

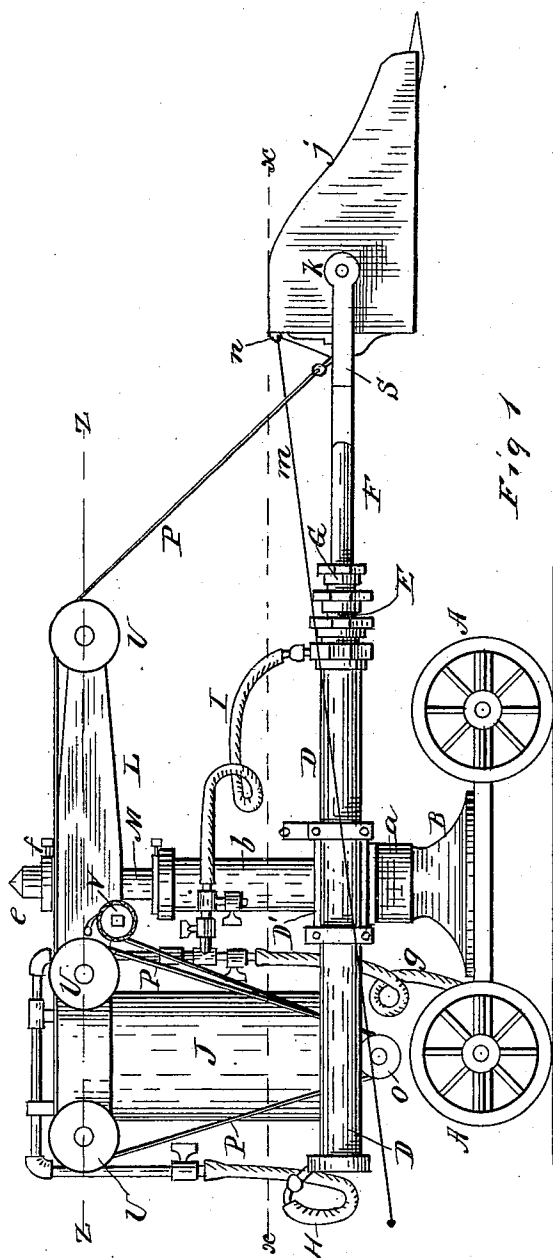
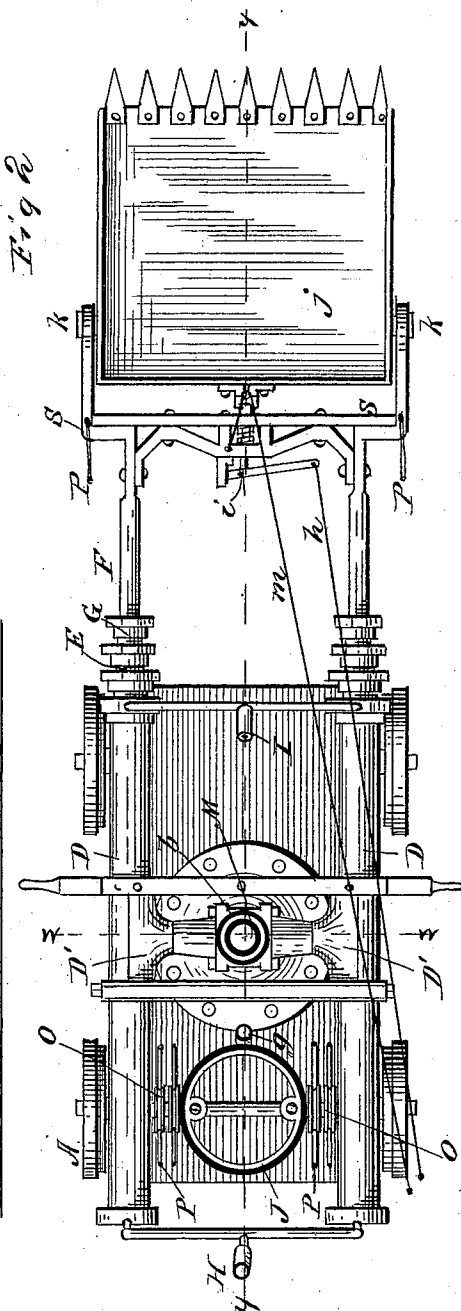
(No Model.)

3 Sheets—Sheet 1.

G. D. WHITCOMB.
POWER MINING SHOVEL.

No. 308,118.

Patented Nov. 18, 1884.



Witnesses

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(No Model.)

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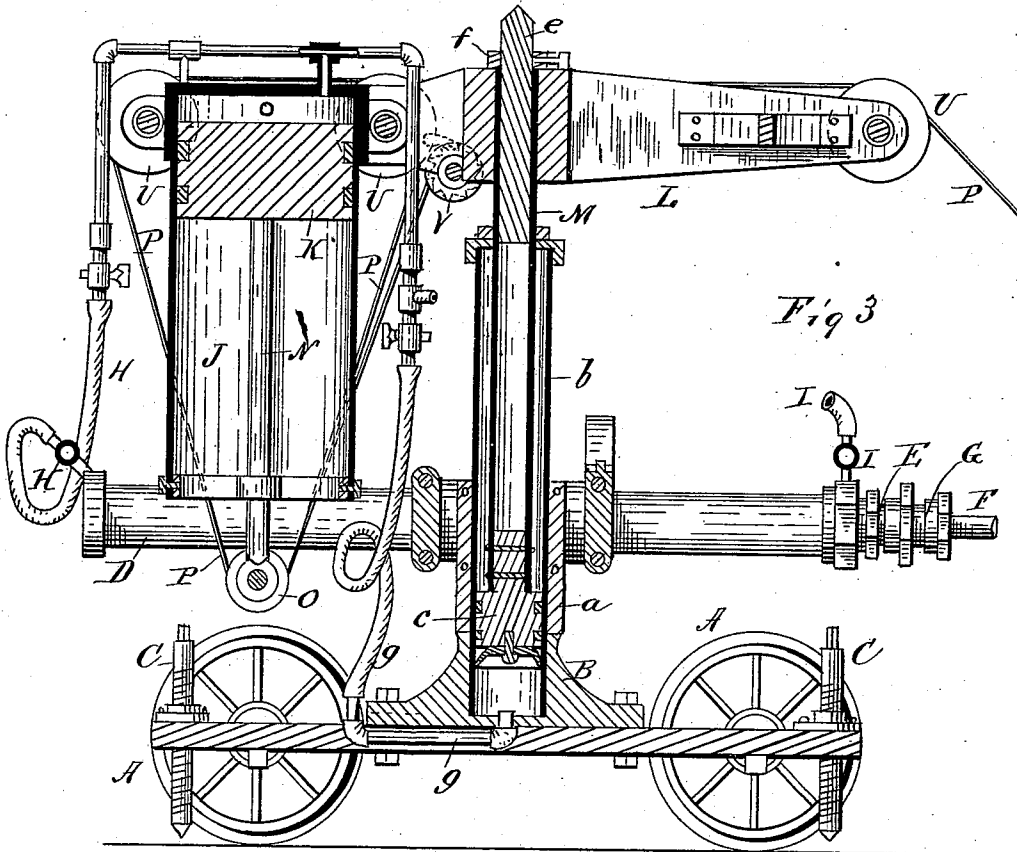


Fig 3

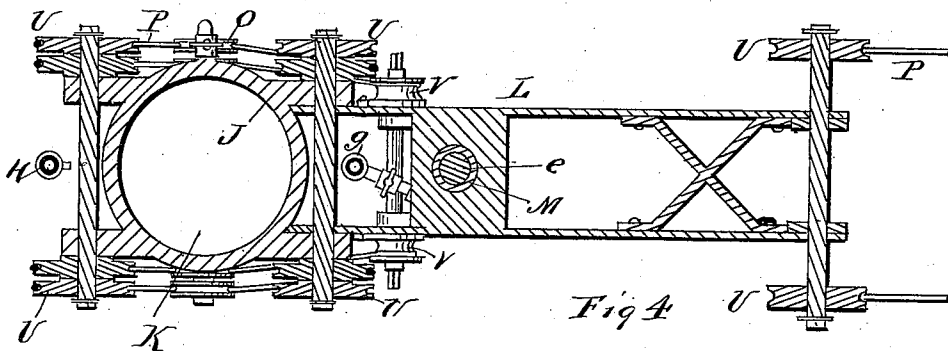


Fig 4

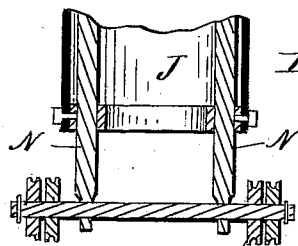


Fig 5

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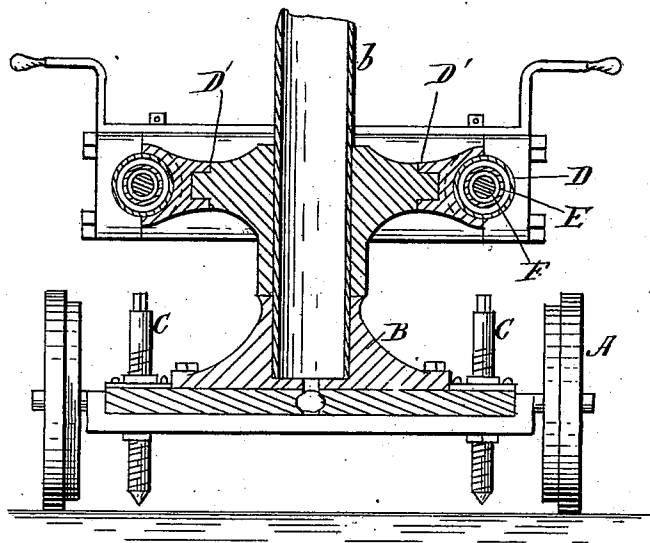


Fig 6

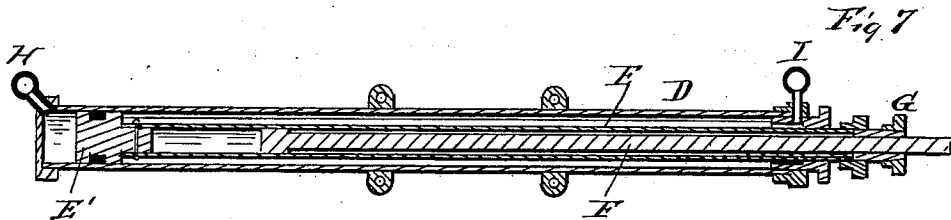


Fig 7

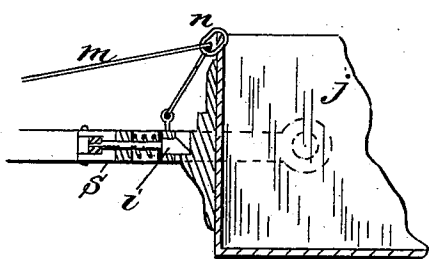


Fig 9

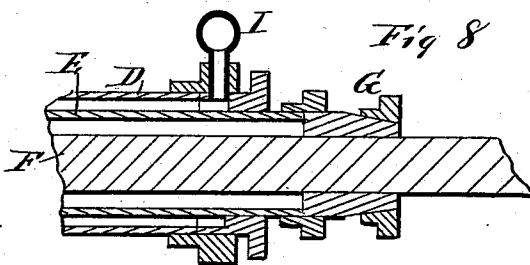


Fig 8

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UNITED STATES PATENT OFFICE.

GEORGE D. WHITCOMB, OF CHICAGO, ILLINOIS.

POWER MINING-SHOVEL.

SPECIFICATION forming part of Letters Patent No. 308,118, dated November 18, 1884.

Application filed August 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. WHITCOMB, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Power Mining-Shovels, which are fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to a power-shovel which is adapted to be used in mines; and it consists in the improved mechanism for raising and lowering the shovels, and the improved apparatus for adjusting the height of the raising and lowering mechanism, and for bracing the structure between the floor and roof of the chamber in which it works, which I will now fully describe, and will afterward point out definitely in the claims.

In the drawings, Figure 1 represents a side elevation of my power mining-shovel; Fig. 2, a transverse view taken on the line *x x*, Fig. 1; Fig. 3, a vertical central sectional view taken on the line *y y*, Fig. 2; Fig. 4, a transverse sectional view taken on the line *z z*, Fig. 1. Fig. 5 is a cross-section of the lower end of the cylinder for raising and lowering the shovel. Fig. 6 is a transverse vertical section taken on the line *w w*, Fig. 2. Fig. 7 is a longitudinal sectional view of one of the shovel-cylinders. Fig. 8 is an enlarged detail view of one end of the part shown in Fig. 7, and Fig. 9 is a vertical sectional view of the locking device of the shovel.

In the accompanying drawings, A represents the wheels which support my machine.

B denotes the central post on which the operative machinery is supported. It has an upright cylindrical socket which receives the cylinder *b*.

C are pointed screws, which pass through the frame to the floor or earth to hold the machine in position. (See Figs. 3 and 6.) D are two cylinders, supported on trunnions D', which are supported by means of their connecting-piece *a*, (which is made in the form of a hollow cylinder surrounding the cylinder *b*,) on the top of the central post, B, so as to rotate laterally thereon. This connection admits of these cylinders D being vibrated vertically as well as horizontally. I call these

cylinders "shovel-cylinders," because they operate the handle of the shovel. The handles or rods F extend into and are held by the cylinders E.

G are locking devices that lock and firmly secure the rods F in the socket or cylinders E at any desired position.

If it is desired to work the shovel at a great distance from the frame of the machine, the locking devices G are loosened and the rods F are drawn out of the cylinders or sockets E.

H is a pipe for admitting steam or compressed air into the cylinder D. Behind the pistons are telescoping cylinders E, to give the shovel its forward stroke in shoveling coal and other like articles.

I is a similar pipe for admitting steam or compressed air into the cylinder D, to give the shovel its backward stroke. I admit and exhaust the steam or air through the same ports, the cock in the pipes being opened and closed for the purpose of admitting and exhausting.

It will be observed that to one end of the cylinder E, I attach a packed piston-head, E', which receives steam on each side to throw the cylinder E back and forth in the cylinder D, for the purpose above described.

J is a vertical cylinder, carrying the piston K. This cylinder is open at its lower end, and receives steam only above the piston K. The cylinder J is suspended from the cross-tree L, and the cross-tree L is firmly secured to the cylinder M, and the piston-rods N carry the pulleys O.

P is a rope or chain which is attached to the shovel-holder S.

U are pulleys attached to the cross-tree L, over which this rope or chain passes, and it passes also under the pulley O up to the pulley or wheel V, where it is firmly secured. The wheel V is provided with a retaining-pawl, as shown in Fig. 1, which prevents it from turning so as to let out the cord unless the pawl is lifted. It can, however, without lifting the pawl, be turned so as to take up any slack that may occur. It serves thus to regulate exactly the length and tautness of the cord as and whenever the operator may desire.

By admitting steam or compressed air into the cylinder J above the piston K it is thrown down into the cylinder, carrying with it the pulleys O, and through the ropes or chains P the shovel is raised by turning the cylinders D on their trunnions to any desired height. By allowing the steam to exhaust, the gravity of the shovel on its load carries it back to any desired position. The center post, *a*, supports the cylinder *b*, which is firmly secured thereto and held in a vertical position. The piston *c* of this cylinder carries the cylinder M.

When compressed air or steam is admitted into the lower end of the cylinder *b*, the cylinder M is raised, lifting the cross-tree L with the cylinder J to any desired height. This cylinder M carries a stay-piece, *e*, which is intended to be projected solidly against the roof of the mine to hold the machine solidly in position when it is being operated.

f is a locking device composed of set-screw and collar, or other similar appliances, for locking the piece *e* to the cross-tree L. By loosening the set-screw *f* this piece *e* can be raised in the cylinder M nearly its entire length, and when in that position by raising the piston *c* it can be made to reach the roof of a mine in a very high room by throwing it into the position shown in Fig. 3, and by allowing the steam or air to exhaust from the cylinder *b* the machine can be taken into a very low space and operated with the same facility.

g is the pipe for admitting air into the cylinder *b*. It is provided with air-cocks, so that the air can be admitted or allowed to exhaust at pleasure. By admitting the air into the cylinder *b* through the pipe *g* the cylinder M is raised until the piece *e* strikes the wall or ceiling of the mine, and in connection with the pointed screws C the machine is firmly held in the desired position. The operator regulates the stroke of the piston K in its cylinder so as to throw the shovel to the desired position to make its stroke to take the load. He then admits steam or compressed air into the cylinders D through the inlet-pipe H, and causes the cylinders E to make the forward stroke carry the shovel forward with great force. The air is then let into the cylinder J above the piston K, when the shovel is raised with its load to any desired height by turning the cylinders D upon their trunnions D'.

h is a tripping-cord which operates the locking device *i*, to hold the shovel in position to keep its load. The shovel *j* is hung on trunnions or lugs *k*. When the tripping-cord *h* is pulled, it unlocks the locking device *i*. The shovel *j* throws on its trunnions *k* and dumps its load.

It will be observed that the shovel may be swung around laterally at any desired position to carry the coal which is taken from the bottom of the mine by the shovel *j* all around

over the wagon by turning the cylinder D on the trunnions D', and revolving the trunnions around on the center post, *a*, as above described.

m is a cord passing over the pulley *n*, attached to the shovel, down to the shovel-holder S, by which the operator places the shovel back in a position to be locked for receiving and holding its load. When the shovel has been dumped, the compressed air is allowed to exhaust through the pipe H, and is let into the pipe I, which throws the cylinders E back in the cylinders D, thus bringing the shovel back into a position to make a stroke for another load. The trunnions or lugs *k* are so placed on the shovels *j*, and they are so connected to the shovel-holder S, that the shovel always dumps over its front, what I call "dumping forward." This enables me to dump the shovel when very near the roof of the mine, and enables me also to operate the shovel in a very shallow space. This I consider very important.

It will be observed that I can run my machine into a mine on a track, and operate the shovels on all sides of the frame, and secure it to any desired place, and operate the shovels to shovel coal at any side of the frame, and dump the coal upon the mine wagon or truck at any other side or at any height it happens to be. The telescopic shovel-cylinders D will operate to give the shovel its thrust in any position, and the other operating parts will operate equally well whatever the direction from the truck or frame it is desired to operate the shovel.

I can secure my machine firmly in place in various heights of mines. I can operate my shovel at any desired distance from the truck, and regulate it by the telescoping of the rods F into the cylinders E.

I have made a compact, cheap, and efficient machine, which has great capacity for accomplishing the work for which it is desired.

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

1. In a power mining-shovel, the upright cylinder *b*, the cylinder M, arranged therein, and provided with the piston *c*, the stay-piece *e*, adjustably set in the upper part of the cylinder M, the cross-tree L, rigidly set upon the cylinder M, and mechanism suspended from said cross-tree for raising and lowering the shovels, all in combination substantially as and for the purpose described.

2. The cylinder J, the piston K, pulleys O, cross-tree L, and suitable mechanism for raising and lowering the shovel, as specified and shown.

3. The frame B, screws C, cylinder *b*, the cylinder M, and piece *e*, for holding the machine solidly in position, as above specified and shown.

4. In a power mining-shovel, the cross-tree

L, cylinder J, the vertical cylinders *b* and M, and piston *c*, when the cross-tree is securely attached to the part connected with the piston *c*, which operates to throw the cross-tree and cylinder M to any desired height, substantially as described.

5 5. The cylinder J, piston K, and pulleys O and U, the drum or spool V, and shovel-holder S, the drum or spool V being adapted

to take up the slack of the rope or chain and to regulate its length, so as to have it operate within the desired scope vertically, as specified and shown.

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Witnesses:

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