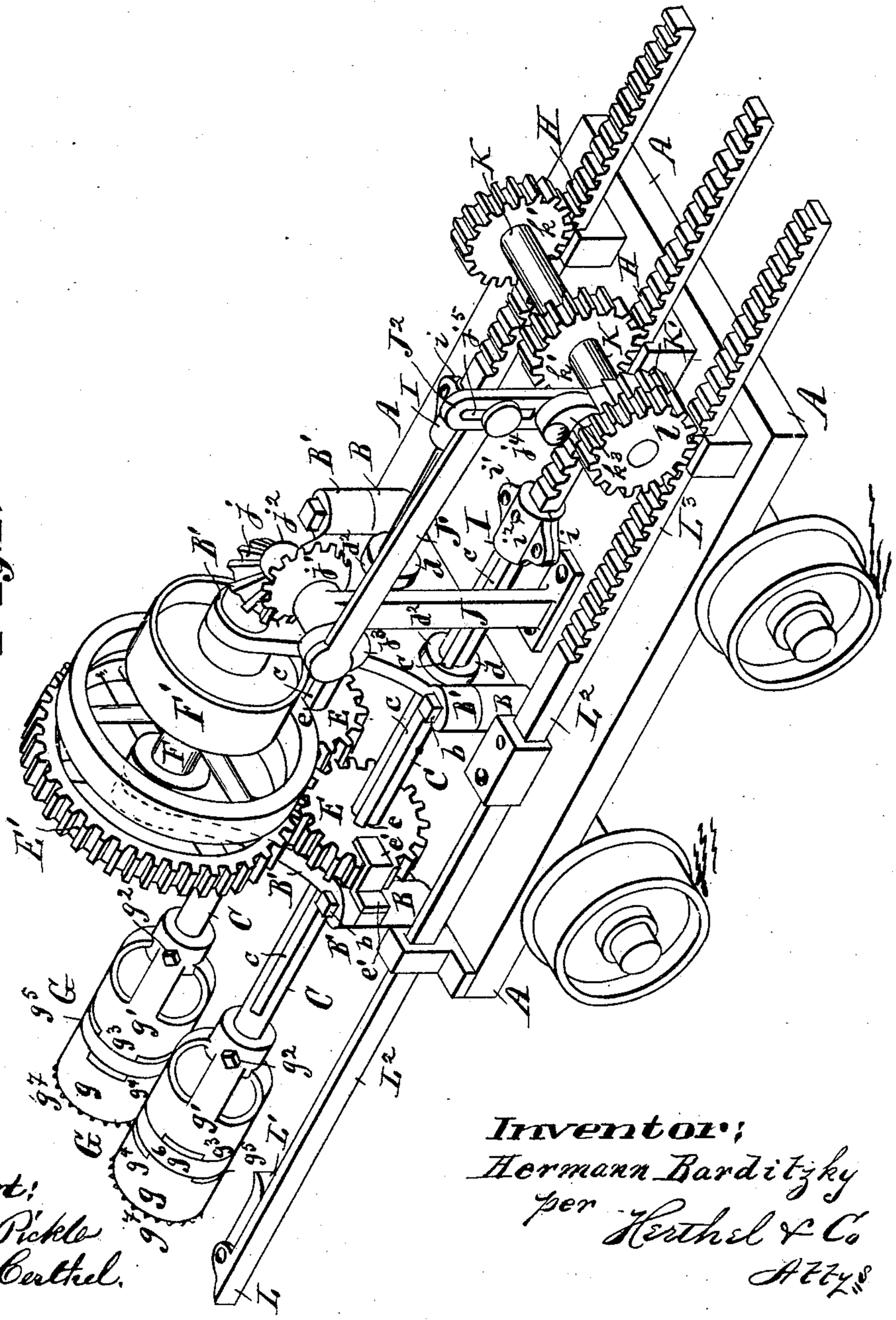
(No Model.) 2 Sheets—Sheet 1.

H. BARDITZKY.

MINING MACHINE.

No. 280,781. Patented July 10, 1883.

Fig. 1.



Attest:
Charles Pickle
John W. Herthel.

Inventor:
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per Herthel & Co
Attys

(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

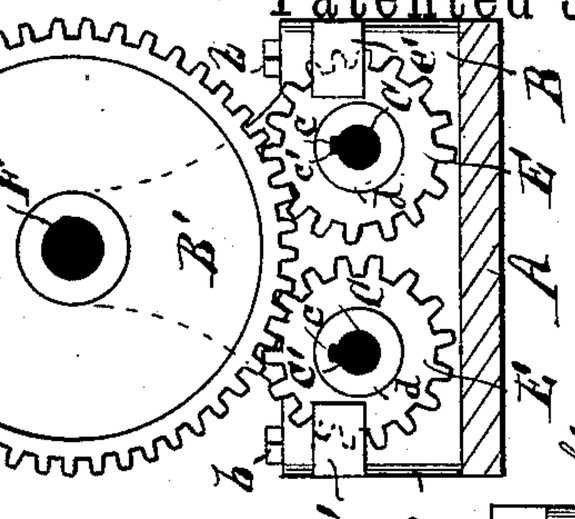


Fig. 2.

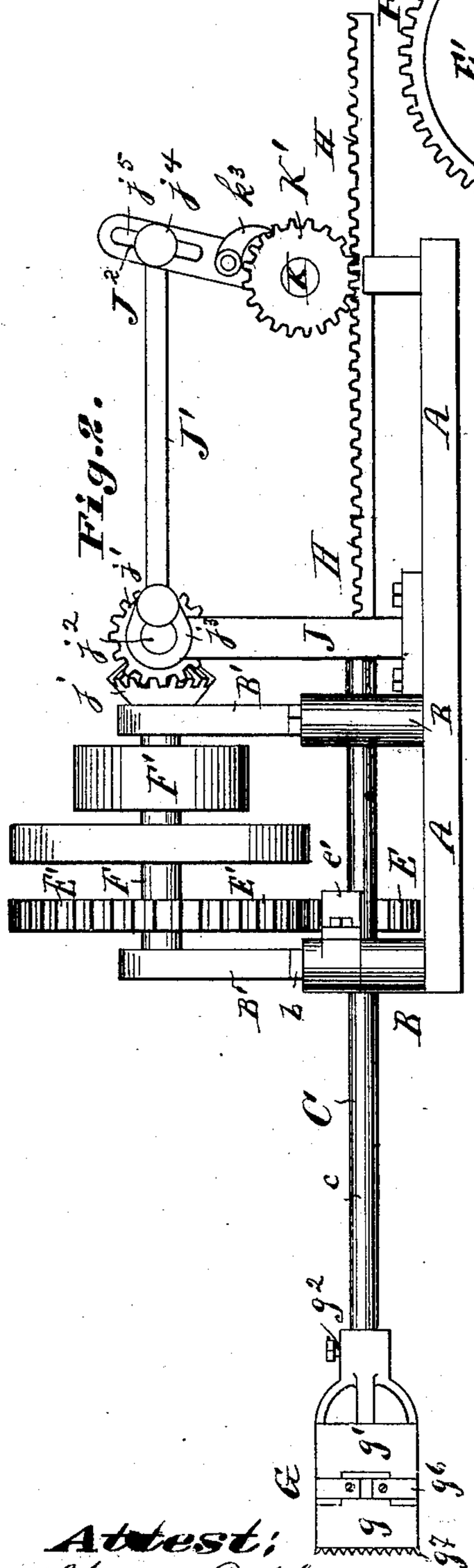


Fig. 5.

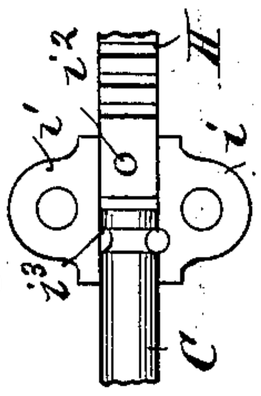


Fig. 6.

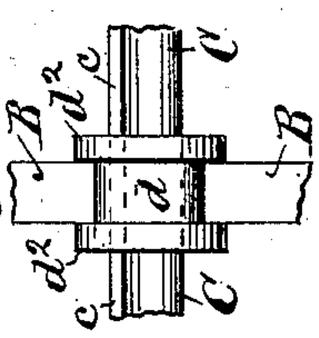


Fig. 7.

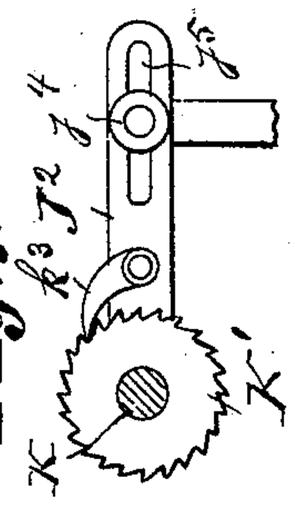


Fig. 8.

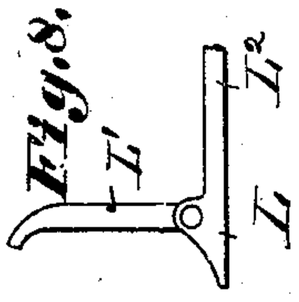
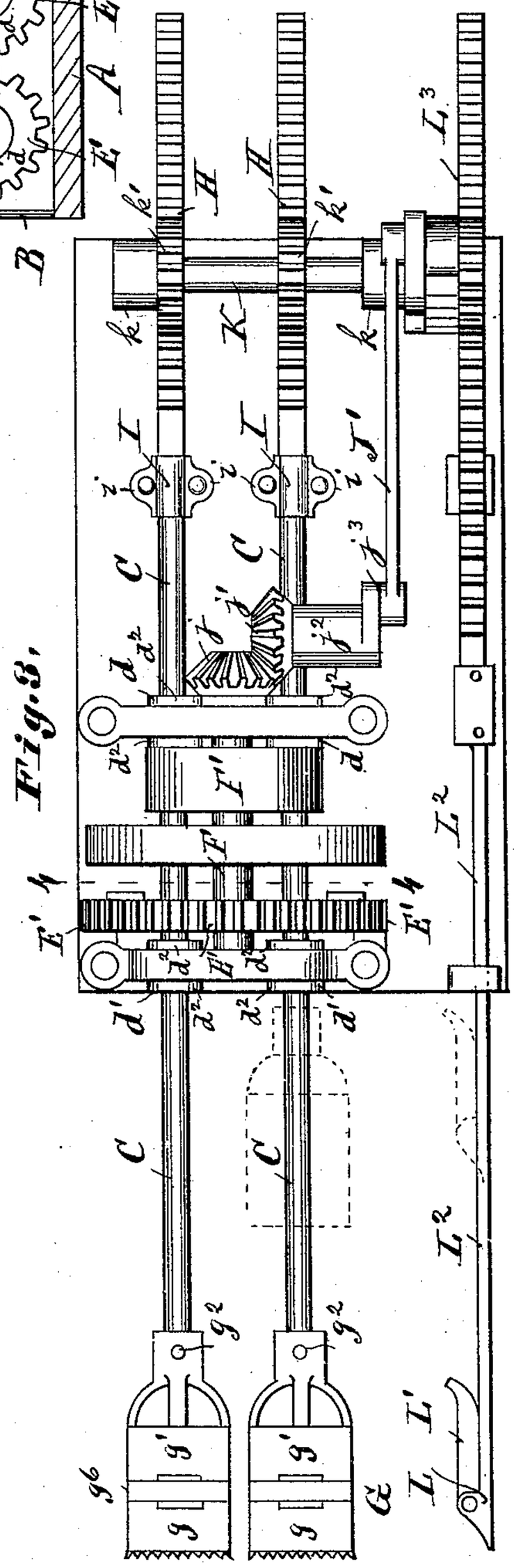


Fig. 3.



Attest;
Charles Pickles
John W. Herthel.

Inventor;
Hermann Barditzky
per Herthel & Co

UNITED STATES PATENT OFFICE.

HERMANN BARDITZKY, OF ST. LOUIS, MISSOURI, ASSIGNOR OF TWO-THIRDS TO ANDREW BRANDENBURGER AND WILLIAM TIRRE, OF SAME PLACE.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 280,781, dated July 10, 1883.

Application filed February 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, HERMANN BARDITZKY, a subject of the King of Prussia, and a resident of St. Louis and State of Missouri, have invented a new and useful Improved Mining-Machine, of which the following is a specification.

My invention relates to improvements in mining-machines designed more especially to facilitate the laborious operation of undercutting, boring, drilling, and detaching coal, clay, rocks, &c.; hence is serviceable for working in coal and clay mines and banks, quarries, and for tunneling purposes. I accomplish the said objects by the mechanism illustrated in the accompanying drawings, in which—

Sheet I: Figure 1 is a perspective view of the complete machine as ready for application and use. Sheet II: Fig. 2 is a side elevation. Fig. 3 is a top plan, the dotted lines representing the respective positions any of the boring-tools, also pick and extractor-tool, can be made to assume when not to be used. Fig. 4 is a transverse section on line 4 4 of Fig. 3. Fig. 5 is a detail view showing the coupling-connection between one end of a shaft and its rack-bar. Fig. 6 is a detail view showing a shaft with its feather passing through a collar fitted by its flanges to revolve in the bearing of the upright frame. Fig. 7 is a detail of the feed mechanism that drives the pinions on all the rack-bars, said figure showing adjustable parts to suit the pawl with relation to the driving ratchet-wheel. Fig. 8 is a detail of the pick with its pivoted jaw or extractor.

Similar letters of reference refer to the same parts throughout the several views.

A represents the bed-plate of the machine, upon which the operating parts are mounted.

As shown in Fig. 1, the entire machine can be made portable by providing same with trucks or wheels in the manner usual.

The respective standards are composed of two parts—the lower section, B, and the top section, B′. (See Figs. 1, 2, 3, 4, 6.)

b represents the bolt-fastening through the sleeve-corners of the two sections B B′, to unite the standard parts top of each other, as indicated.

C are the shafts, of which there can be any number, all similarly arranged and operating alike. Each shaft is capable of being revolved, and at the same time has a forward push motion, and the manner and means to fit said shafts to pass through the respective opposite collars *d d′* in the standards are as follows: Each shaft has extending its entire length a feather, *c*. This fits in a corresponding-shaped groove, *c′*, made in the two collars, as shown in Figs. 1, 4, 6. Further, each collar is placed in the bearing between the two sectional parts of a standard, so that the collars can freely revolve at the same time. The opposite side flanges at d^2 belonging to each collar retain the same in place without interfering with its proper rotation. (See Fig. 6.) The feather-joint of each shaft with the groove of its collar permits the shaft, when revolved, to revolve the collars with it; also, the said joint further permits the shaft to have a forward and backward or reciprocating motion.

E are the pinions—one for each shaft, to impart revolution to same. The shaft also passes through the pinion F, which similarly has a groove at *e* to fit the feather *c* of the shaft, as shown in Figs. 1, 4. Otherwise the pinions are kept in place alongside the standards by an additional bracket-support, *e′*, so as not to interfere with the proper rotation of the pinion. (See Figs. 1, 3.) The joint, therefore, between the pinion and its shaft is such as also to permit the shaft to be revolved and be capable of a forward motion when the shaft is to be fed forward or be withdrawn, as the case may require.

E′ is the main driving-gear, fitted to mesh with both pinions to impart rotation to each. (See Figs. 1, 2, 3, 4.) This driving-gear-wheel is mounted to turn with the power-shaft F, that has its ends journaled near top of the uprights or standards.

F′ is the bell-pulley on the main shaft, from which, by belting connection to power source, the operation of all the parts takes place.

G represents the boring-tool or cutters. (See Figs. 1, 2, 3.)

The several shafts C, together with their boring-tools, can therefore be freely revolved to bore, drill, or "hole" the coal, clay, or material; but, further, it is my object at the

same time, in boring or "holing" the material, to impart to each shaft, or all combined, as desired, a forward thrust or push motion, and this I accomplish by the mechanism as follows:

H H are the respective rack-bars, which I couple to each shaft. The coupling I, to unite the end of the shaft to its rack-bar, is such as to freely permit not only the shaft to revolve, but also permits both shaft and its rack-bar to have the horizontal forward feed motion just stated to thrust the boring-tool forward while in the act of boring or holing the material. This coupling I is in the nature of a sleeve made in two like halves, with flanges i i'. (See Figs. 1, 2, 3, 5.) At one end the coupling presents an opening fitted for the insertion of the end of the rack-bar, and a pin, i^2, is passed through all the parts to secure the rack-bar to the coupling. (See Figs. 1, 5.) The end of the shaft is likewise placed between the coupling-halves, these being fitted with an annular groove or recess, i^3, to receive the head of the shaft, which is thus coupled, so that it can revolve, yet follow up the movements imparted to the rack-bar. (See Fig. 5.) Finally, the two coupling-halves are placed top of each other, and their sleeves are firmly bolted together, as indicated. All the rack-bars are thus coupled to their shafts; hence when the former are withdrawn or moved backward the same motion can be imparted to the shaft. This coupling-connection permits the operator to disengage any or all the rack-bars from their shafts, to dispense entirely with any particular rack-bar, or to operate a shaft and borer-tool alone.

The mechanism to operate the rack-bars is as follows: The power-shaft at one end carries a bevel-gear, j, meshing with the similar bevel-gear j', mounted on a shaft, j^2, which is transversely arranged and turning in proper bearings top of a side standard, J, that is bolted upright to the bed-plate of the machine. (See Figs. 1, 2.) The opposite end of the transverse shaft j^2 carries a disk-wheel, j^3, to which is eccentrically pivoted one end of a pitman, J'. The other end of pitman, by means of a set-screw, j^4, passing through a slot, j^5, is adjustably secured to an arm, J^2, that has its lower end pivoted to the bed-plate or journaled to the rear shaft, K, as indicated. The rear shaft, K, is also arranged transversely, and turns in proper journal-boxes of the side frames or standards, k k. (See Fig. 3.) To this shaft K is rigidly secured the respective pinions k' k' to mesh with the respective rack-bars. (See Figs. 1, 2, 3.) Also, on the shaft K is the driving ratchet-wheel K', in engagement with which is the pawl k^3, that is shown pivoted to the vibratory arm J^2. (See Figs. 1, 2, 3, 7.) Thus the intermittent circular motion of the driving ratchet-wheel K', from the vibratory motion of the arm J^2, carrying the pawl k^3, revolves the rear shaft, K, with its pinions, and imparts a horizontal feed or "push" motion to each rack-bar.

It will be noted that the "feed motion" on the part of any or all the racks does not interfere with the revolving of the tools, and that as each tool holes or bores into the material this forward feed motion on the part of the rack-bars is communicated to its proper shaft and tool, and decisively assists the latter to bore its way into the material.

In connection with the revolving rear shaft I have provided an automatic-acting pry or pick and extractor to enter the coal, clay, or material alongside of the "holings," for purposes of loosening the walls between the places where the holes are bored, breaking the material, also extracting the broken chunks or loosened portions.

L represents the pick, and pivoted to one side thereof is a jaw or extracter, L'. (See Figs. 1, 3, 8.) As shown, the pick is the sharpened point of a long rod or bar, L^2, which passes through guide-boxes secured to the bed-plate. The rear end of the bar L^2 can be made a rack-bar or coupled to one, (see L^3 in Figs. 1, 3.) This rack-bar L^3 is operated by the farther pinion l on the extreme end of the rear shaft, K. (See Figs. 1, 3.) The rack-bar L^3, being thus capable of a forward thrust motion, forces the pick, with its extractor, to enter the material. More specifically stated, in thrusting the pick forward, its hinged jaw or extractor L' is forced to lie alongside of the rod in the position shown in Figs. 1, 3. The pick and extractor in this condition penetrate the material; but on withdrawing the pick its jaw or extractor L' is moved outward, assuming the position shown in Fig. 8, taking hold of the material and extracting the broken portion thereof in the very act of withdrawing the complete instrument. At any stage of the work the pick and extractor can be used, and when not to be used is simply withdrawn to the rear or removed from the machine. Similarly, any shaft carrying a boring-tool can be withdrawn or made to assume the position shown in dotted lines in Fig. 3 by uncoupling the joint with its rack-bar and removing same out of gear.

The complete operation of the machine can be stated as follows: The machine by its trucks can be brought to face the coal, clay, or material to be mined, as desired. When in proper position, the power source operates all the shafts carrying boring-tools simultaneously, or such of these parts as it may be desired to operate. At same time the feed mechanism thrusts the tools forward into the work or material. It is this forward thrust, push, or impact motion of each shaft, acting simultaneously with their revolving boring-tools, that bores and otherwise forms the hole or holings in the material, forming and dividing walls in same, preparatory to loosening and removing the "holed" portions. The loose gritty sand or pulverized portion of the material can pass through the hollow of the boring-tool, falling

out immediately behind same; or the said pulverized rock, coal, &c., removed by the cutting-edges can be passed out at the rear end of the machine by simply making the shafts (that carry the boring-tools) hollow their entire length and closing the tool at its junction with the end of its shaft. The same forward thrust motion being imparted to the pick forces it to enter the material and loosen and break same, and on the return-stroke the said broken material is extracted by the "extractor" or hinged jaw of the pick.

What I claim is—

1. In a mining-machine, the combination of parts—viz., the sectional standards B B′, having collar *d*, made with a groove, *c*, and flanges d^2, the shaft C, having feather *c*, said shaft carrying a boring-tool, G, the power-shaft F, the bevel-gear *j*, the bevel-gear *j′* on a separately-supported shaft, j^2, having eccentric connection to pitman J′, operating a vibrating arm, J^2, carrying pawl k^3, the driving ratchet-wheel K′, mounted on shaft K, having pinion *k′*, meshing with rack-bar H, coupled to same shaft carrying the tool, as described, by means whereof the said shaft or shaft and tool and rack-bar can have a forward or thrust motion, as and for the purposes set forth.

2. In a mining-machine, the combination of parts—viz., the sectional standards B B′, the collar *d*, having groove *c* and flanges d^2, the feed-shaft C, having feather *c*, the boring-tool G, the pinion E, having groove *e*, the main driving-gear E′, power-shaft F, bevel-gear *j*, the bevel-gear *j′* on a separately-supported shaft, j^2, having eccentric connection to pitman J′, operating an arm, J^2, carrying pawl k^3, the driving ratchet-wheel K′ on shaft K, having the pinion *k′*, meshing with rack-bar H, coupled to same shaft carrying the boring-tool, by means whereof the said shaft or its tool can be revolved and at same time feed forward, in the manner and for the purposes set forth.

3. In a mining-machine, in combination with a revolving shaft carrying a pinion, *l*, the rack-bar L^3, the rod L^2, carrying pick L, having pivoted jaw or extractor L′, to operate substantially as and for the purposes set forth.

In testimony of said invention I have hereunto set my hand.

HERMANN BARDITZKY.

Witnesses:

WILLIAM W. HERTHEL,

ANDREW BRANDENBURGER.