(No Model.) 3 Sheets—Sheet 1.

A. BRANDENBURGER, W. TIRRE & H. BARDITZKY.

MINING MACHINE.

No. 283,858. Patented Aug. 28, 1883.

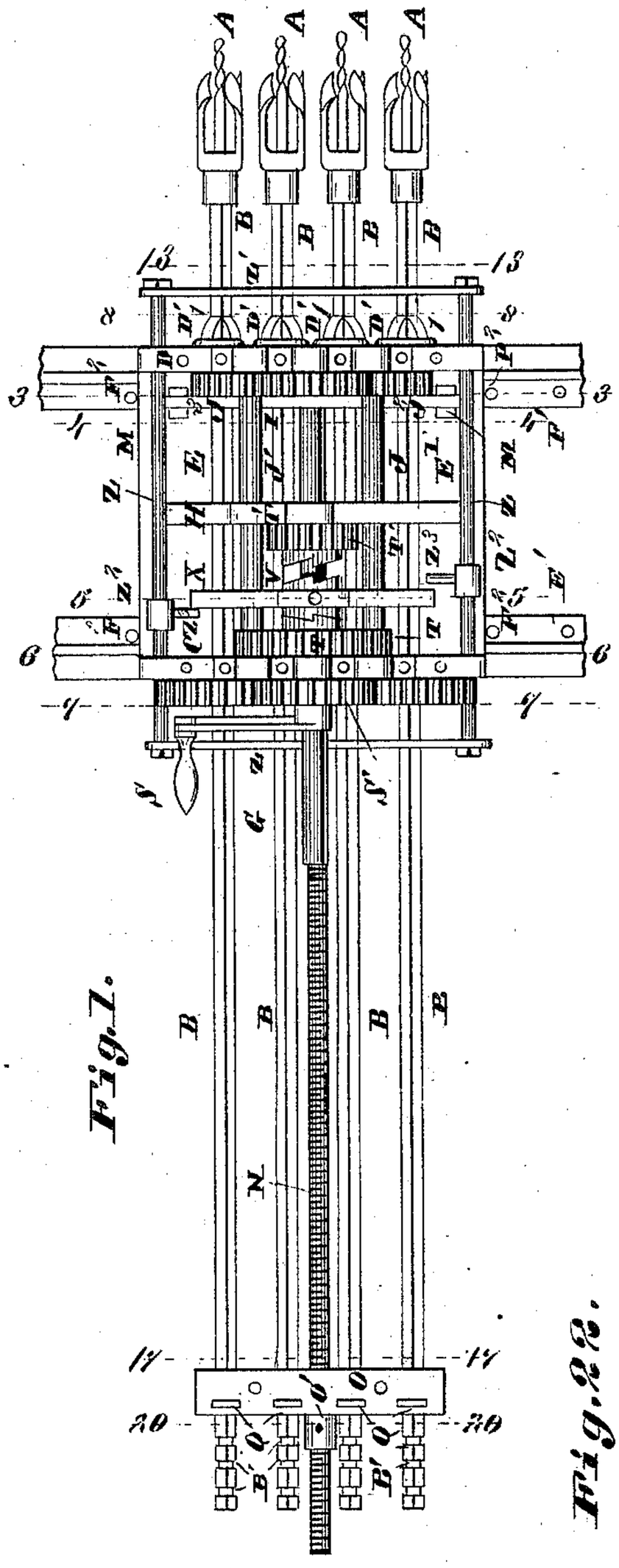

Fig. 1.

Fig. 2.

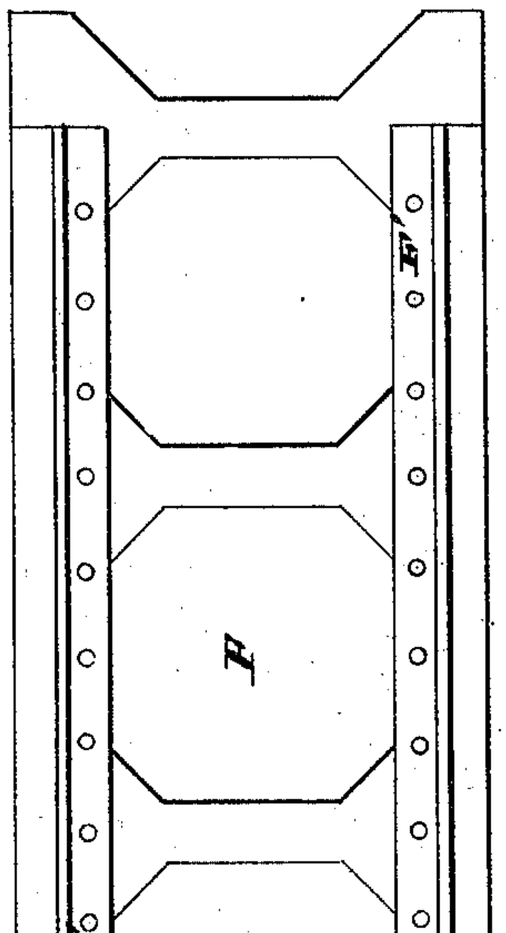

Fig. 2a.

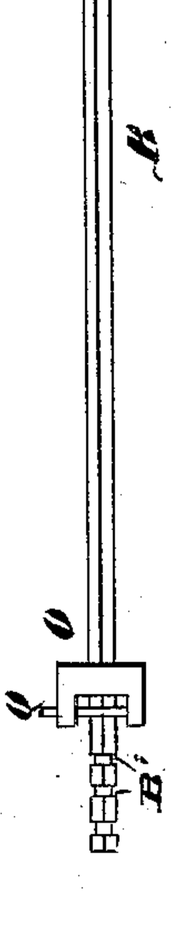

Fig. 2c.

Attest;
Charles Pickles
Herbert Knight

Inventors
Andrew Brandenburger
William Tirre and
Herman Barditzky
By Knight Bros
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MINING MACHINE.

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Fig. 3.

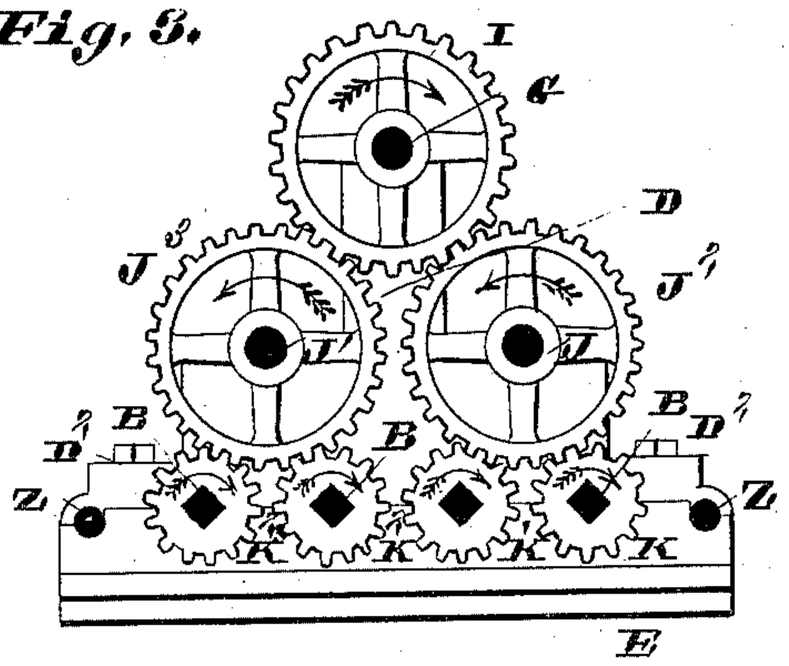


Fig. 4.

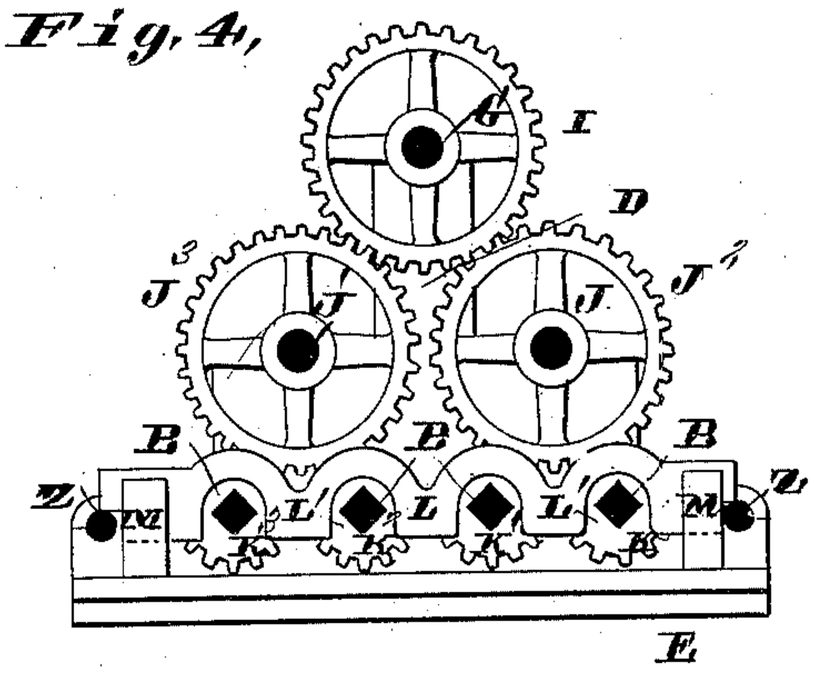


Fig. 5.

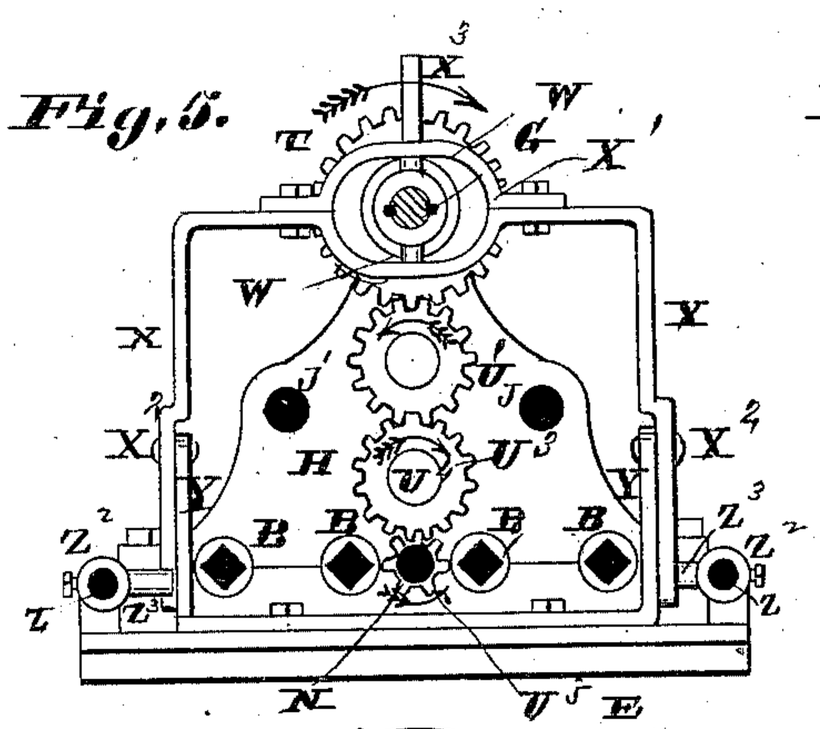


Fig. 6.

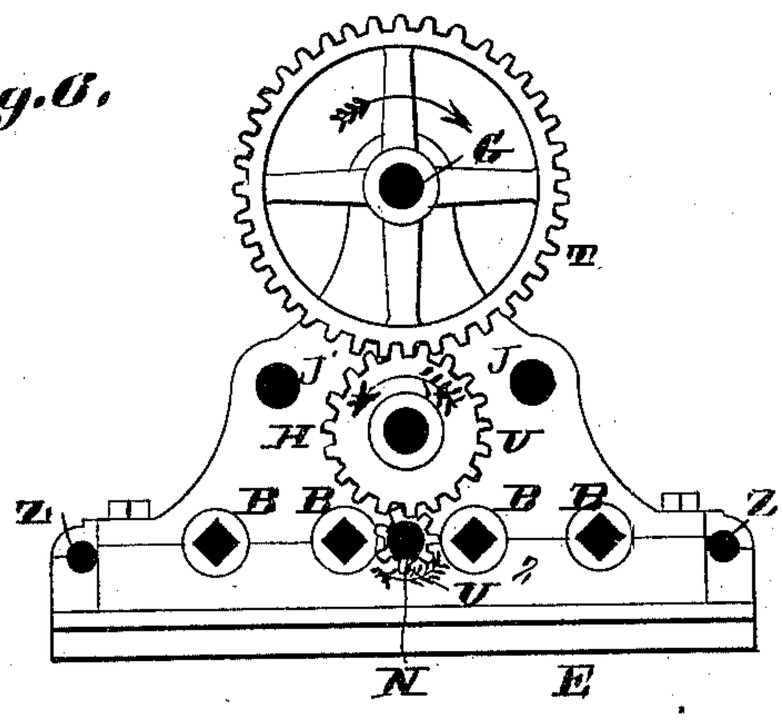


Fig. 7.

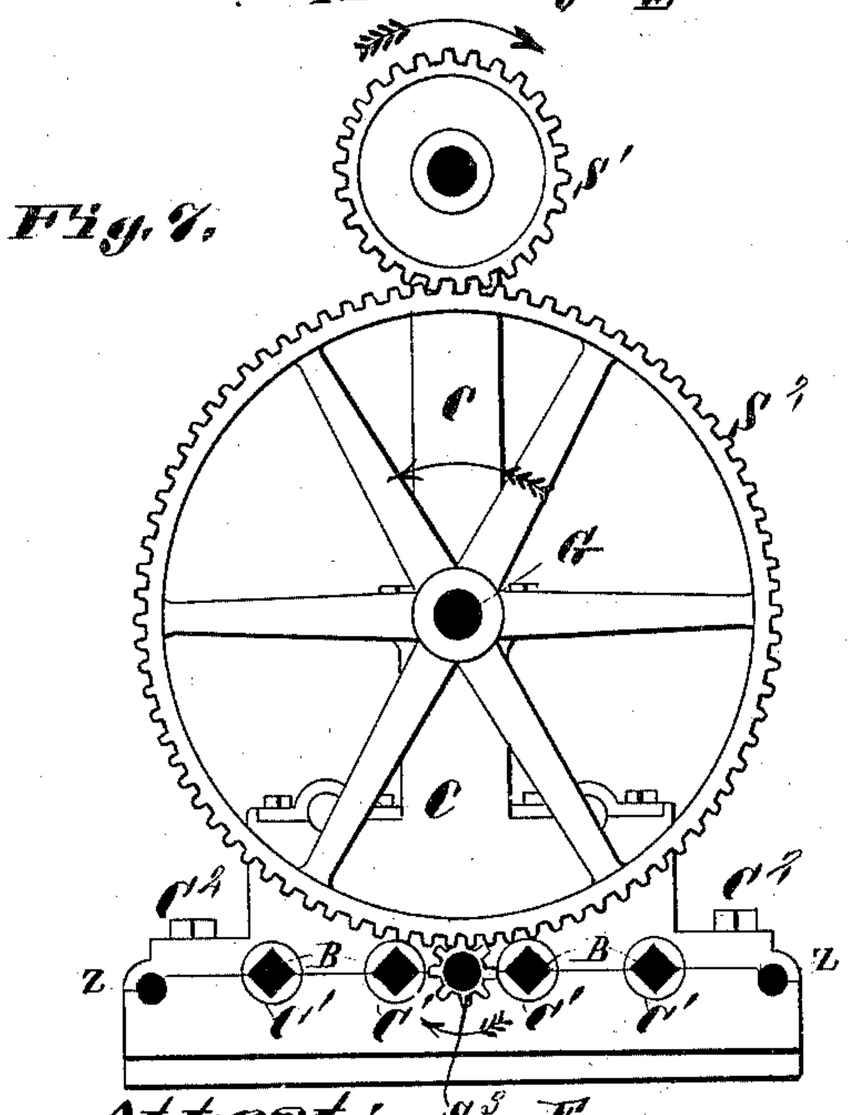
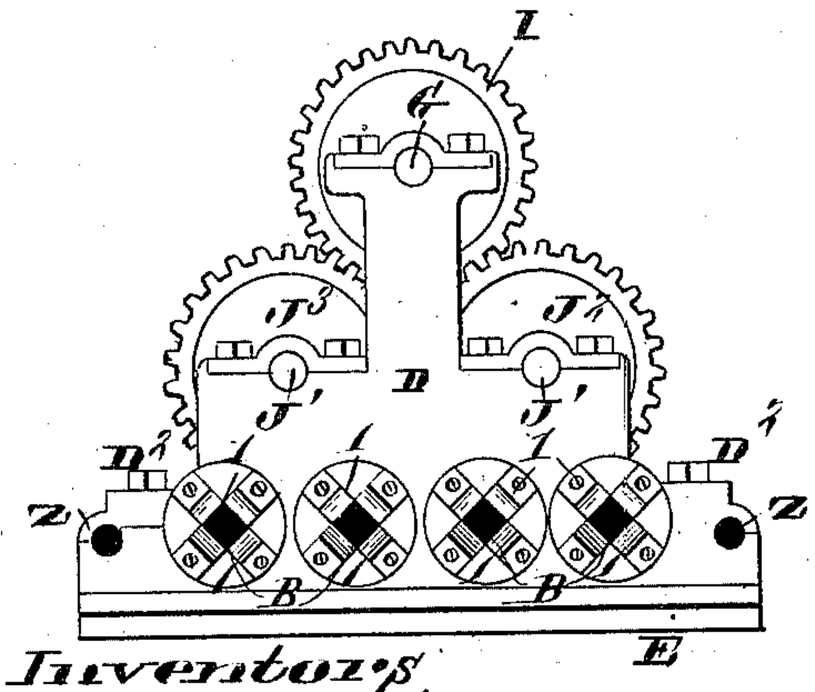


Fig. 8.



Attest:
Charles Pickles
Herbert Knight

Inventors
Andrew Brandenburger
William Tirre and
Hermann Barditzky
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Fig. 9.

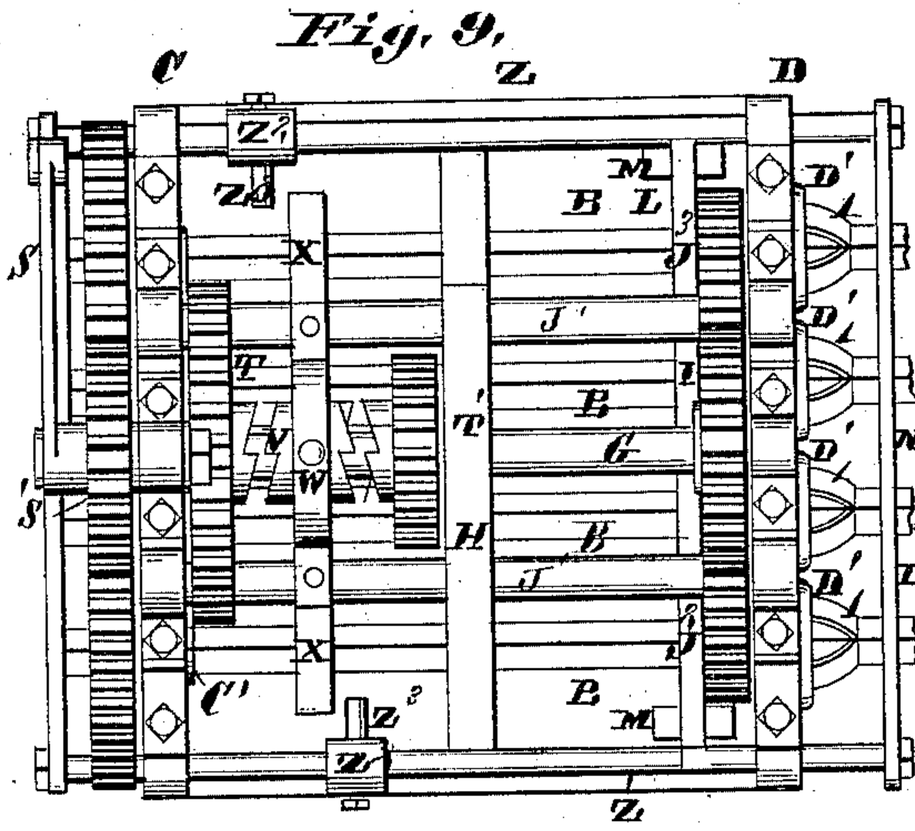


Fig. 11.

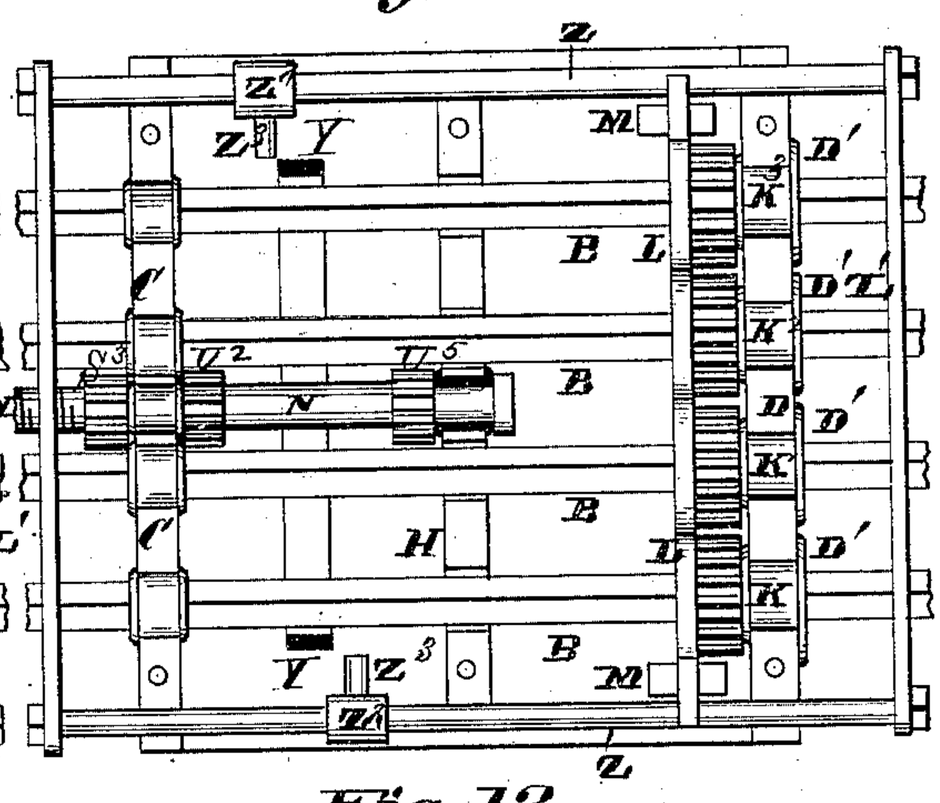


Fig. 12.

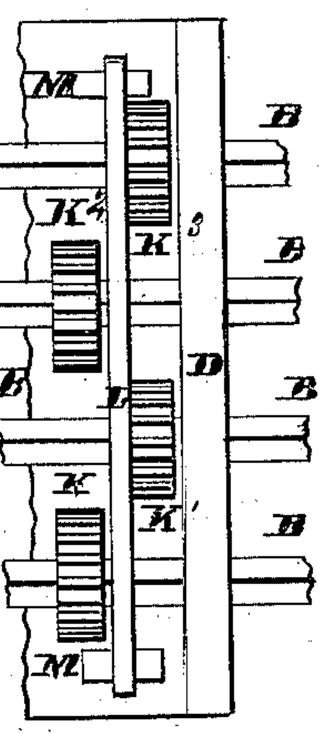


Fig. 13.

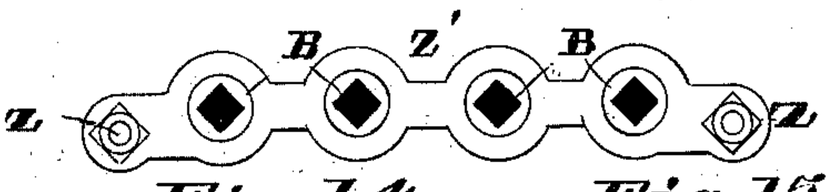


Fig. 14.

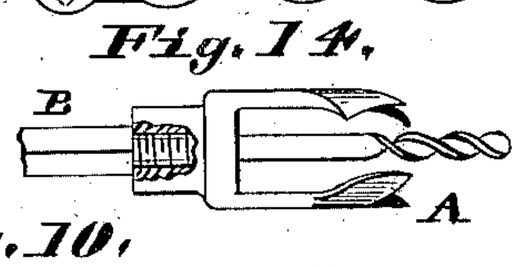


Fig. 15.

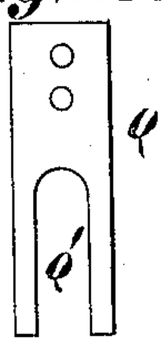


Fig. 16.

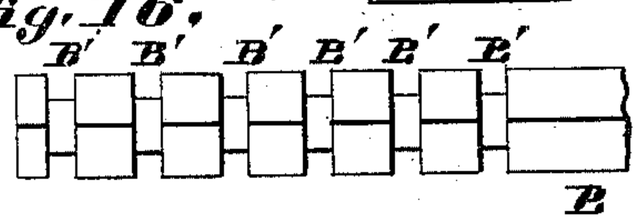


Fig. 10.

Fig. 17.

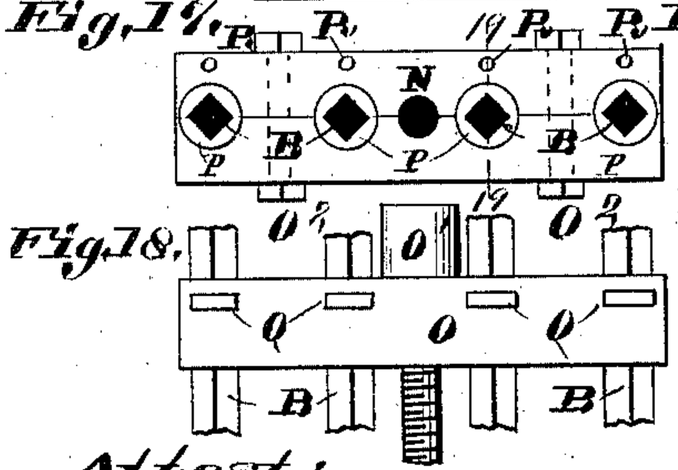


Fig. 18.

Fig. 19.

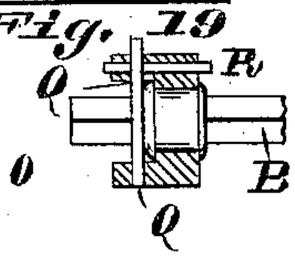


Fig. 20.

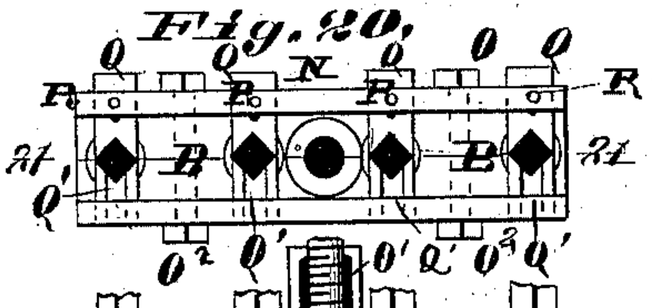
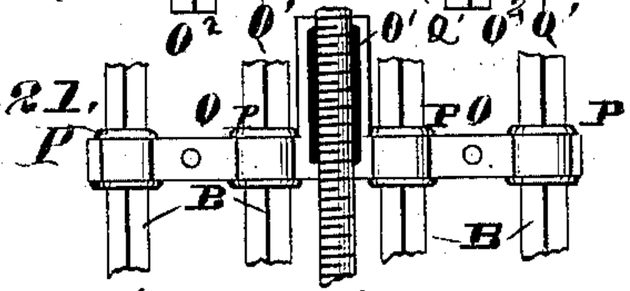


Fig. 21.



Attest:
Charles Pickles,
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Inventors
Andrew Brandenburger
William Tirre 2d
Hermann Barditzky
By Knight Bros
attys

UNITED STATES PATENT OFFICE.

ANDREW BRANDENBURGER, WILLIAM TIRRE, AND HERMANN BARDITZKY,
OF ST. LOUIS, MISSOURI.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 283,858, dated August 28, 1883.

Application filed April 27, 1883. (No model.)

To all whom it may concern:

Be it known that we, ANDREW BRANDENBURGER, WILLIAM TIRRE, and HERMANN BARDITZKY, all of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Mining-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure is a top view. Fig. 2 is a side elevation. Figs. 3, 4, 5, 6, 7, and 8 are respectively sections on lines 3 3, 4 4, 5 5, 6 6, 7 7, and 8 8, Fig. 1. Fig. 9 is an enlarged detail top view. Fig. 10 is an enlarged detail elevation. Fig. 11 is an enlarged section taken on line 11 11, Fig. 10. Fig. 12 is an enlarged detail view. Fig. 13 is a transverse section taken on line 13 13, Fig. 1. Fig. 14 is an enlarged side view of one of the augers. Fig. 15 is an enlarged side view of one of the yokes or notched plates for connecting the auger-carrying shafts or rods to their cross-head. Fig. 16 is an enlarged view of the end of one of the auger-carrying shafts or rods. Fig. 17 is a transverse section, enlarged, taken on line 17 17, Fig. 1, illustrating the manner of connecting the cross-head and auger-carrying shafts or rods. Fig. 18 is a top view of same. Fig. 19 is a section on line 19 19, Fig. 17. Fig. 20 is a transverse section, enlarged, taken on line 20 20, Fig. 1. Fig. 21 is an enlarged transverse horizontal section taken on line 21 21, Fig. 20, and Fig. 22 is a top view of the track on which the machine rests while at work. Of the figures taken on section-lines, Fig. 1, those 8 8, 13 13, and 17 17 are looking toward the rear of the machine, while the others are looking forward or toward the front of the machine.

Our invention relates to a machine for removing dirt from beneath coal-beds, &c., the instruments for cutting or loosening the dirt being augers; and our invention consists in points of novelty hereinafter fully described, and pointed out in the claims.

Referring to the drawings, A represents the augers on the ends of long shafts or rods B, of which there may be any desired number. We have shown four, and which are preferably square or other non-circular shape in cross-section. These shafts have free longitudinal movement through bushing C′ D′, supported by and having journal-bearing in vertical plates C D, (see Figs. 3 and 6,) which are made in two parts secured by bolts C^2 D^2. These plates are connected by the shafts of the gear-wheels, hereinafter described, and rest upon a base, E, having grooves to receive the rails F′ of the track F. (See Fig. 10.) The bushings C′ D′ are held from end movement by suitable flanges, as shown, while they are allowed to turn freely in their bearings. As the auger-carrying shafts or rods fit loosely in the bushings and the bushings turn in their bearings, the shafts can thus have a compound revolving and end movement.

G represents the main driving-shaft, to which any suitable motive power may be applied. It is journaled in the vertical plates C D and in a central vertical plate, H.

Rigidly secured to the forward end of the shaft G is a cog-wheel, I, meshing into wheels J^2 J^3 on shafts J J′, having journal-bearing in the plates, and the wheels J^2 J^3 mesh into wheels K K′ K^2 K^3 on the auger-carrying shafts B, and thus the shafts carrying the augers are turned, each wheel J^2 J^3 driving two of the auger-carrying shafts, (see Fig. 3,) turning them all in the same direction, as shown by the arrows. The wheels K K′ K^2 K^3 fit loosely on the shafts B, and are held from moving on the shafts between the plate D and a bar, L. (See Fig. 11.) The bar has slots L′ (see Fig. 4) to receive the auger-carrying shafts, and is held in place by fitting into the slotted ends of posts M, supported on the base-plate E. The bar can thus be raised for the purpose of sliding any one or more of the wheels K K′ K^2 K^3 out of engagement with the wheels J^2 J^3, so that any one or more of the auger-carrying shafts can remain at rest while the others are at work. (See Fig. 12.) While the auger-carrying shafts are thus revolved or turned continuously they are fed forward and moved backward by the following means:

N represents a screw-threaded feed-rod, having journal-bearing at its forward end, in the vertical plates C H, (see Fig. 11,) and on its other end is a screw-threaded bushing, O′, se-

cured to a cross-head, O. As the feed-rod is turned in opposite directions the cross-head is moved back and forth in a horizontal plane.

Secured and journaled in the cross-head are bushings P, through which the auger-carrying shafts pass, as shown. The shafts fit loosely in these bushings, and are made to move back and forth with the cross-head by being connected therewith by plates Q, with slots Q′ in their lower ends, (see Figs. 15 and 20,) which straddle the shafts, fitting in circumferential grooves B′ in the ends of the shafts. While the shafts are thus moved back and forth with the cross-head they are at the same time allowed to turn freely. There are a number of the grooves B′, so that, if desired, any one of the shafts can be shifted so that its auger will be in advance of the others. When any one of the wheels K K′ K² K³ is thrown out of engagement with the wheels J² J³, its shaft can also be disconnected from the cross-head, so as not to be moved back and forth, by simply removing its plate Q. The plates are held in by transverse pins R. (See Figs. 17, 19, and 20.) The cross-head is preferably made in two parts connected by bolts O². (See Fig. 17.) The bushings P have flanges, so that they will not be moved endwise in the cross-head. The feed-rod can be turned either by hand or through means of the main driving-shaft. It is turned by hand by means of a crank, S, on a short shaft journaled in the upper end of the plate C and carrying a cog-wheel, S′, that meshes into a large wheel, S², fitting loosely on the main driving-shaft G and meshing into a small wheel, S³, on the feed-rod. (See Fig. 7.) Thus by turning the crank forward or backward the cross-head, and consequently the auger-carrying shafts, will be moved back and forth.

The feed-rod may be turned through the main shaft G by means of cog-wheels T T′, loosely secured to the main shaft so as not to be turned by it, meshing into wheels U U′, journaled on studs projecting from the plates C H. (See Figs. 10, 5, and 6.) The wheel U meshes into a small wheel, U², on the feed-rod, (see Fig. 6,) and the wheel U′ meshes into a wheel, U³, on a stud, U⁴, projecting from the plate H, and the wheel U³ meshes into a wheel, U⁵, on the feed-rod. (See Fig. 5.) The wheels T T′ are loose upon the main shaft, but either one may be made to turn with it by means of a sliding clutch, V, (see Figs. 1, 2, 5, and 9,) which has feather-and-groove connection with the main shaft, so as to be turned by it. Thus when the clutch is in engagement with the wheel T′ the augers are fed forward, and when the clutch is in engagement with the wheel T the augers are moved back, turning of course all the time. The clutch has an annular groove in which fits a ring, as usual, having projecting pins W, (see Fig. 5,) fitting in a yoke, X′, of a swinging frame, X, pivoted at X² to the upper ends of arms Y, projecting upward from the base-plate E. (See Fig. 5.) The frame may be moved to change the clutch by a hand-lever, X³, or it may be moved automatically as follows:

Z represent horizontal rods (see Fig. 1) fitting loosely in the plates C D, so as to have free end movement. They are connected by cross-plates Z′, against the forward one of which the augers strike when the shafts are moving backward, moving the rods Z back, and against the other of which the cross-head O strikes when the auger-carrying shafts have about reached their extreme forward movement, moving the rods Z forward. Z² represent collars adjustably secured to the rods Z, and having inwardly-projecting pins Z³, (see Figs. 1 and 5,) which strike the frame X below the pivot-point on opposite sides as the rods are moved backward and forward, as described, to automatically change the clutch, as mentioned.

The machine is kept from moving laterally on the track by pins F², fitting in holes in the track. (See Figs. 1 and 2.) 1 represents scrapers secured to the bushings D′, so as to turn with them, and bearing upon the four sides of the auger-carrying shaft, as shown, for the purpose of cleaning the dirt off the shaft at each backward movement thereof.

Belt instead of gearing connection may be made between the shaft G and rod N.

We claim as our invention—

1. In a mining-machine, the combination of auger-carrying shafts B, a fixed head, gear-wheels K K′ K² K³, to slide on the shafts, slotted posts M, and a removable bar, L, to retain the gear-wheels in or out of mesh, substantially as and for the purpose set forth.

2. In a mining-machine, the combination of the non-circular auger-carrying shafts passing through suitable bushings, and the scrapers secured to the bushing and bearing on the shafts, for the purpose set forth.

3. In a mining-machine, the combination of auger-carrying shafts B, bushings D′, journaled in plate D, and scrapers 1, secured to the bushing and bearing on the shafts, substantially as shown and described, for the purpose set forth.

4. In a mining-machine, the combination of cross-head at the rear of the machine, feed-screw for adjusting the cross-head, and auger-carrying shaft having a series of grooves, B, secured to and adjustable in the cross-head, as set forth.

5. In a mining-machine, the combination of cross-head O, having screw-threaded bushing O′, feed-screw N, for adjusting the cross-head, auger-carrying shafts B, each having a series of circumferential grooves, B′, and plates Q, securing the shafts to the cross-head, as set forth.

6. In a mining-machine, the combination of cross-head O, auger-carrying shafts B, secured thereto to turn therein, feed-rod N, adjustable in the cross-head, and provided with pinions U² and U⁵, and turning in suitable supports at

the forward end, main driving-shaft G, having cog-wheels T and T′, adjustable clutch intermediate of said cog-wheels, to connect either cog-wheel to the main driving shaft, and suitable sets of gearing connecting the pinions to their respective cog-wheels, as set forth.

7. In a mining-machine, the combination of cross-head, auger-carrying shafts having suitable projections, and feed-rod connected to the cross-head, suitable driving and retracting mechanism connected to said feed-rod, a clutch-shifting frame, and a sliding frame having suitable projections to move the shifting frame, which is struck by the projections on the shafts, as set forth.

8. In a mining-machine, the auger-carrying shafts B, cross-head O, feed-rod N, drive-shaft G, connected to the feed-rod by suitable gearing, clutch V, frame X, arms Y, to which the frame is pivoted, rods Z, connected by plates Z′, and collars Z^2, secured to the rods Z, and having inwardly-projecting pins Z^3, all substantially as and for the purpose set forth.

ANDREW BRANDENBURGER.
WILLIAM TIRRE.
HERMANN BARDITZKY.

In presence of—
SAML. KNIGHT,
GEO. H. KNIGHT.