

(No Model.)

2 Sheets—Sheet 1.

J. A. BICKFORD.
MINING CAR.

No. 452,464.

Patented May 19, 1891.

Fig 1.

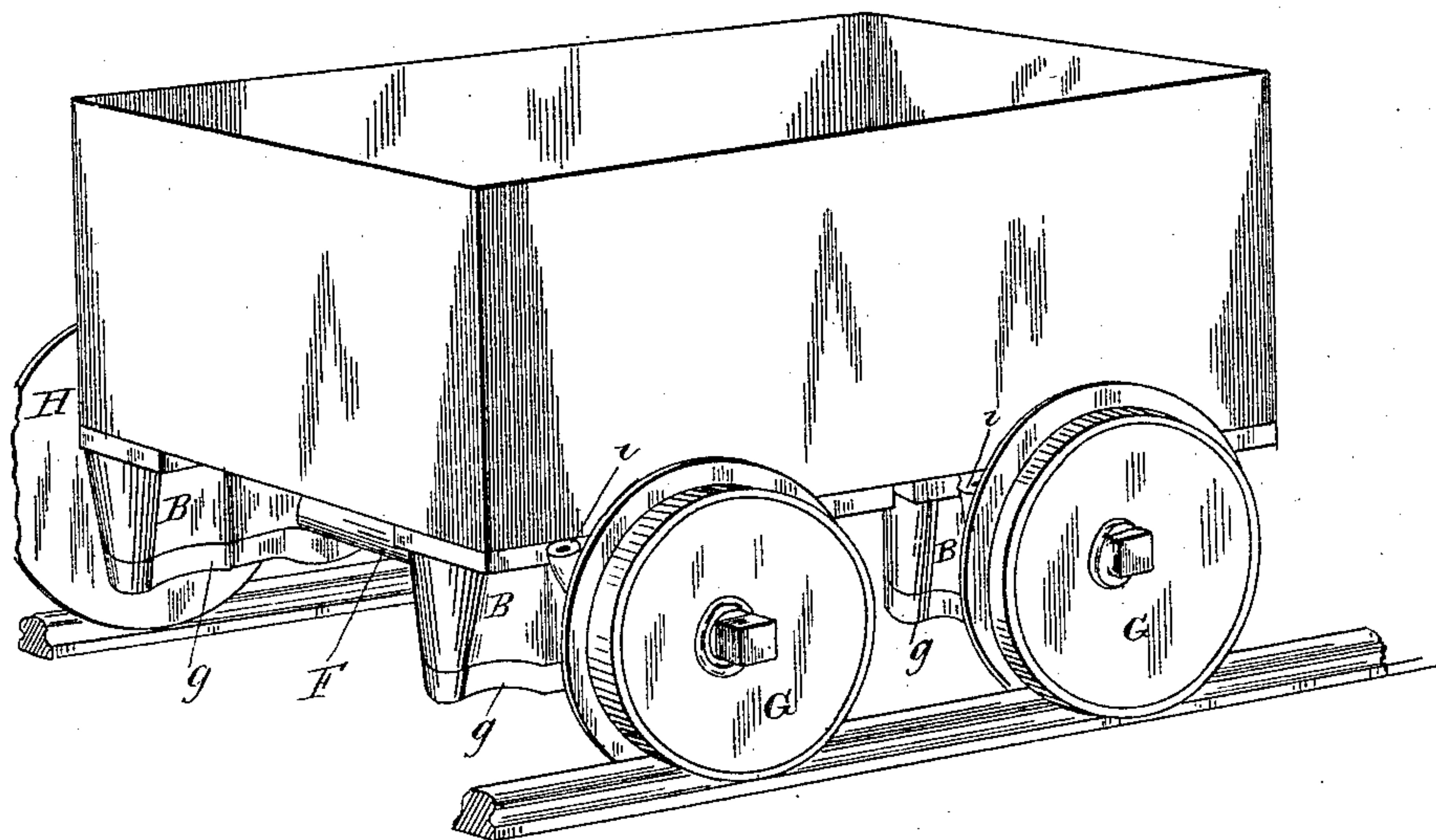
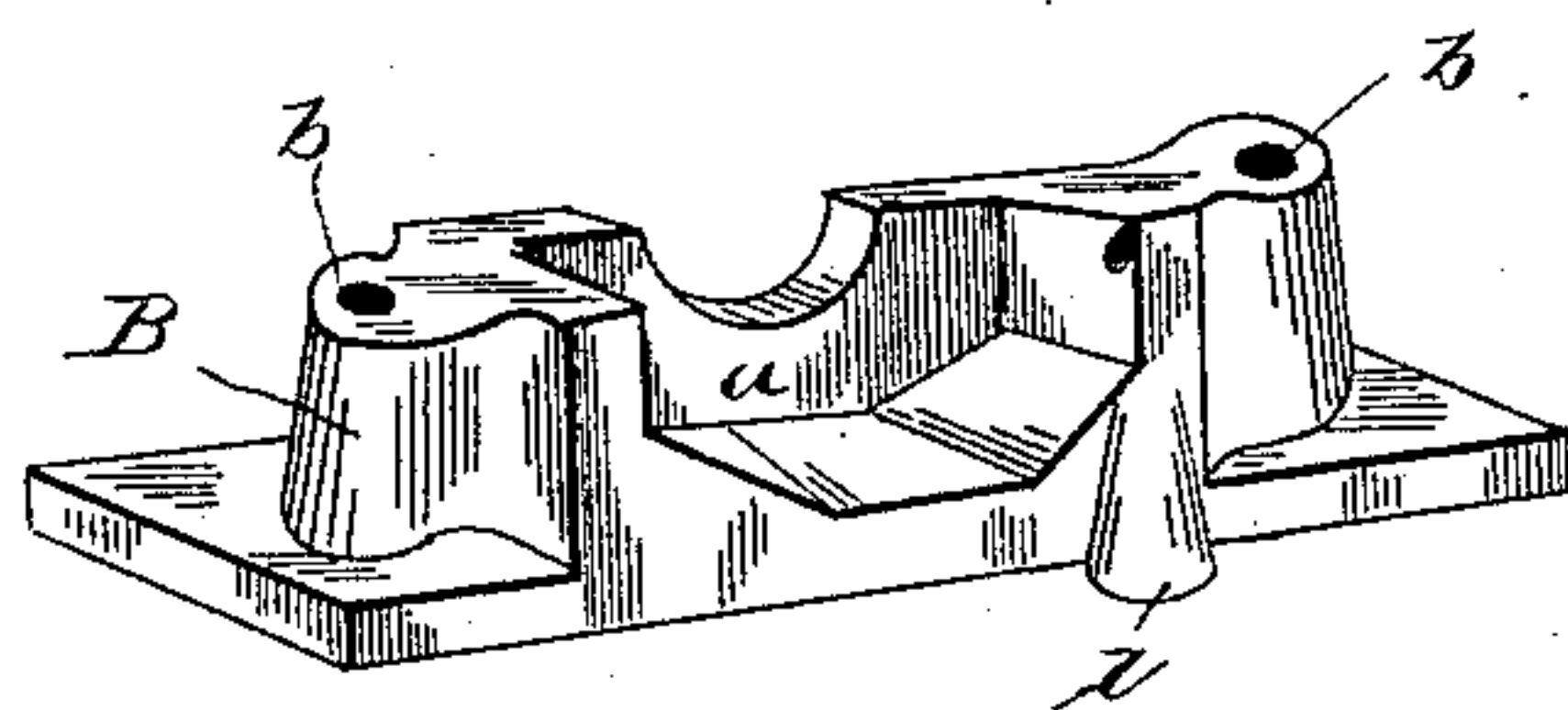


Fig 5



Witnesses

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Fig. 2.

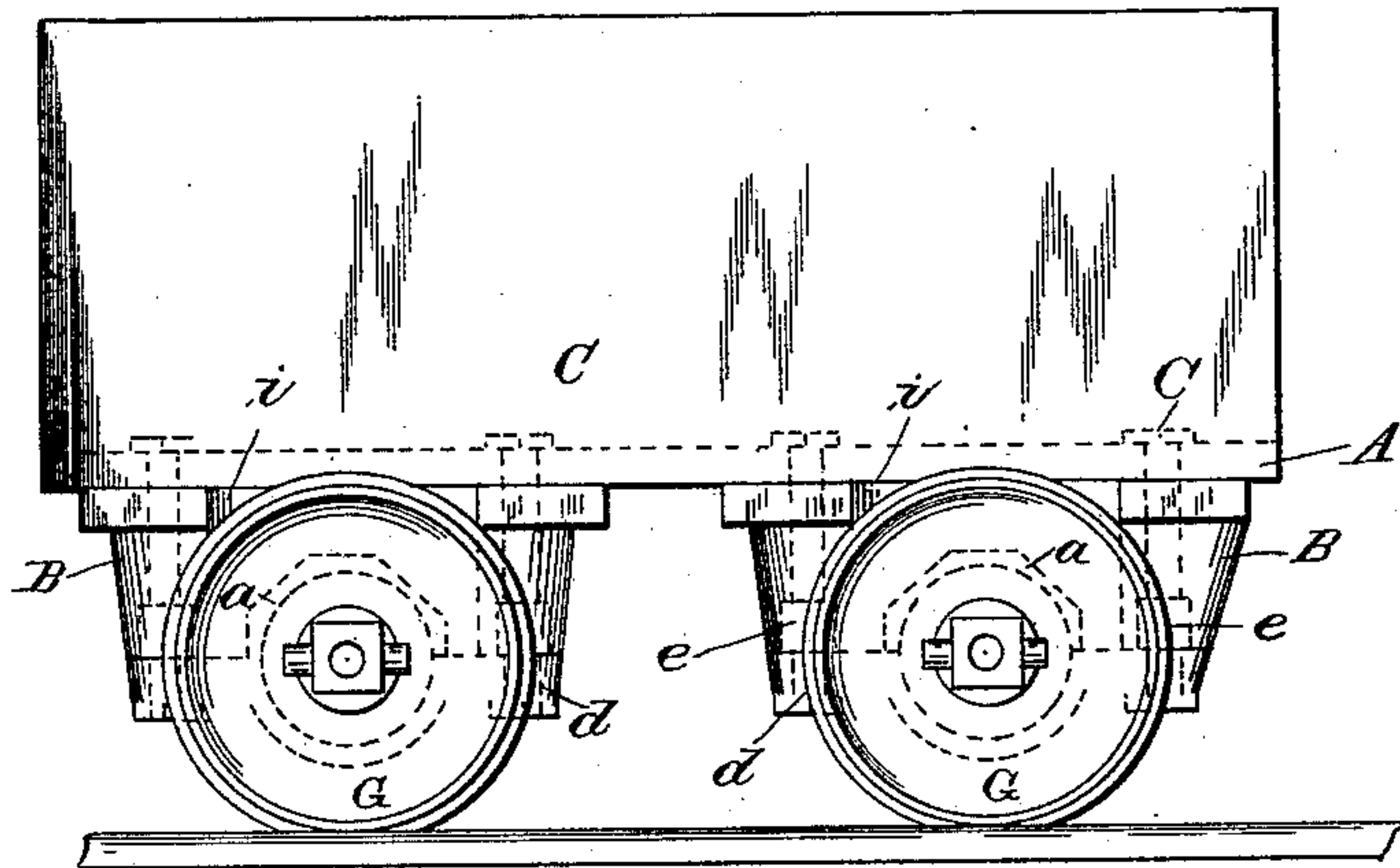


Fig. 3.

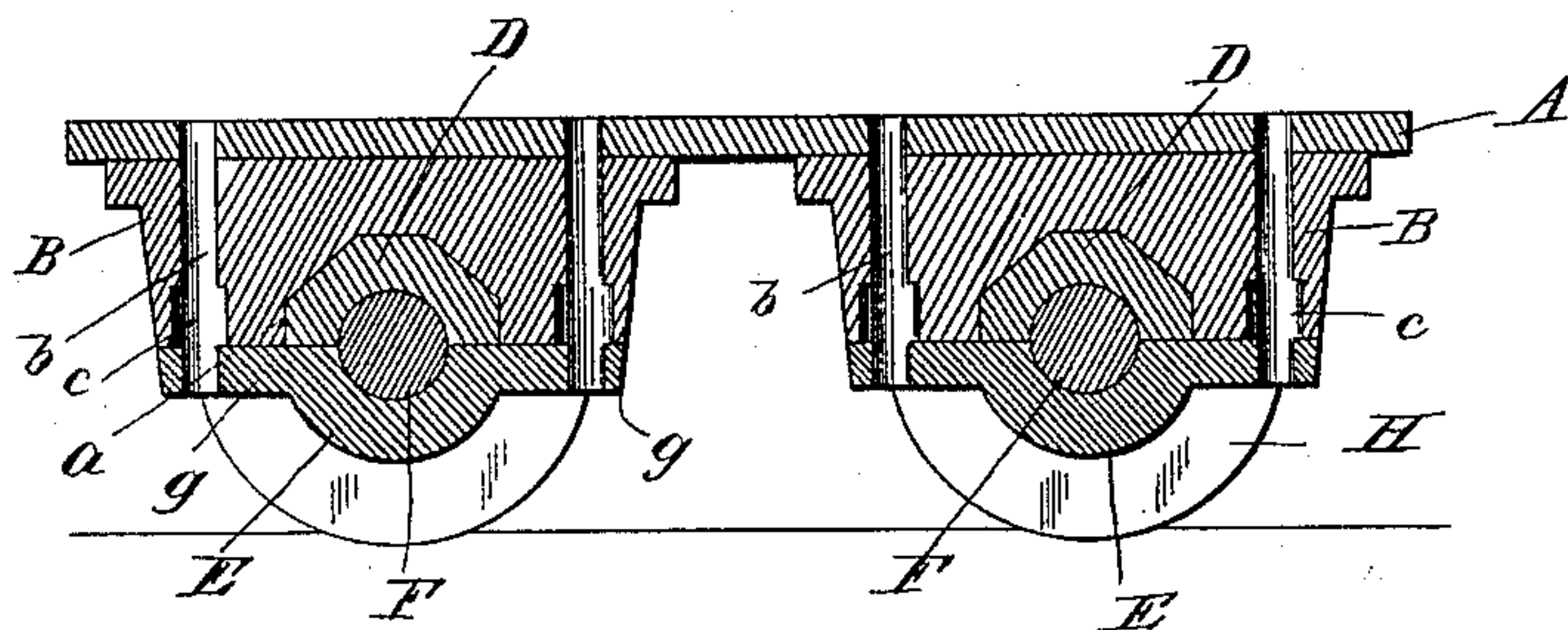
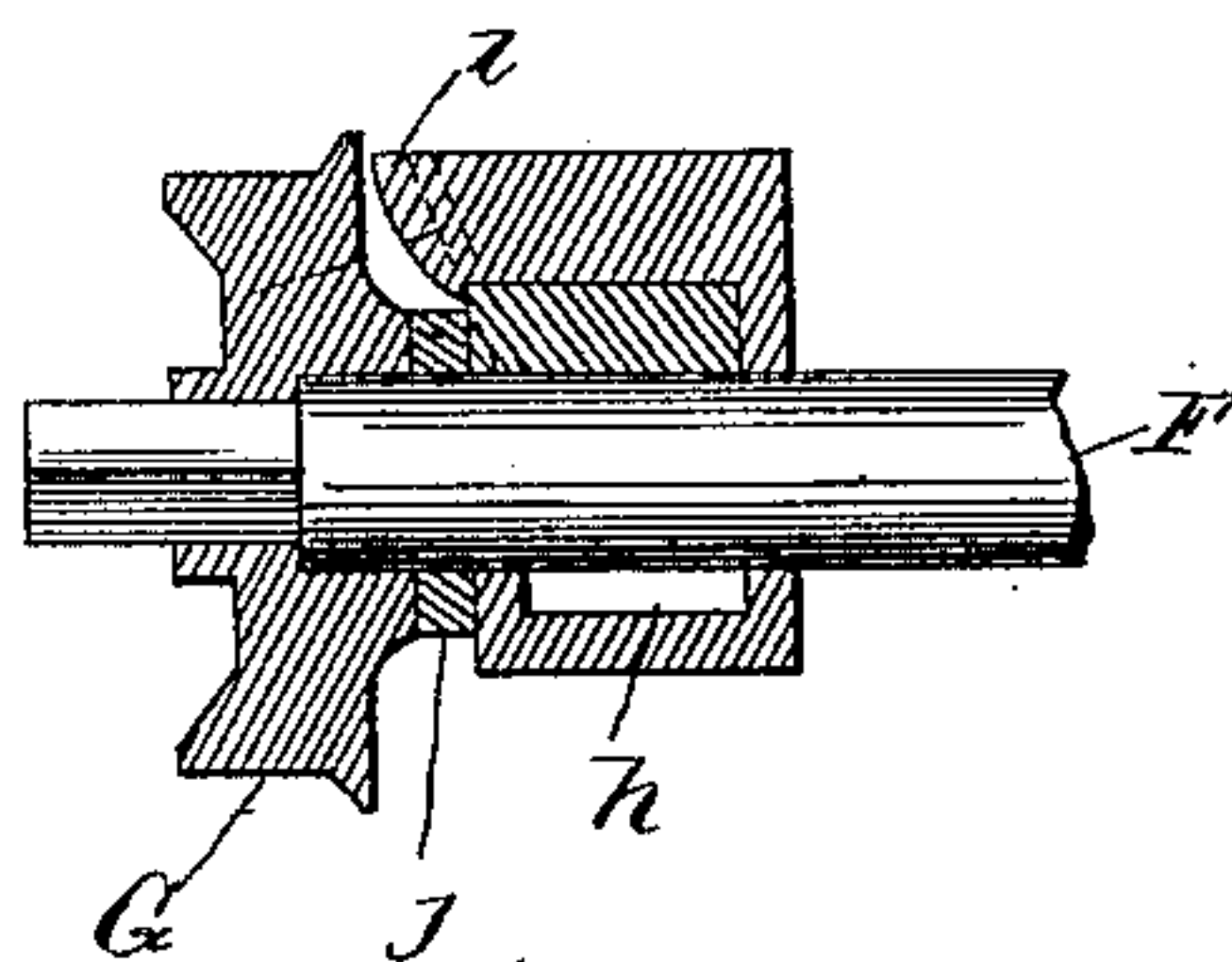


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES A. BICKFORD, OF LOCK HAVEN, PENNSYLVANIA.

MINING-CAR.

SPECIFICATION forming part of Letters Patent No. 452,464, dated May 19, 1891.

Application filed October 24, 1890. Serial No. 369,202. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. BICKFORD, a citizen of the United States, residing at Lock Haven, in the county of Clinton and State of Pennsylvania, have invented certain new and useful Improvements in Mining-Cars; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to various new and useful improvements in mining-cars.

The principal object of my invention is to provide and produce a mining-car which will round curves with the least possible amount of friction.

Another object is to provide a new and useful bearing for the axles of the car, which will be very strong and rigid and at the same time will allow the axle to turn easily therein.

The principal novelties in the construction of my improved car consist of two or more axles mounted in bearing-boxes of novel construction with two wheels for each axle, one being rigidly and the other loosely mounted on the same, means whereby the loose wheel may be lubricated, and removable bearing-pieces within the bearing-boxes, which may be removed when worn, as well as in other but less important details of construction, all as will be more fully hereinafter pointed out and described and embodied in the claims.

For a better comprehension of my invention attention is invited to the accompanying drawings, forming a part of this specification, and wherein corresponding parts in the several views are represented by identical letters of reference.

In the drawings, Figure 1 is a perspective view of the improved mining-car; Fig. 2, a side elevation of the same; Fig. 3, a sectional view taken through the axle-boxes on one side; Fig. 4, a sectional view taken through one of the axles and its bearing-boxes, and Fig. 5, a perspective view of one of the bearing-boxes with a cap therefor and bearing-piece removed.

A represents the platform of the car, of a general rectangular shape, as shown. This platform is to be made either of wood or of

metal, as the case may require and according to the use to which it is to be put.

B represents the axle-box proper of the car. Each axle-box is of the general construction shown, and each is provided with the semi-hexagonal-shaped opening or recess *a*, for the purpose to be mentioned hereinafter. On each side of this opening *a* in each axle-box is a vertical cylindrical passage *b*. Each of these passages is enlarged at its lower end at *c*, as shown. Extending up through each of these passages *b* and directly through the platform A of the car is a bolt C of peculiar construction, as will now be set out. Each bolt consists of a shank *d*, screw-threaded at both ends, and an integral collar *e* near the screw-threads of the lower portion. When this bolt is in position within the opening *b*, the collar *d* will fit within the enlarged portion *c* so as to be flush with the lower portion of the bearing-box proper, or it may extend some little distance within the same. Each axle-box will be held securely in position by means of nuts engaging with the upper portion of the bolts C above the platform of the car, as shown. Fitting securely within each opening *a* is a bearing-piece D, which is to be of any of the so-called "anti-friction metals" now on the market; or, instead of being made entirely of anti-friction metal, it may be made of some harder metal lined with anti-friction metal. Each of the openings *a* inclines slightly upward at its inner end—that is to say, toward the center of the car—and the bearing-piece D is made to fit correspondingly. By doing this when the bearing-pieces are resting on the car-axles they will be moved by the weight of the car up against flanges *f*, which are a part of the bearing-boxes proper, as will be evident. In this way the bearing-pieces may be quickly and easily removed when worn, and at the same time they will be held firmly in position free from accidental disarrangement by the weight of the car. When the axles are in position within the bearing-boxes, they are to be held therein by means of a semicircular-shaped cap E. Each cap is provided with two ears *g g*, with which the lower ends of the bolts C engage. These caps are held in position by means of nuts en-

gaging with the lower ends of the bolts C. Each cap is provided on its inner side with a hollowed-out portion *h*, which is adapted to be filled with cotton waste or some substance capable of absorbing and holding oil.

Each bearing-box B is provided on its outer face with a lip or projection *i*, which is made hollow, and which communicates by a passage with the inner face of the axle-box directly adjacent to the opening *a*. The oil may be introduced into the lip *i*, and will flow through the passage to the hollowed-out portion *h* of the cap, so as to saturate the cotton waste or analogous substance therein. By this means, since the axle will always revolve in contact with this cotton waste, it will be kept constantly lubricated.

F represents the axles, which are mounted within the axle-boxes, as I have before pointed out. Each axle is provided with two collars *j j*, which may be either integral therewith or separated therefrom and shrunk into position. These collars prevent the axle from moving longitudinally within the axle-boxes, as will be evident. One end of each axle for a short distance is made rectangular in cross-section, as shown; but it will be evident that it may be made of any other irregular or angular shape. Engaging with this portion of the axle is a car-wheel G, having its opening therein of the same shape as the axle, so that the wheel will be movably mounted on the same. The other end of the axle is perfectly cylindrical, and carries another car-wheel H, which will be capable of moving loosely on the axle, as will be evident. The loose wheels should be on one side of the car and the rigid wheels should be on the other side of the car. The action of this part of the car is as follows: When the car is traveling on a perfectly-straight track, the two sets of wheels will revolve at precisely the same speed and the axles will be rotated accordingly by the rigid wheels, so that all the wear will be taken up by the bearing-pieces, it being of course understood that the loose wheels do not rotate on the axles. In going round a curve, however, owing to the increased length of the outside track, one set of wheels will revolve faster than the other set. This difference of rotation between the two sets of wheels is allowed by mounting one set loosely upon the axle. In order that the loose wheels may be lubricated when working independently of the axles, I provide

each with a passage *k*, extending down from a point near the hub of each to the central passage for the axle. This passage *k* may be filled with oil, in which case a cover should be provided for the same to prevent the oil leaking out, or it may be filled with cotton waste saturated with oil, in which case no cover will be necessary. By either of these arrangements the loose wheels will be very effectively lubricated when moving independently of the axles.

Although it has been mentioned that it is preferable to place the loose wheels on one side of the car and the rigid wheels *n* on the other side of the car, it is not necessary to do this, and a successful operation of the car in no way depends upon such a particular arrangement.

Having now described my invention, what I claim as new therein is as follows:

1. An improved mining-car consisting of a platform A, having bearing-boxes B secured thereto, with removable bearing-pieces within each bearing-box, and axles having each extremity mounted within one of said bearing-boxes and bearing against said bearing-pieces, and each of said axles having a wheel rigidly secured thereto and a wheel loosely mounted thereon, substantially as set forth.

2. An improved mining-car consisting of a platform A, having axle-boxes B secured thereto, with removable bearing-pieces within said axle-boxes, a removable cap for each bearing-box, the hollowed-out portion in each cap to hold cotton waste or similar substance, axles having each extremity bearing in one of the axle-boxes, a wheel loosely mounted on each axle, and a wheel mounted rigidly on each axle, substantially as set forth.

3. An improved mining-car consisting of a platform A, axle-boxes B secured thereto, a cap for each bearing-box, a hollowed-out portion in each cap containing cotton waste or similar substance, a lip *i* on each bearing-box communicating with the hollowed-out portion of the cap, axles bearing in the axle-boxes, a wheel rigidly secured to each axle, a wheel loosely mounted on each axle, and a passage within each wheel extending into the axle, whereby the same may be lubricated.

JAMES A. BICKFORD.

In presence of—

F. P. BALL,

C. R. GEARHART.