

(No Model.)

2 Sheets—Sheet 1.

W. R. KIRK.

APPARATUS FOR THE CONSTRUCTION OF TUNNELS.

No. 290,989.

Patented Dec. 25, 1883.

Fig. 1.

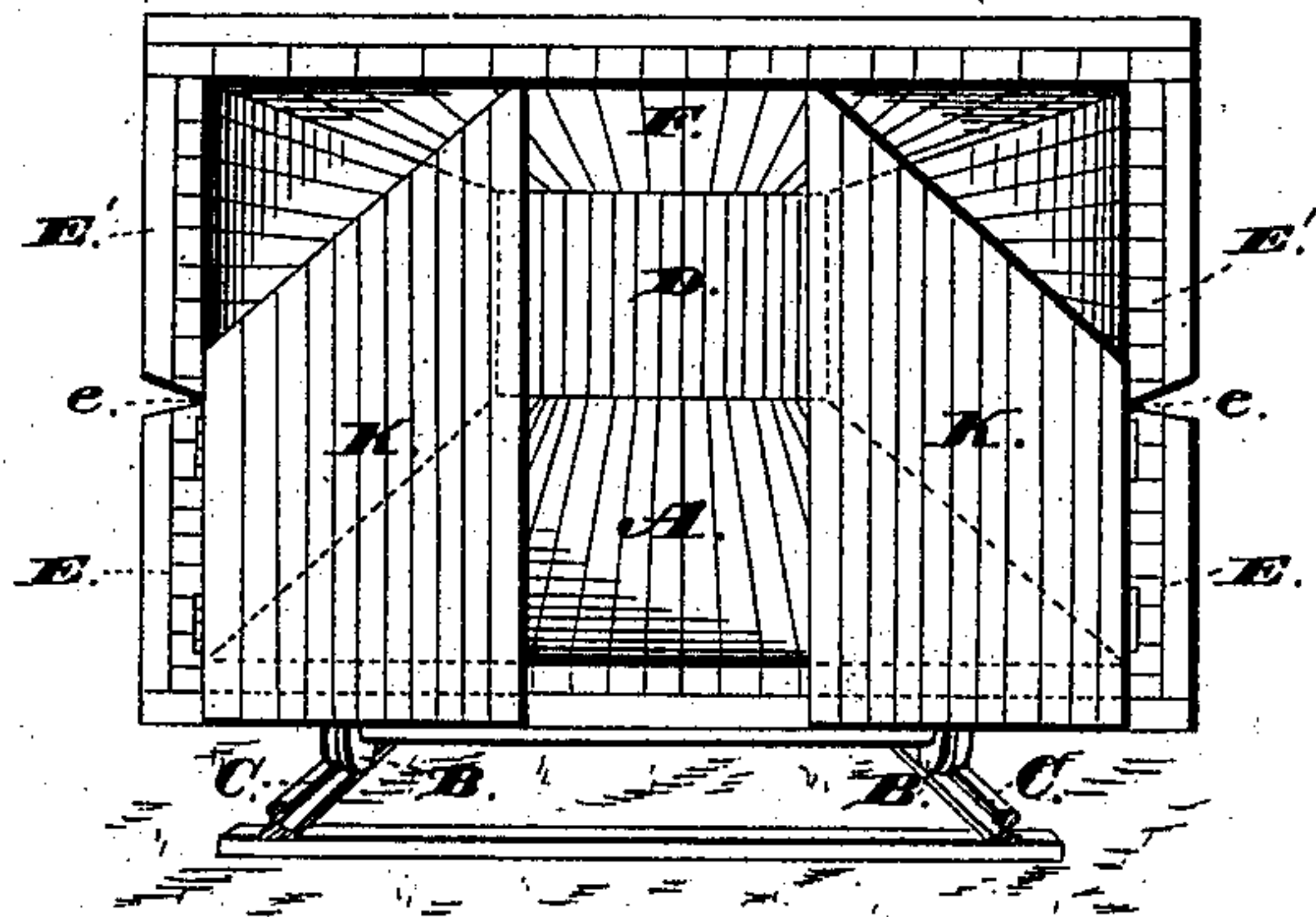
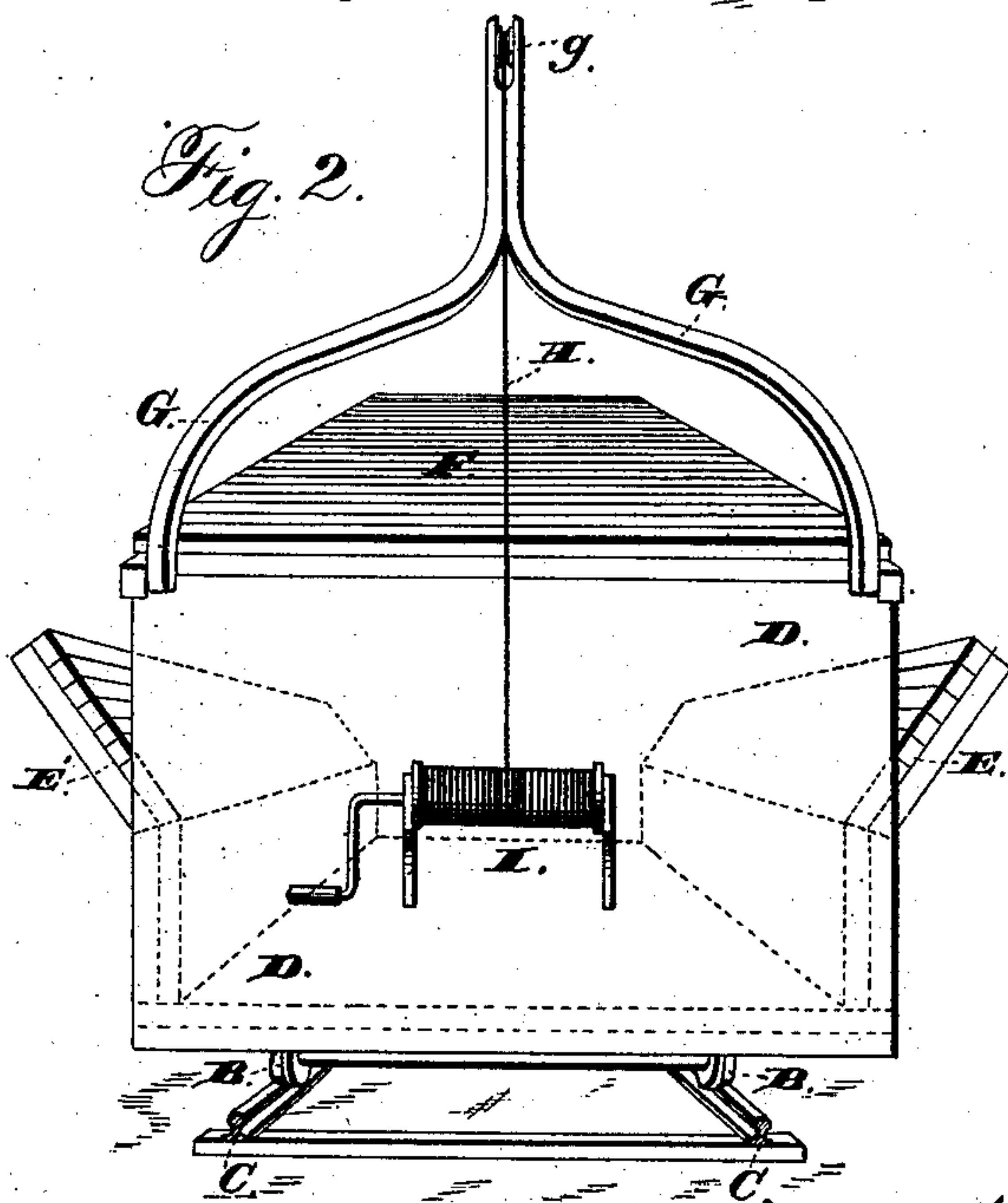


Fig. 2.



Witnesses:

Jas. E. Hutchinson.
 Henry C. Hazard.

Inventor.

H. R. Kirk, by
Prindle & Russell, his Attys

(No Model.)

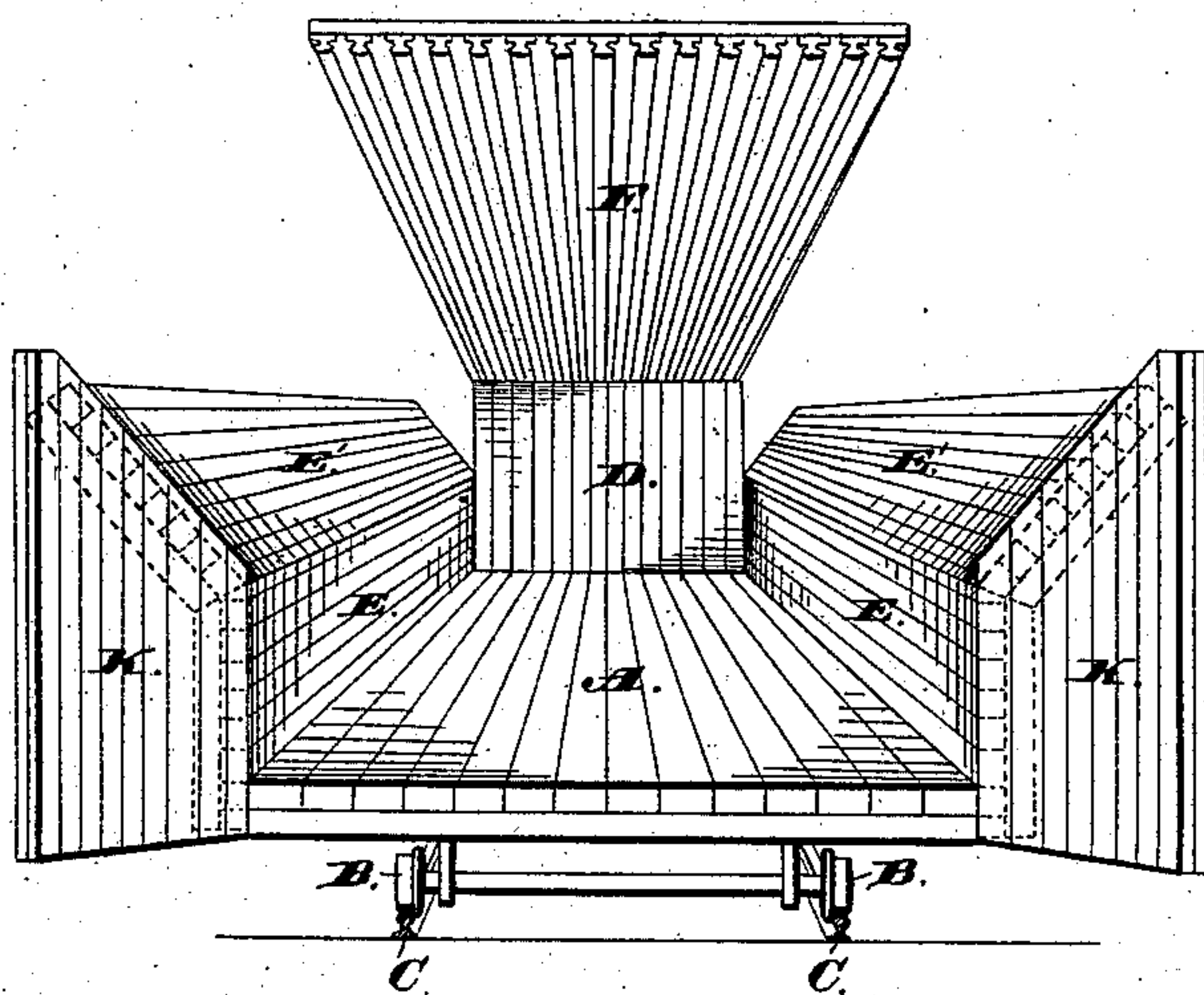
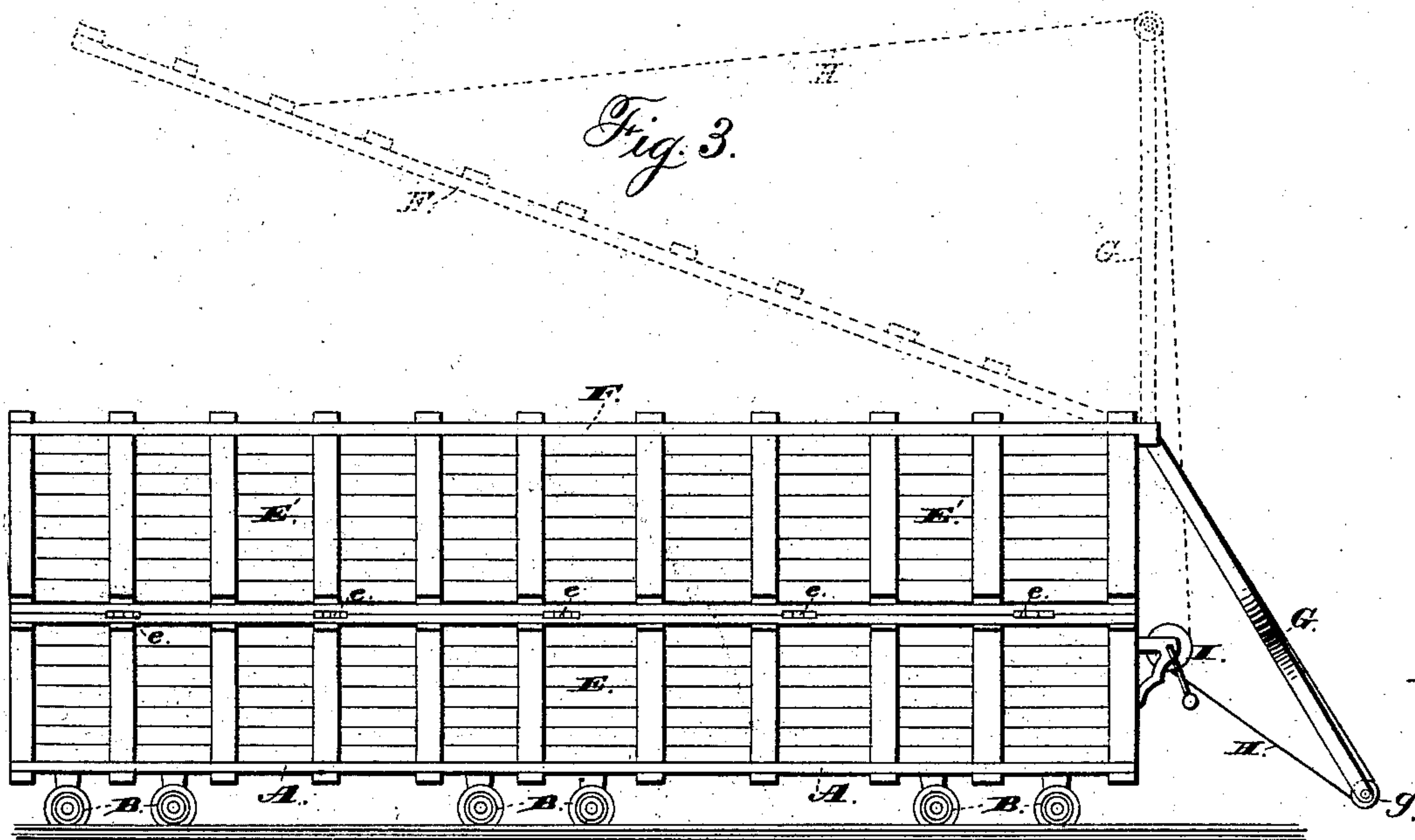
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UNITED STATES PATENT OFFICE.

W. RANSON KIRK, OF FORT SCOTT, KANSAS, ASSIGNOR OF ONE-HALF TO
W. J. MOORE, OF SAME PLACE.

APPARATUS FOR THE CONSTRUCTION OF TUNNELS.

SPECIFICATION forming part of Letters Patent No. 290,989, dated December 25, 1883.

Application filed May 5, 1883. (No model.)

To all whom it may concern:

Be it known that I, W. RANSON KIRK, of Fort Scott, in the county of Bourbon, and in the State of Kansas, have invented certain new and useful Improvements in Apparatus for the Construction of Tunnels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my car from the front, as arranged for moving into or out of a tunnel. Fig. 2 is a like view of the same from the rear, arranged for receiving a blast. Fig. 3 is a side elevation of said car when closed together as shown in Fig. 1, the dotted lines showing the positions of the top when elevated and of the apparatus employed for raising said top; and Fig. 4 is a front elevation of the same when in position to receive the rock thrown down by a blast.

Letters of like name and kind refer to like parts in each of the figures.

In the construction of tunnels the usual course has heretofore been to first place in position the drilling mechanism and prepare holes for the reception of an explosive; next to remove said apparatus, so as to leave the tunnel unobstructed; next to charge and fire the blast; next to load the excavated material upon cars that were run in for such purpose, and, after loading, were run out and dumped, after which said drilling apparatus was taken back into the tunnel and the operation described repeated. By this method of operation a large proportion of the time has been required for the removal of the excavated material, and but a fraction of the time has been available for such work as required skilled labor, and the construction of a tunnel having any considerable length has, from such cause, required so much time as to prevent many similar enterprises from being carried through.

To obviate these objections is the design of my invention, which consists, principally, as an improvement in apparatus for constructing tunnels, in a car having an open front end and adapted to receive material as dislodged

by a blast, and provided with a movable top and sides, which may be arranged to practically close the tunnel and cause the flying rock to fall into said car, substantially as and for the purpose hereinafter specified.

It consists, further, in the special construction of the car, substantially as and for the purpose hereinafter shown.

In the annexed drawings, A represents the platform or body of a car, which is supported upon four or more wheels, B, that preferably have much less diameter than those usually employed, so as to bring said body as near the rails C as practicable.

Secured to and extending upward from one end of the body A is an end piece, D, which has substantially the intended height of the box, while from each side edge of said body a side piece, E, extends upward to about one-half the height of said end piece, and has hinged to its upper edge a similar piece, E', that, when placed vertically, carries the height of each side up to that of said end piece, D.

Hinged at one end to or upon the upper edge of the end piece, D, is a top or cover, F, which has such dimensions as to enable it to close the entire upper side of the car-box when the hinged side pieces E' are turned inward to vertical position. Said cover is adapted to be raised upward to the position shown in Figs. 3 and 4, and is thus raised, when desired, by the following-described means, viz:

Hinged at one end to or upon the rear end of the cover F is a bar, G, that at its outer end is provided with a pulley, g, around which passes a rope, H, that has one end connected with the upper side at or near the front end of said cover, and its other end connected with a windlass, I, which is journaled upon the rear end of the car. Said bar, when not in use, is turned rearward and downward to the position shown by the full lines of Fig. 3; but when it is desired to raise said cover said bar is turned upward and forward until it reaches a vertical position, as seen in Fig. 2 and by the dotted lines of Fig. 3, when its further movement in such direction is arrested, and by the turning of said windlass said rope, drawing over said pulley g, will cause the front end of

said cover to be elevated. The upper face of the body A, the inner faces of the end pieces, D, and the sides E and E', and the lower face of the cover F are heavily plated with metal, preferably T-rails, arranged as shown, in order that they may be able to withstand the impact of flying rock, and in order that the joints between the side pieces, E and E', may be protected from injury, and at the same time made sufficiently close to prevent the passage of stones through the same, the contiguous edges of said parts are beveled outward, and their hinges *c* are placed upon a line with the inner faces of said parts, as shown in Figs. 1 and 3. The box thus constructed is intended to occupy about one-half of the vertical dimensions of a tunnel, and to have such width as to enable it to pass freely through the same, and is used as follows, viz: After the drilling mechanism has prepared holes for the explosive, said mechanism is moved rearward a short distance, and by any suitable means is raised to and held in position at the upper side of the tunnel, after which the car is moved inward upon the rails until its front end is near to the rock to be blasted. The cover is now raised until its front end is in contact with the upper side of the tunnel, and the hinged portions of the sides are turned outward until they rest against the contiguous sides of said tunnel, after which the charges of explosives which have meanwhile been placed in position are fired. The rock dislodged by the explosion will principally fall directly into the car, or will be thrown against the cover or sides of the same, and then fall upon the bottom, and but little, if any, will fall below or outside of said car, so that the labor of loading the material will be entirely avoided or materially lessened, and said car with its contents may be speedily run out of the tunnel and dumped, and the drilling mechanism again placed in position.

In order to avoid all possibility of the passage of stones at the sides of the car, a wing, K, is hinged to the front end of each stationary side piece E, and is adapted to swing outward against the contiguous side of the tunnel, and not only operates to close the space between the latter and said side piece, but also acts as a shield for the front ends of said side piece and of the hinged piece E'.

The mechanism described will not only lessen materially the time and labor required for the construction of tunnels, thereby rendering more speedily available the capital invested, but will also afford protection to those engaged in the work, and prevent, in a great degree, the loss of life which has heretofore attended the prosecution of such works.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. As an improvement in apparatus for constructing tunnels, a car having an open front end and adapted to receive material as dislodged by a blast, and provided with a movable top and sides, which may be arranged to practically close the tunnel and cause the flying rock to fall into said car, substantially as and for the purpose specified.

2. The hereinbefore-described car, consisting of the armored body A, stationary end piece, D, fixed and hinged side pieces, E and E', hinged cover F, elevating mechanism G, H, and I, and hinged wings K, all combined to operate substantially as and for the purpose shown.

In testimony that I claim the foregoing I have hereunto set my hand this 3d day of May, 1883.

W. RANSON KIRK.

Witnesses:

WILLIAM FITCH,
HENRY C. HAZARD.