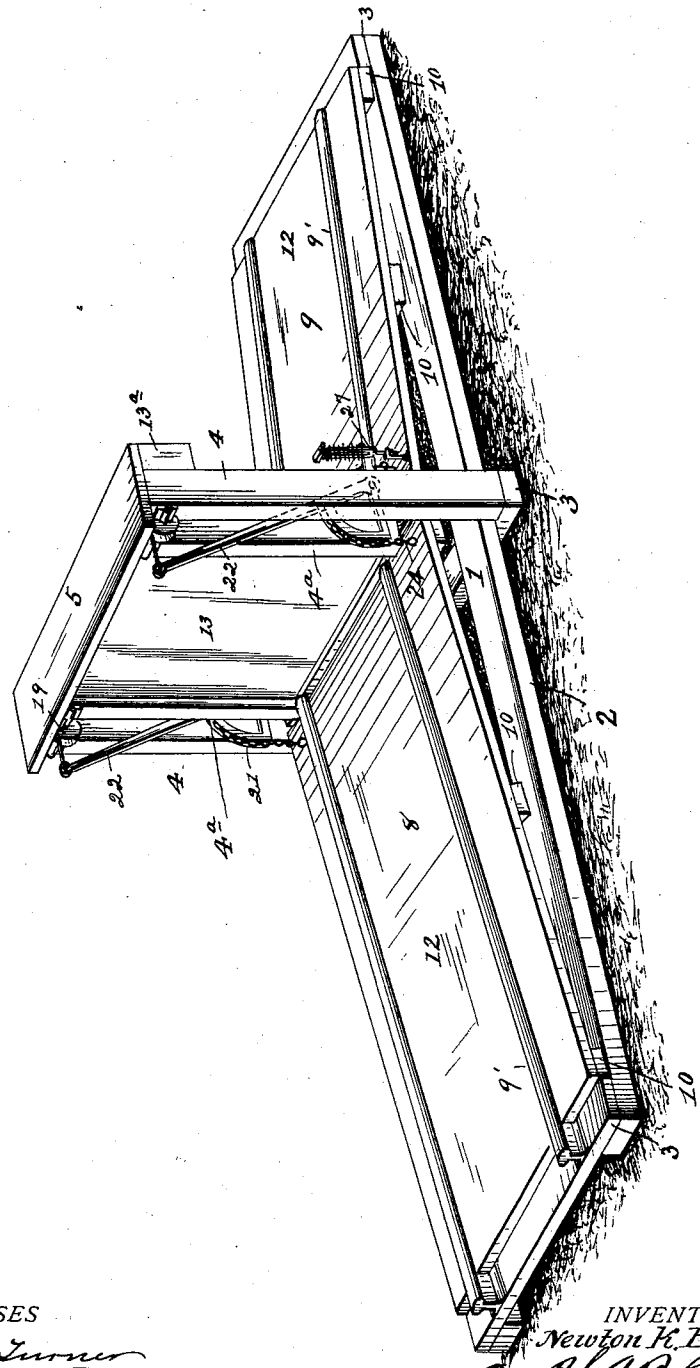



FIG. 1.

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## MINE GATE.

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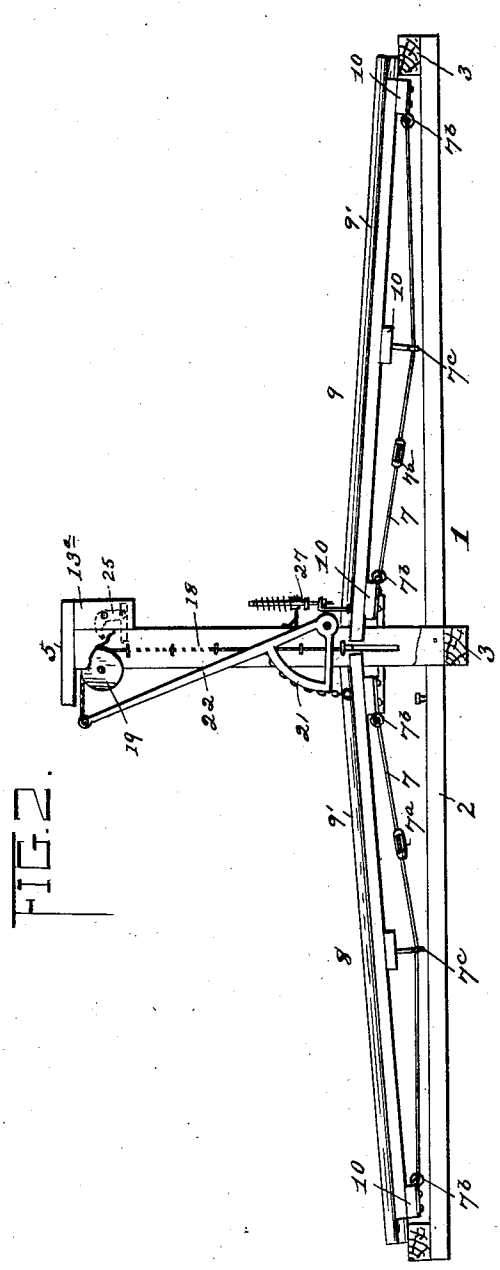


FIG. 2.

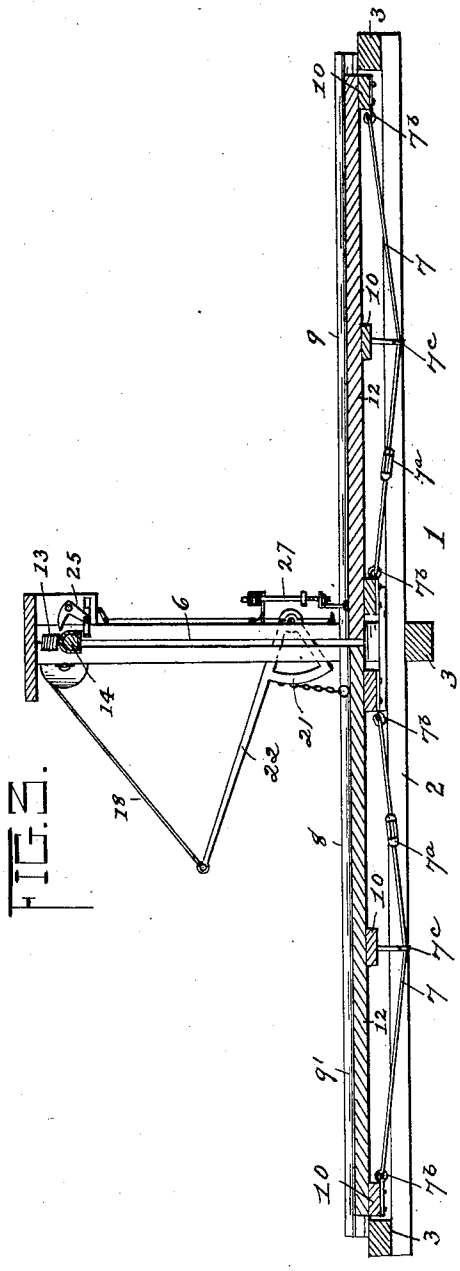


FIG. 3.

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## MINE GATE.

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(No Model.) 4 Sheets—Sheet 3.

FIG. 4.

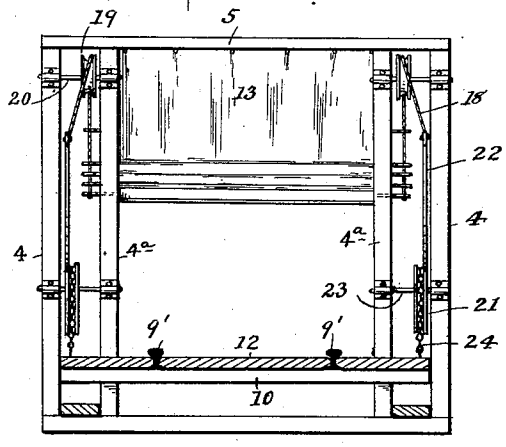



FIG. 5.

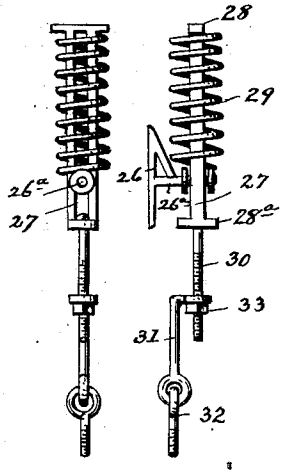



FIG. 6.

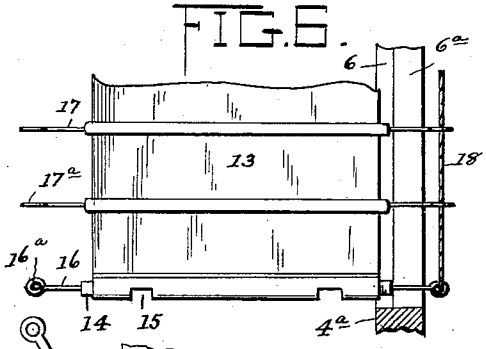
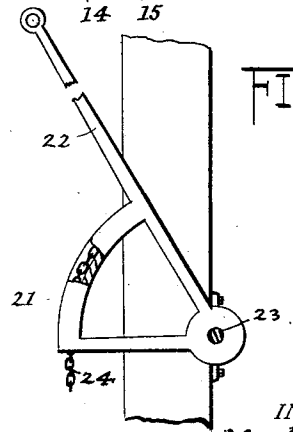



FIG. 7.




WITNESSES

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## MINE GATE.

(Application filed Nov. 20, 1897.)

(No Model.) 4 Sheets—Sheet 4.

FIG. 8.

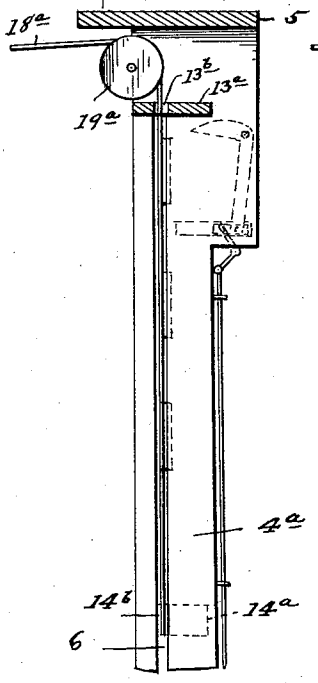



FIG. 9.

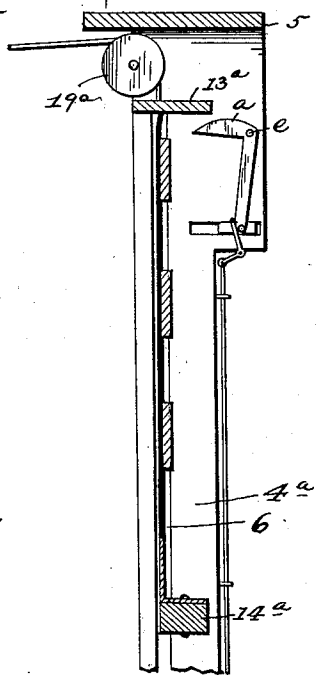



FIG. 10.

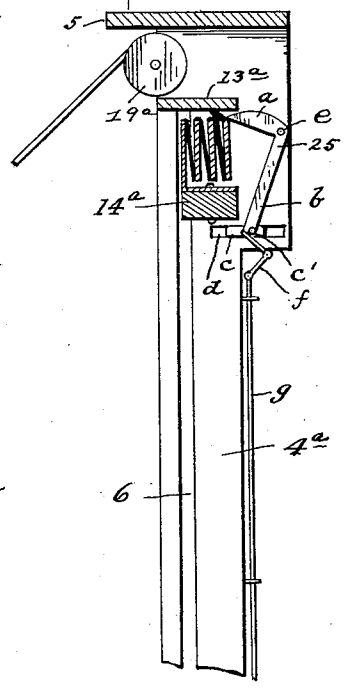



FIG. 11.

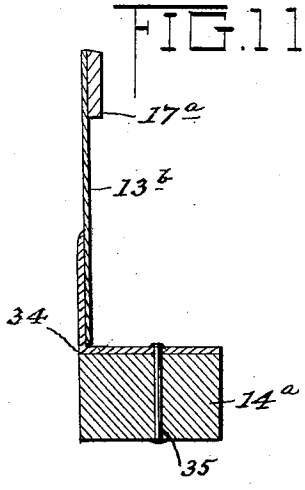
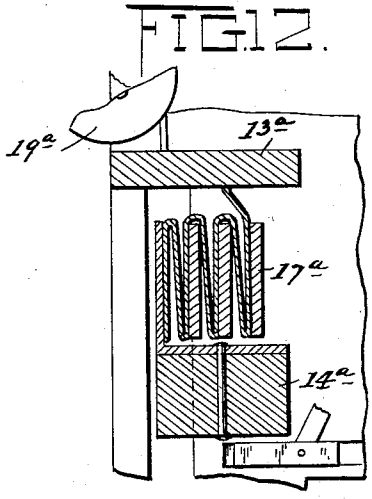



FIG. 12.




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# UNITED STATES PATENT OFFICE.

NEWTON K. BOWMAN, OF LAWRENCE, OHIO, ASSIGNOR TO ALVIN HURFORD, OF CANTON, OHIO.

## MINE-GATE.

SPECIFICATION forming part of Letters Patent No. 608,506, dated August 2, 1898.

Application filed November 20, 1897. Serial No. 659,311. (No model.)

*To all whom it may concern:*

Be it known that I, NEWTON K. BOWMAN, a citizen of the United States, residing at North Lawrence, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Mine-Gates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to automatic mine-gates, and is particularly designed as an improvement on the gate mechanism shown and described in my application for Letters Patent filed August 30, 1897, Serial No. 650,014.

The object of the present invention is to provide, in lieu of a rolling gate-curtain forming the subject-matter of the aforesaid application, a folding gate-curtain of novel construction and improved mechanism for automatically opening and closing the same.

A further object is to provide mechanism for adjusting and maintaining the gate-platform sections in proper operative position and preventing the same from sagging when water-soaked, choked, or weighted by accumulated deposit of coal, mud, &c., thereon.

To the accomplishment of these ends the invention consists in certain novel constructions, combinations, and arrangements of parts, as will be hereinafter more fully described and claimed.

In the accompanying drawings, Figure 1 is a perspective view of a mine-gate embodying my invention; Fig. 2, a side elevation of same, showing the gate-curtain closed and parts broken away to expose the gate-operating mechanism; Fig. 3, a vertical longitudinal section showing the gate open; Fig. 4, a transverse section of the gate-platform and an elevational view of the gate; Fig. 5, a front and a side view of the platform-adjusting device; Fig. 6, a broken detail view of the gate-curtain and sectional elevation of one of the guide-posts; Fig. 7, a side view of one of the quadrant-levers. Fig. 8 is a vertical section of the gate-frame, taken on a line between one of the standards and the gate-post, and shows a modification in the construction of the gate. Fig. 9 is a central vertical section of same, showing the gate closed; Fig. 10, a similar view, but showing the gate folded or in open position; Fig. 11, a section view of a portion of the gate detached, and Fig. 12 is an enlarged detail sectional view of parts shown in Fig. 10.

Referring now more particularly to the said drawings, Figs. 1 to 7, inclusive, 1 represents the gate-platform, comprising two longitudinal parallel side sills connected at their ends and center by transverse braces 3.

4 represents vertical posts or standards rising from the sills or center transverse brace and connected at their upper ends by a cross-bar 5, and 8 9 represent inclined tilting platforms mounted on the said frame and carrying track-rails 9′, secured to and supported by cross-ties 10. The deck-flooring 12 of the platform is laid on said cross-ties, and the said platforms are suitably connected at their inner ends, so as to rise or fall at the center in unison.

7 represents trusses, two of which are provided on each platform, one arranged at each side and extending longitudinally thereof. Each truss consists of two sections having their inner contiguous ends connected by a swivel or turnbuckle $7^a$ and their outer ends connected to eyebolts $7^b$ on the end cross-ties 10, and the center portion of each truss is supported by a truss brace or guide $7^c$ on the center cross-tie, as shown. These trusses are adapted to prevent the rails and the platform-deck from bending or sagging under the weight of heavily-loaded cars passing thereover.

$4^a$ represents the gate-posts, which are arranged on the inner side of the standards 4 and parallel therewith and connected with the center transverse brace 3 and cross-bar 5. These posts are each formed on their inner sides with guide-grooves 6, extending part way through the posts and merging into narrower guide-slots $6^a$, opening through the outer sides of the posts, as clearly shown in Fig. 6.

13 represents the gate-curtain, which is made of heavy ducking, canvas, or some other suitable waterproof material. This curtain is secured at its upper end to a bar $13^a$ and provided at its lower end with a sleeve or pocket in which is inclosed a transverse bar 14, re-

cessed at 15 to fit down over the rails 9' and formed at opposite ends with reduced stems 16, moving in the guide-slots $6^a$ and provided with eyes $16^a$. The function of the bar 14 is to close the curtain by gravity and when the curtain is closed to hold the lower end thereof firmly against air-pressure, and thereby maintain it in close contact with the platform-sections. The curtain is stiffened to resist air-pressure by batten-rods 17, secured thereto, and the ends of these rods also project through the guide-slots $6^a$ and are formed with eyes $17^a$, as shown.

18 represents cords or cables secured at one end to the eyes $16^a$ of the bar 16 and extending through the eyes of the batten-rods and passed over grooved pulleys 19, carried by shafts 20, mounted to revolve in bearings on the standards and posts $4\ 4^a$. The opposite ends of the cords or cables are attached to the arms 22 of quadrant-levers 21. These quadrant-levers are arranged at opposite sides of the gate, each being rigidly mounted upon a shaft 23, having bearing in the adjoining standard and gate-post at that side. A chain 24 connects each quadrant-lever with the platform-section 8.

The operation of the gate thus constructed is as follows: When a person walks upon one of the platforms—the platform 9, for instance—or a car rolls upon the rails thereon, the weight of said person or car will depress and cause both platforms to tilt or sag down at the center to a horizontal position. This will draw on the chains 24, which will move the quadrant-levers from the position shown in Figs. 1 and 2 to the position shown in Fig. 3. The cords or cables 18 being secured to the lever-arms 22 will move in accordance therewith and raise the lower end of the curtain, causing it to fold in the manner shown in Figs. 3 and 4 and open the gateway. The gate-curtain will remain open until the person or car has passed over the platform-section 8, whereupon the gate will be caused to unfold and close the gateway by the weight of the bar 14, and at the same time the platform-sections will be restored to their normal position.

Automatic pivoted dogs 25 are provided on each gate-post $4^a$ to engage the bar 14 and prevent the curtain from sagging down until the full weight of the car or person is removed from the platform. These dogs, which are shown in Figs. 8 to 10 for clearness of illustration, are each formed with a hook *a* and an arm *b*, carrying a pivoted guide-block *c*, which moves in a horizontal slot *d* in the gate-post. Each dog is pivoted at the intersection of its hook and arm by a pin or bolt *e*. The dog is actuated to engage and release the curtain by a pivoted bell-crank lever *f*, having one of its arms adapted to engage the extended pivot-pin *c'* of the block *c* and its other arm jointed to a rod *g*, movable in guides on the post $4^a$. The lower end of this rod is adapted to engage a trip device of suitable construction on the platform-section 9, so that when the said platform-section is depressed and the curtain folded the rod will be moved to cause the block *c* to insert itself under the bar 14 and when the platform-section raises to perform the reverse operation.

The mechanism for adjusting and maintaining the gate-platform sections in proper operative position is shown in detail in Fig. 5 and comprises a bracket 26, secured to each standard 4 and formed with a headed arm $26^a$, which operates in the longitudinal slot of a tension-bar 27 and serves as a guide therefor. The bar 27 is formed with stop-pieces 28 $28^a$ at its upper and lower ends and is encompassed by a stiff spiral spring 29, which abuts against the stop 28 and heads on the bracket-arm $26^a$. An adjusting-bolt 30 connects the bar 27 with an eyebolt 31, swiveled to an eye 32, fixed in the platform, and a nut 33 on the shank of the bolt 30 couples said parts together. It will be understood that by adjusting this nut the tension of the spring may be increased or diminished, and the pull on the platform-sections thereby regulated. Thus if the platform-sections become choked by coal-dust or laden by reason of water-soaking or the accumulated deposit of mud or coal thereon the tension of the springs may be increased to prevent said sections from sagging down.

In the embodiment of my invention shown in Figs. 8 to 12, inclusive, the construction of the gate-frame is essentially the same; but the gate-curtain is slightly modified in construction to fold in a different manner. The curtain is made fast at its upper end to the bar $13^a$ and at its lower end to an angle stay-plate 34, secured to the bar $14^a$ by a bolt or rivet 35. Transverse slats $17^b$ are secured to the curtain at suitable distances apart from one another in such manner that the flexible portion of the curtain between adjoining slats serves as a hinge to permit the said slats successively to assume a vertical position and lap against one another in folding the curtain, as clearly shown in Figs. 10 and 12. When folded, the slats extend parallel with the vertical web of the stay-plate 34 above the bar $14^a$. The said bar $14^a$ is provided at each of its ends with an arm or extension $14^b$, which travels in the slot $6^a$ of the parts $4^a$, and to these arms are attached flat tapes or bands $18^a$, which pass over the flanged pulleys $19^a$ and are secured to the arms of the quadrant-levers and drawn upon in the same manner as the cords 18 in Figs. 1 to 7, inclusive.

Having thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is—

1. In mine-gates, the combination with a tilting platform, and a gate adapted to be operated thereby, of an adjustable platform-supporting device comprising a slotted bar, a bracket on the gate-post having an arm fitted in the slot of the bar and forming a guide therefor, a spiral spring encompassing said

bar and bearing against the bracket-arm, an eyebolt connected with the platform, and an adjusting-bolt connecting said bar and eyebolt and adapted to be adjusted to vary the tension of the spring, substantially as described.

2. In mine-gates, the combination of a tilting platform, a folding gate-curtain, and a connection between the platform and curtain whereby the tilting of said platform will cause the curtain to fold, substantially as described.

3. In mine-gates, the combination of a tilting platform, a folding gate-curtain, and a pivoted lever connected with the lower end of the curtain and platform, and adapted to be operated by the tilting of said platform to cause the curtain to fold and open the gateway, substantially as described.

4. In mine-gates, the combination of a tilting platform, a gate-curtain, a spring-actuated tension device supporting the platform and adjustable to vary its resistance to the downward tilting thereof, and a connection between the platform and curtain whereby the tilting of said platform will cause the curtain to rise and open, substantially as described.

5. In mine-gates, the combination of tilting platforms, a folding, gravity-closing gate-curtain, a pair of pivoted levers, cords or cables connecting the lower end of the curtain and free ends of the levers, and a connection between the said levers and platform, substantially as described.

6. In mine-gates, the combination of a frame carrying gate-posts, tilting-platform sections mounted on said frame, a folding gravity-closing gate-curtain secured at its upper end to said posts and provided with stiffening-rods having eyes, a pair of pivoted levers, cords or cables connecting the lower end of the curtain and free ends of the levers and extending through said eyes, and a connection between each lever and one of said tilting-platform sections, substantially as described.

7. In mine-gates, the combination of a frame carrying standards, gate-posts arranged parallel with said standards and formed with guide-slots, two tilting-platform sections mounted on said frame, a folding gate-curtain made fast at its upper end and carrying at its lower end a gravity-bar, stiffening-rods secured to said curtain and formed at their ends with eyes, a pair of quadrant-levers pivoted between the posts and standards and having arms, cords or cables connecting the gravity-bar at the lower end of the curtain with the free ends of said lever-arms and extending through the eyes of the stiffening-rods, and a chain connecting each quadrant-lever with one of the platform-sections, substantially as described.

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

NEWTON K. BOWMAN.

Witnesses:
WILLIAM J. GREEN,
DANIEL DOUGHERTY.