

H. JAPP.
TUNNELING APPARATUS.
APPLICATION FILED SEPT. 4, 1908.

922,431.

Patented May 18, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

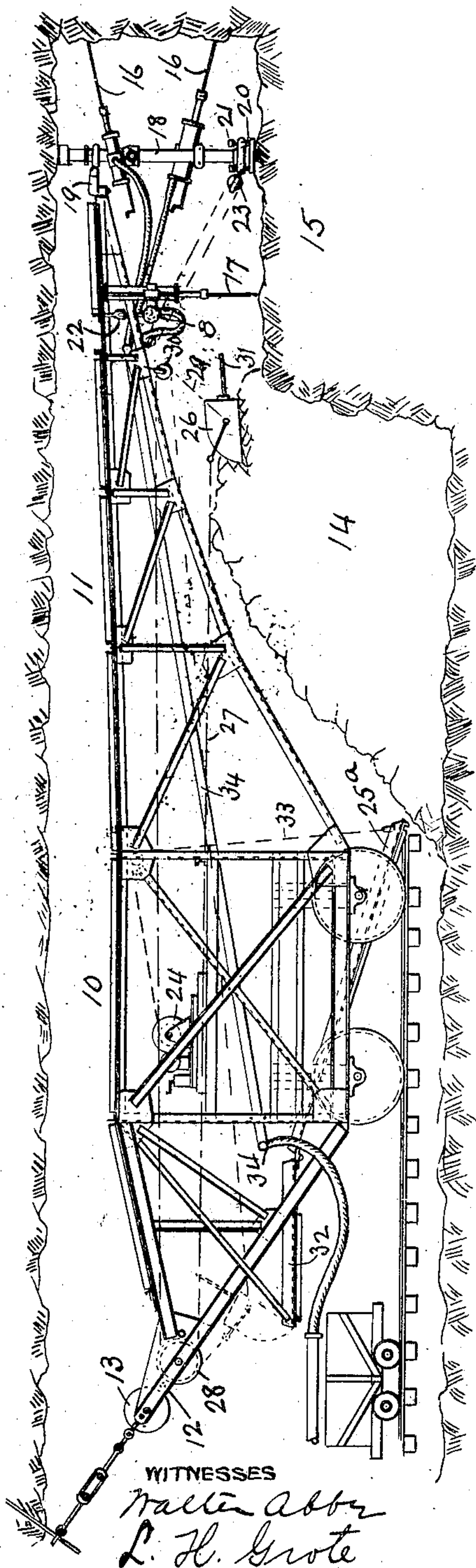
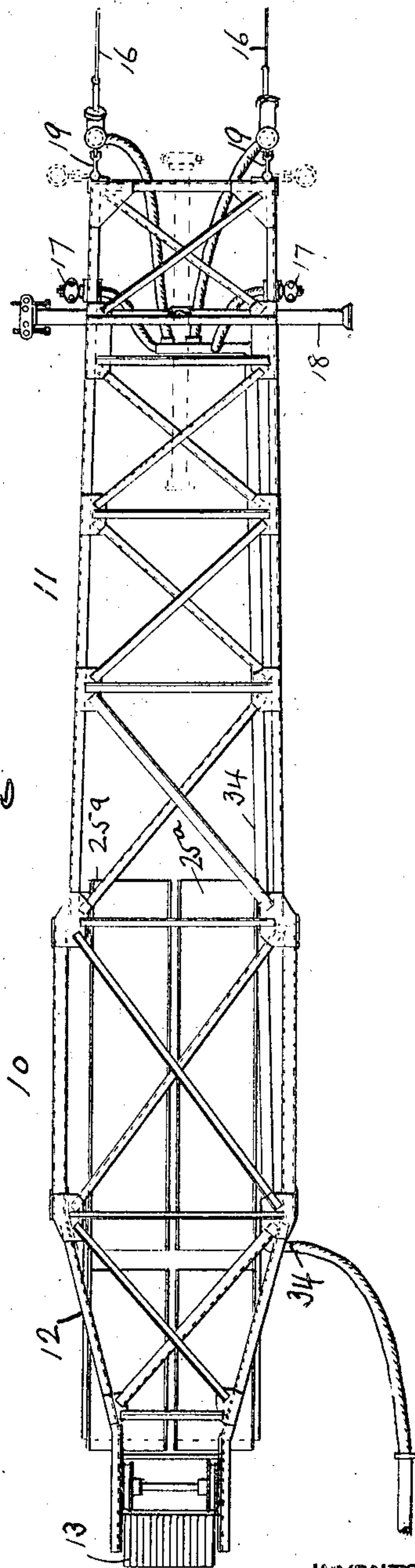


Fig. 2.



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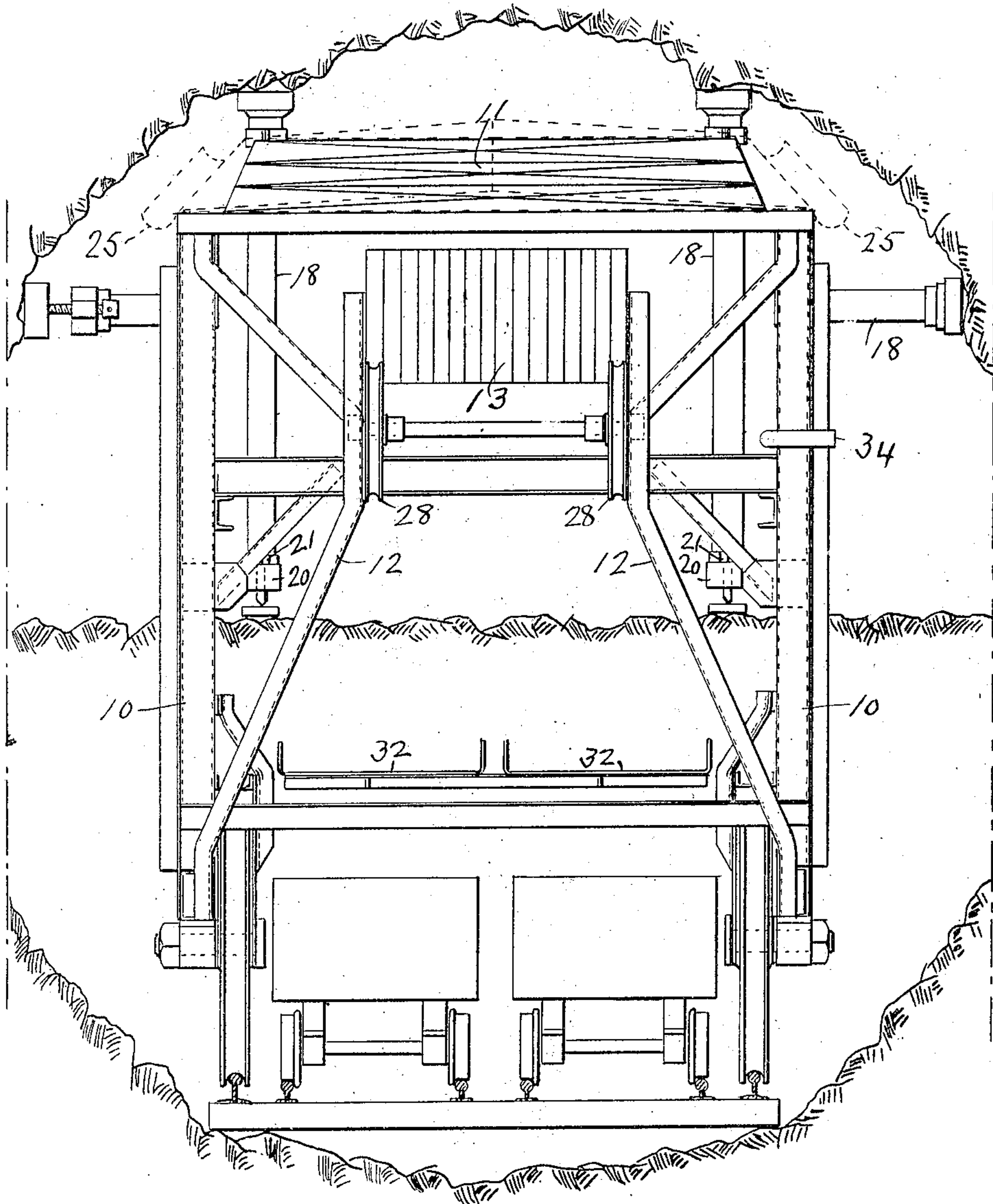
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2 SHEETS—SHEET 2.

Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY JAPP, OF NEW YORK, N. Y., ASSIGNOR TO S. PEARSON AND SON, INC., OF LONG ISLAND CITY, NEW YORK, A CORPORATION OF NEW YORK.

TUNNELING APPARATUS.

No. 922,431.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed September 4, 1908. Serial No. 451,679.

To all whom it may concern:

Be it known that I, HENRY JAPP, a subject of the King of Great Britain and Ireland, and a resident of the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Tunneling Apparatus, of which the following is a specification.

My invention relates to tunneling apparatus and particularly to apparatus for rock tunneling, the object of my invention being to provide an improved carriage for the drills, etc.

In the accompanying drawings, Figure 1 is a side elevation of a carriage embodying my invention; Fig. 2 is a plan thereof; and Fig. 3 is an end view.

My device comprises a carriage 10 provided with a forwardly extending arm 11, preferably of cantaliver construction as shown, and a rearwardly extending balancing arm 12 carrying counterweights 13. The arm 11 is of such length as to extend beyond the muck pile 14 and over the bench 15 and carries the horizontal drills 16 at its extremity for driving the heading and behind them the vertical drills 17 for breaking down the bench. To afford a suitably rigid support for the drills, I mount them adjustably upon the columns 18, which for the vertical drills are swung at the top from pivoted brackets 19 while the bottom is provided with a foot block 20 with screws 21 for making the same firm. The column for the vertical drills is suspended from slides on the string pieces of the cantaliver arm, so that the bench drills may be moved closer to or farther from the heading drills as may be expedient, while the bench drills themselves may be laterally adjusted across their supporting column if desired.

In order to clear the drills of the walls of the cut when the carriage is to be traveled, the horizontal column 18 is swiveled on its hanger 22, while the vertical columns for the heading drills are provided with tackle 23 attached to the block at the foot of each column, by means of which the latter, being hinged to the brackets 19, may be swung up to clear the bench floor.

When it is desired to fire a blast the drills and their supporting columns, instead of being dismantled and carried back out of danger, are merely swung up on the cantaliver arm as described, and the carriage run back to a

safe distance. After the blast the carriage is again run forward, the columns lowered to position and the drilling operations can begin again at once—thus saving much time and labor heretofore lost.

To facilitate the moving of the carriage, it may be provided with a winch 24; operated by any suitable power, the wire rope from which is carried in the direction which it is desired to move the carriage, fastened to a convenient projection, for instance, a drill stuck in a crevice in the rock, and the winch set in operation.

A roofing 25 (shown in dotted lines, Fig. 3) may be placed over the carriage and cantaliver arm, or over the latter alone, to protect the workman against drip or accidental falls from the unfinished roof of the cut.

My carriage may also be provided with a conveying apparatus for removing the muck and delivering it to the cars. To this end I mount a pair of inclined slides 25^a beneath the carriage proper, the lower ends of which reach to the foot of the muck pile. A scoop or pair of scoops 26 is pulled, on the loading travel, by a heavy rope 27 passing around a pulley 28 to the smaller cylinder of the winch, and on the return stroke by a lighter rope 29 passing around the pulley 30 to the larger cylinder of the winch. At the forward end of the carriage the scoops are lifted by the arm 11 above the bench so that they can assist in removing the muck broken down by the heading drills. A handle 31 is provided for the scoop by which the latter may be guided into the muck pile when filling. After the scoop is filled, it slides down the muck pile to the foot of the incline up which it is pulled by the winch, finally passing along the horizontal section 32 to the point of discharge, when it empties into a car.

In order to provide against interruption of work in case of a break down of the device, the carriage is made of sufficient width to span the tracks of the dump cars and the slides 25^a are hinged at their upper ends and provided with tackle 33 by which they may be hoisted up out of the way of the dump cars. Should the apparatus get out of order for any reason, it could be rolled back out of the way, the slides lifted and the tunneling work progress without serious interruption. A considerable saving is also made, in case the drills are operated pneumatically, by carrying the compressed air through metal tub-

ing 34 attached to the carriage. Each drill could be fed from a very short flexible hose from this tubing and a short hose coupling (of large diameter) would connect the tubing at the rear of the carriage to the main air line. The customary long lengths of expensive rubber tubing would thus be done away with.

Various modifications of the device may be employed without departing from my invention and I do not limit myself to the precise structure shown.

I claim as my invention:

1. Apparatus for bench tunneling, comprising a traveling frame and a forwardly extending arm therefor, carrying horizontal drills for making a heading in the upper portion of the tunnel and vertical drills in the rear of the horizontal drills for breaking down the bench, substantially as described.

2. Apparatus for bench tunneling, comprising a traveling frame and a forwardly extending arm therefor carrying horizontal drills for making a heading in the upper portion of the tunnel and vertical drills in the rear of the horizontal drills for breaking down the bench, in combination with a conveyor apparatus carried in part by said forwardly extending arm, the conveyor proper being brought above the level of the bench to remove the muck broken down by the heading drills, substantially as described.

3. Apparatus for bench tunneling, comprising a traveling frame and a forwardly extending arm therefor adapted to carry the drills above the bench, in combination with a drill support movably mounted on said arm and means for swinging said drill support

clear of the tunnel walls when the carriage is to be traveled, substantially as described.

4. Apparatus for bench tunneling, comprising a traveling frame and a forwardly extending arm therefor adapted to carry the drills above the bench, in combination with a vertical drill support and means for swinging the same up to clear the bench floor when the carriage is to be traveled, substantially as described.

5. Apparatus for bench tunneling, comprising a traveling frame and a forwardly extending arm therefor adapted to carry the drills above the bench, in combination with a horizontal transverse drill support and means for swinging the same on a vertical axis so as to clear the walls of the tunnel when the carriage is to be traveled, substantially as described.

6. Apparatus for bench tunneling, comprising a traveling frame and a forwardly extending arm therefor, carrying horizontal drills for making a heading in the upper portion of the tunnel and vertical drills in the rear of the horizontal drills for breaking down the bench, in combination with a rigid fluid conduit mounted on said carriage and extending up said arm to the drills and flexibly connected at one end to the drills and at the other to a main supply pipe, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

HENRY JAPP.

Witnesses:

H. D. FORBES,
W. J. SEIP.