

(No Model.)

2 Sheets—Sheet 1.

G. F. KIBLING.
MINING APPARATUS.

No. 604,330.

Patented May 17, 1898.

Fig. 1.

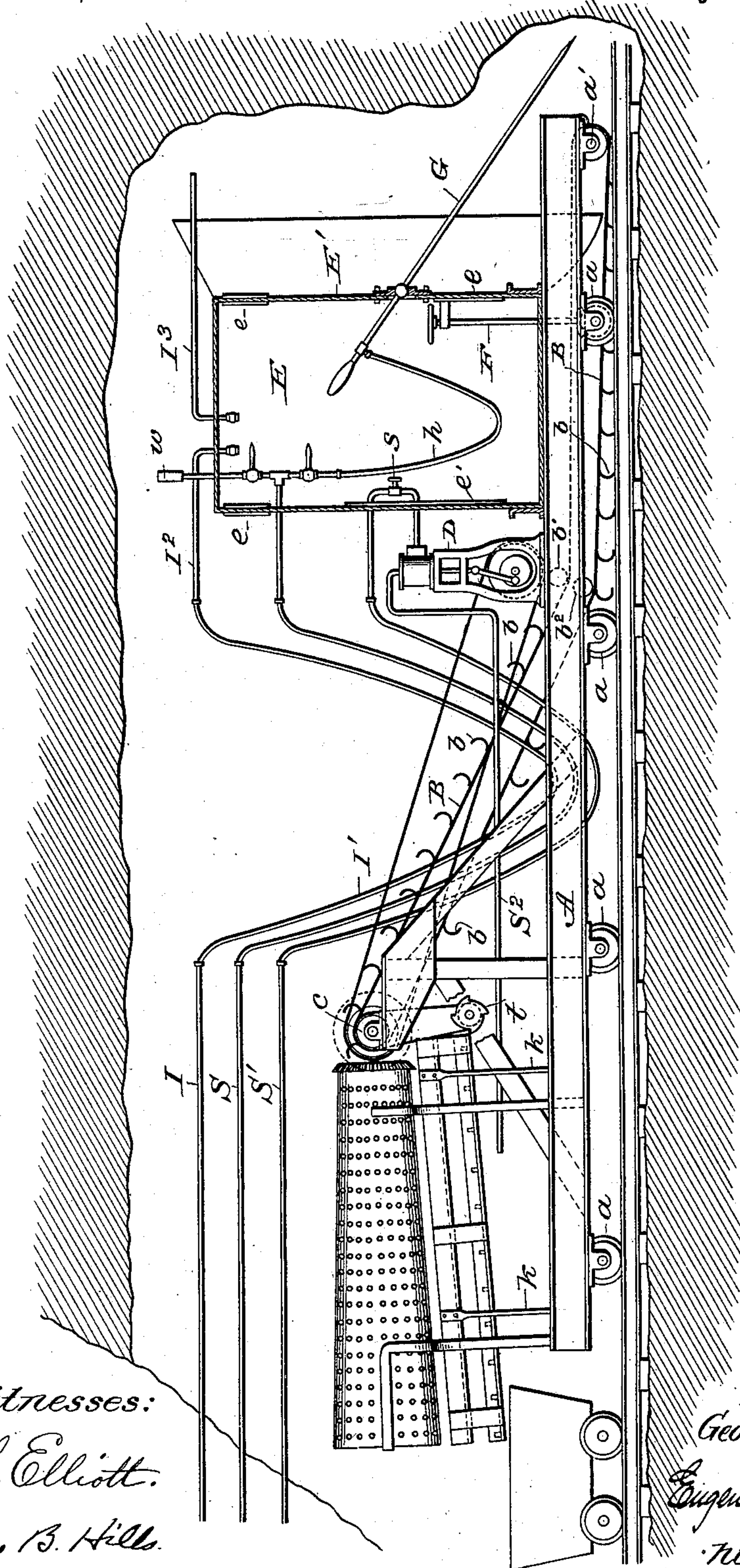


Fig. 3.



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his attorney.

(No Model.)

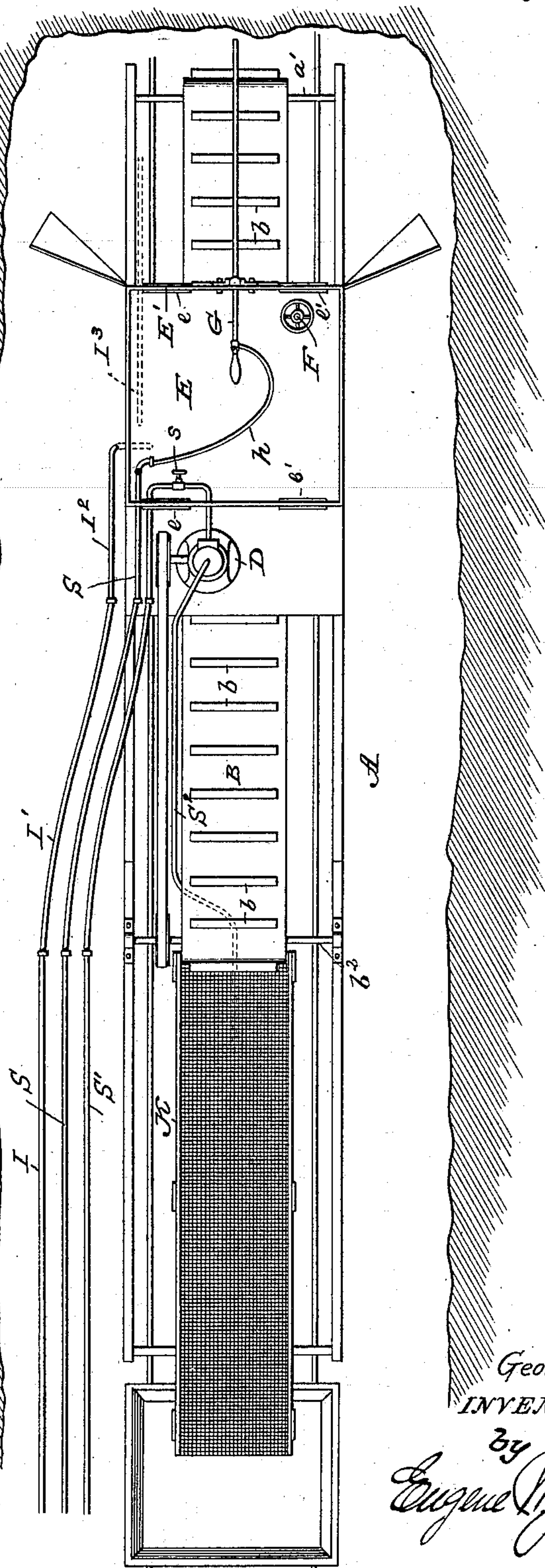
2 Sheets—Sheet 2.

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Fig. 2.



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UNITED STATES PATENT OFFICE.

GEORGE F. KIBLING, OF HANOVER, NEW HAMPSHIRE.

MINING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 604,330, dated May 17, 1898.

Application filed October 18, 1897. Serial No. 655,575. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. KIBLING, a citizen of the United States of America, residing at Hanover, in the county of Grafton and State of New Hampshire, have invented certain new and useful Improvements in Mining Apparatus; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in tunneling or mining apparatus; and the object in view is to provide an effective means for excavating in frozen soil; and it consists in the means employed for thawing the soil in front of the apparatus, so that it will fall upon a suitable conveyer and be carried thereby to a car.

In carrying out my invention I make use of a movable platform, preferably mounted on wheels, said platform being provided with a compartment or chamber for the operators who work in the tunnel, said compartment being provided with an air-supply pipe which leads into the chamber for the purpose of supplying air to the operators; also with forward projecting tubes through which steam can be forced upon the soil to thaw the same in advance of the excavating apparatus.

The invention further consists in the construction, combination, and organization of the parts, whereby means are provided for thawing out the soil, conveying the same to a separator and from thence to a car, and shielding the operators while at work, as well as providing a signaling means for the operators within the compartment and means whereby they can move the apparatus backward or forward upon its tracks.

In the accompanying drawings, Figure 1 is a side elevation showing generally the embodiment of my invention. Fig. 2 is a plan view, and Fig. 3 is a detail view, of the end of the pipe.

The apparatus which I will now proceed to describe is designed, primarily, for mining in frozen soil, and it is designed to provide means whereby mining may be carried on during

the winter season by tunneling into the soil which is held compact by reason of its being frozen, owing to the intense cold in such regions, Alaska and the British possessions adjacent thereto being an example of the region in which this apparatus is adapted for use.

A refers to a suitably-constructed platform or frame having supporting wheels or rollers *a*, the wheels or rollers being adapted to engage with tracks laid on a line with the floor of the tunnel. The side bars of the platform extend considerably in front of the forward rollers or wheels and carry a shaft *a'*, over which passes an endless conveyer B, which has at suitable intervals buckets or excavators *b*. This conveyer B is guided by rollers *b'* and a shaft *b*², so that the rear part can be upwardly inclined, being maintained in an elevated position by a roller or drum *c*, which is driven by a belt or sprocket-chain, which extends therefrom to the driving-wheel of an engine D, mounted on the platform.

E refers to a compartment or chamber of sufficient size to accommodate two or more workmen, and this chamber is a rigid structure mounted on the platform and made as near air-tight as practicable and is provided at its front and rear with windows *e* and doors *e'*. The front wall *E'* of the chamber has secured thereto side or laterally-projecting wings, the lower portions of which curve inwardly, so that the gravel or soil may be guided thereby toward the conveyer, which is located between the side bars of the platform.

Through the floor of the chamber extends a shaft F, having at its upper end a hand-wheel, the lower end of said shaft being geared to the forward roller of the platform, so that by turning the hand-wheel the platform and parts carried thereby can be moved in either direction.

Through the front wall of the chamber extends a bar G, the same engaging with a universal coupling or joint, so that it can be moved from within the chamber, where it is provided with a suitable handle, and the rod G is hollow and provided near its end with a plurality of perforations, said end being preferably pointed, so that it may be used in breaking down the soil or forced into the soil, so as to be held thereby while it is thawed

out by a jet of steam or heated air, which passes through the rod or tube G.

In mining, at a suitable distance from the tunnel which it is desired to excavate is located a steam-boiler and an air-pump of any suitable type, and the air is forced into the tunnel through a pipe I, which has a flexible section I', connected to a pipe I², which enters the chamber E, and said chamber is also provided with an air-outlet pipe I³, the end projecting forward of the compartment or chamber. The ends of the pipe I² and I³ are provided with suitable valves and cut-offs, which may be operated within the chamber.

S and S' refer to steam-pipes which extend from the boiler hereinbefore referred to, but not shown, to the chamber or casing, said steam-pipes having intermediate flexible sections the same as the air-pipe, and the pipe S has a T-head from which extend pipes, one passing through the casing and being provided with a whistle w, the other branch having a hose or flexible connection h, which is attached to the tube G. Suitable cocks or cut-offs are provided within the casing. The whistle provides means for signaling from the chamber to the boiler or power house. The steam-pipe S' extends within the chamber, where it is provided with a valve or cut-off s, and, again, through said chamber, where it is connected to an engine, said engine driving the conveyer B, hereinbefore referred to. The exhaust from the engine is carried, by means of a pipe S², to a point beyond the conveyer, where a separator is located, said separator preferably comprising a drum or cylinder which is perforated and is rotated in any suitable manner. The drum is inclined, and the ore is delivered into the higher end from the conveyer. Beneath the drum is a frame or box which is supported by springs k, and said frame has a screen and below the screen a series of riffle-plates, and the pan or box having the riffle-plates is adapted to contain quicksilver, which is kept in a fluid condition or from freezing by the exhaust-steam from the engine D. The box or pan forming a part of the separator is agitated by a cam-wheel t on a shaft which is driven from the drum c.

The ore carried by the conveyer will be deposited into the revolving drum and the smaller particles will pass through the drum upon the screen or sieve below the finer particles, falling into the box containing the riffle-plates. The larger particles of the ore which do not pass through the perforations in the drum or screen below will be deposited in a car which can be positioned on the track beneath the lower end of the separator. If desirable, the ore can be deposited directly into a car.

In the regions where this device is intended to be used the soil or earth bearing gold ore is principally of a gravelly nature, which is frozen, so that it can only be worked during the summer season; but with this apparatus the soil can be excavated and carried to such

buildings where it can be worked during the entire year.

I am aware that prior to my invention it has been proposed to make tunnels or shafts by freezing artificially the earth in front of a wall, so that the earth can be prevented from caving in during the process of excavation. In the present instance we are met with a condition of extreme cold, which, acting upon the earth, forms it into a rock-like mass, and the thawing of the same by the application of steam will bring the soil into such condition that it may be removed by an excavator, substantially the only manual labor that is performed being to guide the steam-jets so as to thaw the soil where desired. When the tunnel has been excavated to such a distance that it is necessary to lay further tracks for the platform, the structure may be moved rearward and the tracks then laid, for it will be noted that the forward end of the excavator or conveyer is considerably in advance of the forward or supporting wheels.

Many changes in the form of the apparatus may be made without departing from the spirit of my invention.

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

1. In an apparatus for excavating tunnels in naturally-frozen soil, the combination with a bed or platform, an endless conveyer mounted on said platform, a wall or support attached to the platform to the rear of the front end of the endless conveyer, an excavating-tool carried by the wall or support so as to project through the same and a steam-supply pipe connected to the tool, substantially as shown and for the purpose set forth.

2. In a mining apparatus for excavating in frozen soil, the combination of a platform, a chamber mounted thereon, air and steam supply pipes extending within the chamber, the steam-supply pipe being connected to a forward projecting rod which serves the purpose of an excavating-tool by discharging the steam upon the frozen soil, a conveyer-belt for taking the soil so excavated toward the rear of the platform, and an engine for operating the carrier-belt, substantially as shown and for the purpose set forth.

3. In an apparatus for mining or excavating frozen soil consisting of a platform, an excavating-tube through which steam is ejected upon said soil, an endless conveyer mounted on the platform, and wings or shields the lower ends of which converge toward the endless carrier, substantially as shown.

4. In an apparatus for mining in frozen soil, the combination of a movable platform having mounted thereon a suitably-driven conveyer, a separator mounted on the platform adjacent to one end of the conveyer said separator being actuated from the same source of power that operates the conveyer, a closed chamber carried by the platform, and a tube which extends through the chamber said tube

being of sufficient length to extend forward of the conveyer, a steam-supply pipe connected with the tube and with the source of power which drives the conveyer, the steam being
5 exhausted beneath the separator, substantially as shown and for the purpose set forth.

5. In an apparatus for mining or tunneling in frozen soil, the combination with an apparatus comprising a platform, means for manually moving the same, said platform carrying
10 a chamber, engine, conveyer, separator and steam-ejecting pipe, organized or assembled as shown, an air-supply pipe connected with the chamber, steam-pipes one connected to
15 the excavating-tube and the other with the engine said engine having a pipe for conveying the exhaust-steam therefrom to a point beneath the separator for the purpose set forth.

6. In a mining apparatus for tunneling in
20 naturally-frozen soil, the combination with a platform, an endless carrier mounted thereon so that the forward portion thereof will be adjacent to the base of the tunnel, a chamber carried by the platform and positioned there-

on to the rear of the forward portion of the
25 endless carrier and a tool connected with a source of heat through which the heated medium is ejected upon the soil, said tool extending through the front wall of the chamber and adapted to be operated from within
30 the chamber, substantially as set forth.

7. In an apparatus for mining or tunneling in naturally-frozen soil, the combination with a platform or support, a chamber mounted thereon and an excavating-tool which is con-
35 nected with a steam-supply pipe, said tool being supported by the front wall of the chamber, the end beyond the chamber being of such length that the tool can operate over an area
40 larger than the area of the platform and parts carried thereby, substantially as shown.

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

GEORGE F. KIBLING.

Witnesses:

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SAMUEL T. LADD.