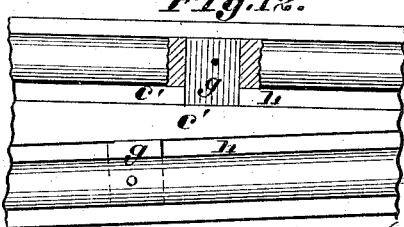
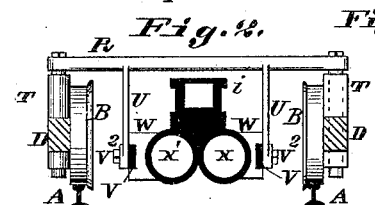
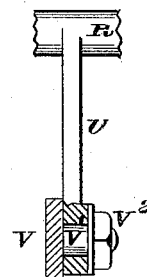
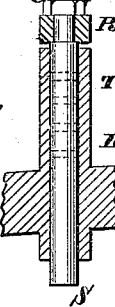
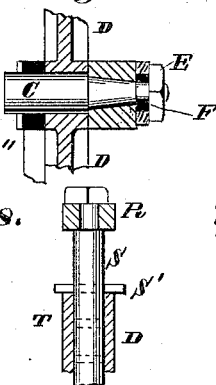
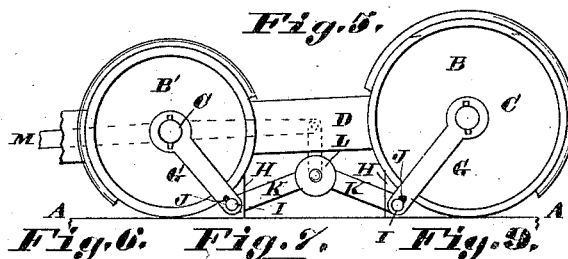
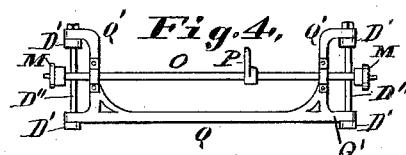
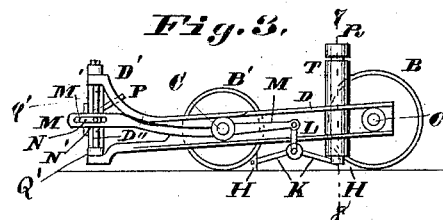


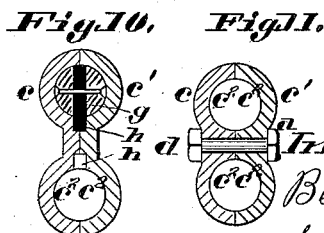
3 Sheets—Sheet 1.


No. 307,514.

Patented Nov. 4, 1884.



Attest:
J^m S. Lacyd.
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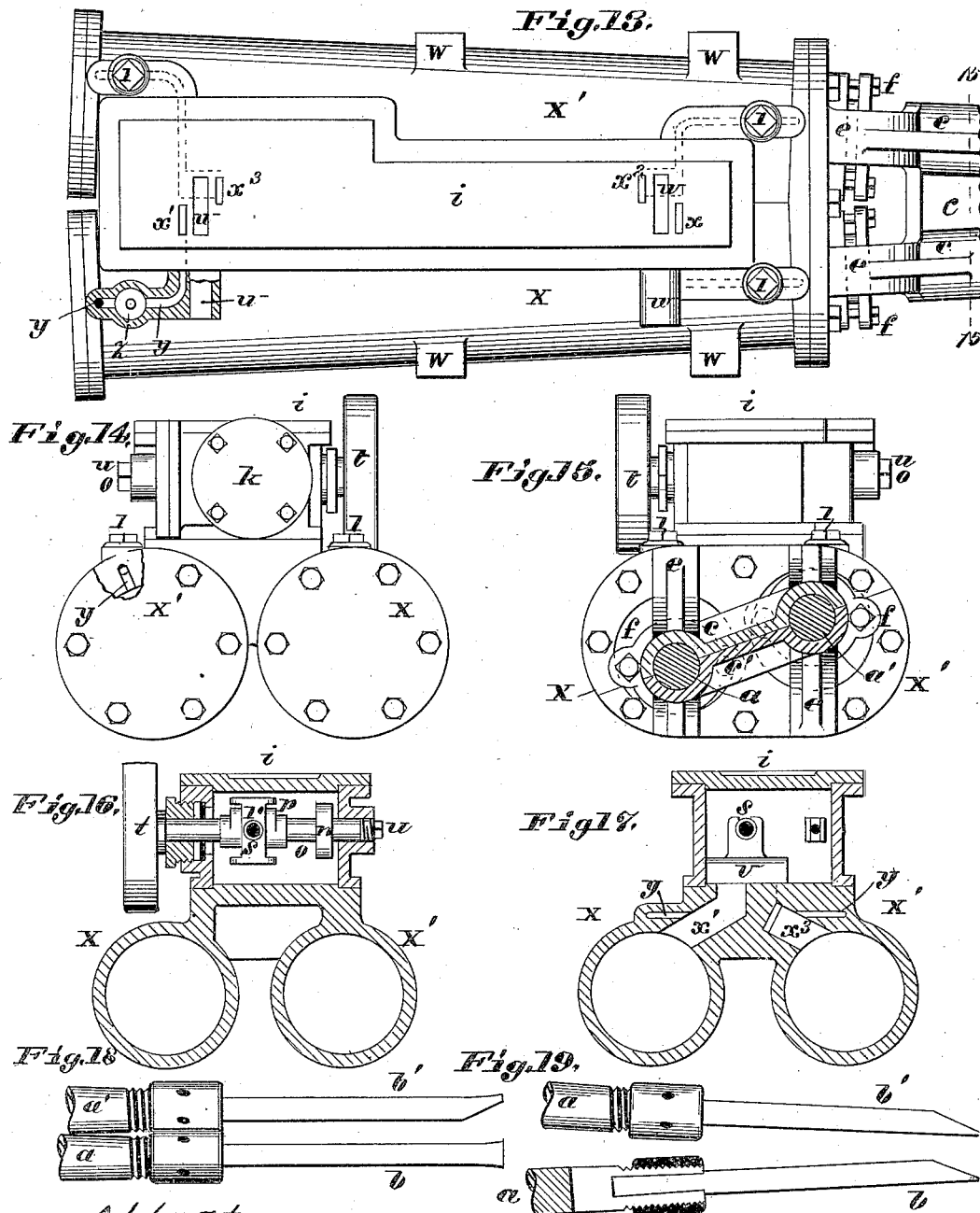
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B. YOCH.

MINING MACHINE.

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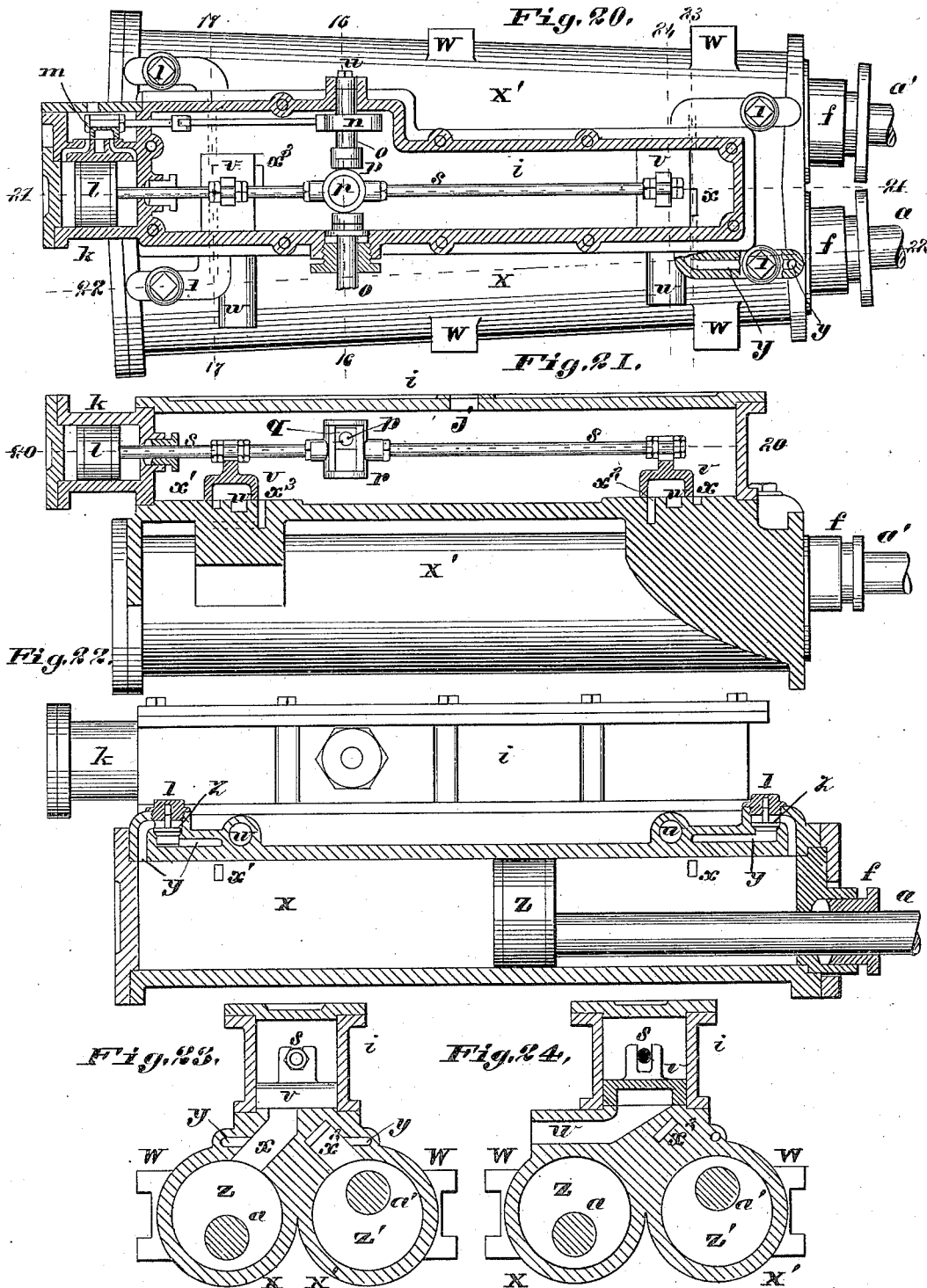
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UNITED STATES PATENT OFFICE.

BENHARD YOCH, OF ST. LOUIS, MISSOURI.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 307,514, dated November 4, 1884.

Application filed February 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, BENHARD YOCH, 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.

My invention relates to an engine for use in a mine for channeling and undercutting coal.

The scope of the invention is set forth in the claims.

Figure 1 is a plan of the machine. Fig. 2 is a transverse section at 2 2, Fig. 1. Fig. 3 is a detail side view. Fig. 4 is a detail rear view. Fig. 5 is an enlarged detail side view illustrating the construction of the brake. Fig. 6 is a detail vertical section (enlarged) showing the connection of the brake mechanism and one of the axles. Fig. 7 is an enlarged vertical section showing the connection between the main frame and the engine-supporting frame, the latter being shown in its working position, the plane of the section being indicated at 7 8, Fig. 3; and Fig. 8 is a detail section on same plane, showing the engine-supporting frame in its elevated position for convenience in moving the machine from place to place. Fig. 9 is an enlarged detail showing one of the hanger-arms with the trunnion which supports the cylinders upon one side, the construction allowing the oscillatory movement of the engine-cylinders in a vertical plane. Fig. 10 is an enlarged transverse section at 10 10, Fig. 1. Fig. 11 is an enlarged transverse section at 11 11, Fig. 1. Fig. 12 is an enlarged detail top view of the guide-frame of the piston-rods, part being in section. The scale of the following figures is larger than that of Figs. 1, 2, 3, and 4. Fig. 13 is a plan of the engine, part being in section. Fig. 14 is a rear view of the engine, part of one of the heads being broken away. Fig. 15 is a vertical section at 15 15, Fig. 13, showing a part front view of the engine. Fig. 16 is a transverse section at 16 16, Fig. 20. Fig. 17 is a transverse section at 17 17, Fig. 20. Fig. 18 is a side view of the two picks, and Fig. 19 is a top view of the same, illustrating the relative positions at the point of striking the

coal, (in fact the picks do not strike simultaneously, but alternately, so that these figures do not show a possible position of the picks, because when passing each other they would be farther apart than shown, owing to the oblique relative positions of the piston-rods.) Fig. 20 is a horizontal section at 20 20, Fig. 21. Fig. 21 is a vertical longitudinal section at 21 21, Fig. 20. Fig. 22 is a vertical longitudinal section at 22 22, Fig. 20. Fig. 23 is a transverse section at 23 23, Fig. 20. Fig. 24 is a transverse section at 24 24, Fig. 20.

A A are track-rails, (see Fig. 2,) upon which the machine is supported when at work by means of front wheels, B, and rear wheels, B'. The wheels turn on arbors or axles C, fixed in the side bars D. The arbors C of wheels B' are shown extending through the side bars, and secured by a nut, E, bearing against a thick washer or sleeve, F, that bears against the side of the side bar. The arbors of wheels B B' form the bearings upon which hang hanger-arms G, to whose lower ends are connected the triangular brake-blocks H, which blocks serve to hold the machine in place when at work, acting as chocks to the wheels by insertion into the angles between the wheels and the track. The brake-blocks or chocks H are connected to the arms by studs I, that extend through slots J in the arms G, so as to allow the blocks to fall out of contact with the periphery of the wheels when it is desired to free the wheels for the movement of the machine.

K are toggle-links, by which the brake-blocks upon each side are connected to a hanger-link, L, common to both. I show the link L weighted so that its weight upon the toggle arms or links K may force the brake-blocks apart into the space between the wheels and the rail. The upper end of the link L is connected to the front end of the lever M. This lever is shown fulcrumed upon the arbor C of wheel B'. The rear end of the lever has a longitudinal slot, M', that receives the pin N' of a crank, N. The cranks N are at each end of a rock-shaft, O, that is turned in its bearings by a handle, P. When the shaft O is so turned that the cranks N point downward, the rear end of the lever M is depressed and the brakes H are drawn upward from the rails A,

and are carried by gravity out of contact with the wheels. On the other hand, when the cranks N are turned upward, the brakes descend and are forced by the weight of the hanger L and arms K beneath the wheels.

To prevent the brake-blocks H from turning on their studs I, I make the studs angular, so that they will not turn in the slots J; but other means may be used to prevent the oscillation of the brake-blocks upon the connecting-studs—such as duplication of the studs and duplication or elongation of the slots.

The shaft O has bearings upon the cross-bar Q of the carriage-frame. The bar Q is forked at the ends Q', and the fork ends are jointed by pintle-pins D'' to the forked rear end, D', of the side bars D. The construction is such that the side bars have independent longitudinal movement to allow the engine to be turned to swing the picks to the right or the left, while the forking of the ends of the bars gives stability to the frame, so as to preserve the verticality of the bars and integrity of the frame as a support for the engine. The fore ends of the side bars D are secured together by the bridge-bar R. The bar R is connected to the side bars by a vertically-descending pin, S, at each end. These pins S fit freely in sockets T in the side bars. The construction is such that the described longitudinal movement of the side bars is not interfered with. The pins S are drawn upward in the sockets T when the engine is lifted in the frame preparatory to moving the machine from place to place. When the pin S is raised in the socket, it may be held up by a traverse-pin, S', passing through the pin S and bearing upon the top of the socket T. (See Fig. 8.) U are hanger-arms which depend from the bridge-bar R. To the lower ends of the hanger-arms are connected the side bars, V, on which the engine is supported. The connection between the side bars V and the hanger-arms is made by means of a screw-stud, V', and nut V''. (See Fig. 9.) The construction is such that the engine can be oscillated upon the studs V' to raise or lower the picks. The side bars V are embraced by brackets W, (see Figs. 23 and 24,) extending from the sides of the engine-cylinders X and X', and the bars are secured to the brackets by bridle-plates W' and screws W''. The cylinders can be adjusted longitudinally upon the bars V, so as to balance them as may be desired upon the trunnion-pins V'.

Y is a bow-formed handle connected to the side bars V by sleeves Y', that are capable of sliding on said bars to adjust the position of the handle, which is fixed in position by set-screws Y''. The engine-cylinders are not parallel with each other, but are so inclined that the picks strike near the same place upon the coal, (see Figs. 1, 13, 18, and 19,) the axes of the cylinders being farther apart at the rear end than at the front end. The pistons are

seen at Z Z', the piston-rods at *a* and *a'*. The piston-rod *a* of the piston Z is set into the piston below the center of the piston, and the other piston-rod, *a'*, is set in above the center of its piston Z', and as the pistons are on the same level it will be seen that the pick *b* upon the rod *a* will strike a point below the level of the point struck by the other drill-pick, *b'*.

The points of impingement of the picks have the same relative positions as described in the specification to my application for patent, Serial No. 77,780. In the said application the picks strike simultaneously, both tools being on one head, attached to parallel piston-rods; but in my present invention there is no attachment of one rod to the other to interfere with their independent longitudinal movement. The parts of the piston-rods outside the cylinders work in a guide-frame, *c c'*, the same being made with an upper member, *c*, having two semi-cylindrical recesses, *c''*, and a lower member, *c'*, of similar form. The members are connected together by bolts *d*, and are secured to the cylinder-heads by brackets *e*, spanning the stuffing-boxes *f*. (See Figs. 1 and 13.)

To prevent the turning of the piston-rods, I secure in them a key, *g*, that works in groove *h* in the guide-frame, the grooves being made partly in each member *c* and *c'*. (See Figs. 10 and 12.)

The two cylinders X X' are shown as cast in one piece; but this is not material.

To complete the machine, the following means for operating the engine are provided: *i* is the valve-chest, into which the compressed air or steam enters at *j*, (or any other suitable point.) The slide-valves are actuated by a valve-engine. This has a cylinder, *k*, in which works a piston, *l*.

This engine has ordinary steam or air ports and usual slide-valve, *m*, that is worked by an eccentric, *n*, on the shaft *o*. The shaft *o* has a crank, *p*, passing through a journal-block, *q*, that works vertically in a yoke, *r*, that is upon the piston-rod *s* of the valve-engine, said rod *s* forming the valve-stem of the main engine. The crank-shaft *o* carries at one end a fly-wheel, *t*, and at the other a key-stud, *u*, by which the shaft may be turned in starting the engine.

Upon the piston rod and stem *s* are two D-valves, *v* and *v'*, similar in construction, the one being near one end of the valve-chest and the other near the other end.

w w are the exhaust-passages, respectively from the front and rear ends of both cylinders.

x is the front valve-port of the cylinder X, and *x'* the rear valve-port of cylinder X. *x''* is the front valve-port of cylinder X', and *x'''* the rear valve-port of cylinder X'.

The valve-ports *x x' x'' x'''* each communicate with a passage, *y*, extending to the end of the cylinder, so that when either of these ports is in communication with the interior of the valve-chest the compressed air or steam, as

the case may be, runs through the passage *y* to the end of the cylinder-chamber.

To prevent the escape of the cushioning air through the passage *y* an upwardly-opening check-valve, *z*, is placed in the passage, which is opened by pressure from beneath of air from the port *x x'*, &c., but which closes by gravity and prevents the escape of air from the end of the cylinder-chamber to said port. 1 are screw-plugs, by which access is had to the valves *z*.

I claim—

1. In a mining-machine, the combination, with an engine, of the side bars having vertical sockets at their fore ends, pins adjustable in said sockets, each having holes to receive a transverse pin resting on the top of the socket, a transverse bridge-bar supported on said pins having depending bars, and side bars supporting the engine, having studs journaled in the depending bars, as set forth.

2. In a mining-machine, the combination, with an engine, of the side bars having vertical sockets at their fore ends, transverse bar jointed to their rear ends, pins mounted in said sockets, transverse bridge-bar pivoted to the tops of the pins having depending bars, and side bars secured to engine, having studs journaled in the depending bars, as set forth.

3. In a mining-machine, the combination, with an engine, of the side bars, *D*, having vertical sockets at their fore ends, upwardly and downwardly extending rear ends, *D'*, cross-bar *Q*, having upwardly and horizontally extending outer ends, *Q'*, pins *D'*, pivoting the ends of the side bars and cross-bar together, vertical pins *S*, mounted in the sockets, transverse bridge-bar *R*, having depending bars *U*, and engine side bars, *V*, having studs secured to the depending bars, as set forth.

4. In a mining-machine, the combination of two pistons working in cylinders placed side by side with piston-rods above the center of one piston and below the center of the other piston, the said rods carrying drill-picks, as set forth.

5. In a mining-machine, the combination of two cylinders and pick-rod-supporting frame mounted all on the same level, and having their passages inclined toward each other from rear to forward ends, and pistons having pick-rods mounted one above and the other beneath the center of the pistons, as set forth.

BENHARD YOCH.

Witnesses:

SAML. KNIGHT,
GEO. H. KNIGHT.