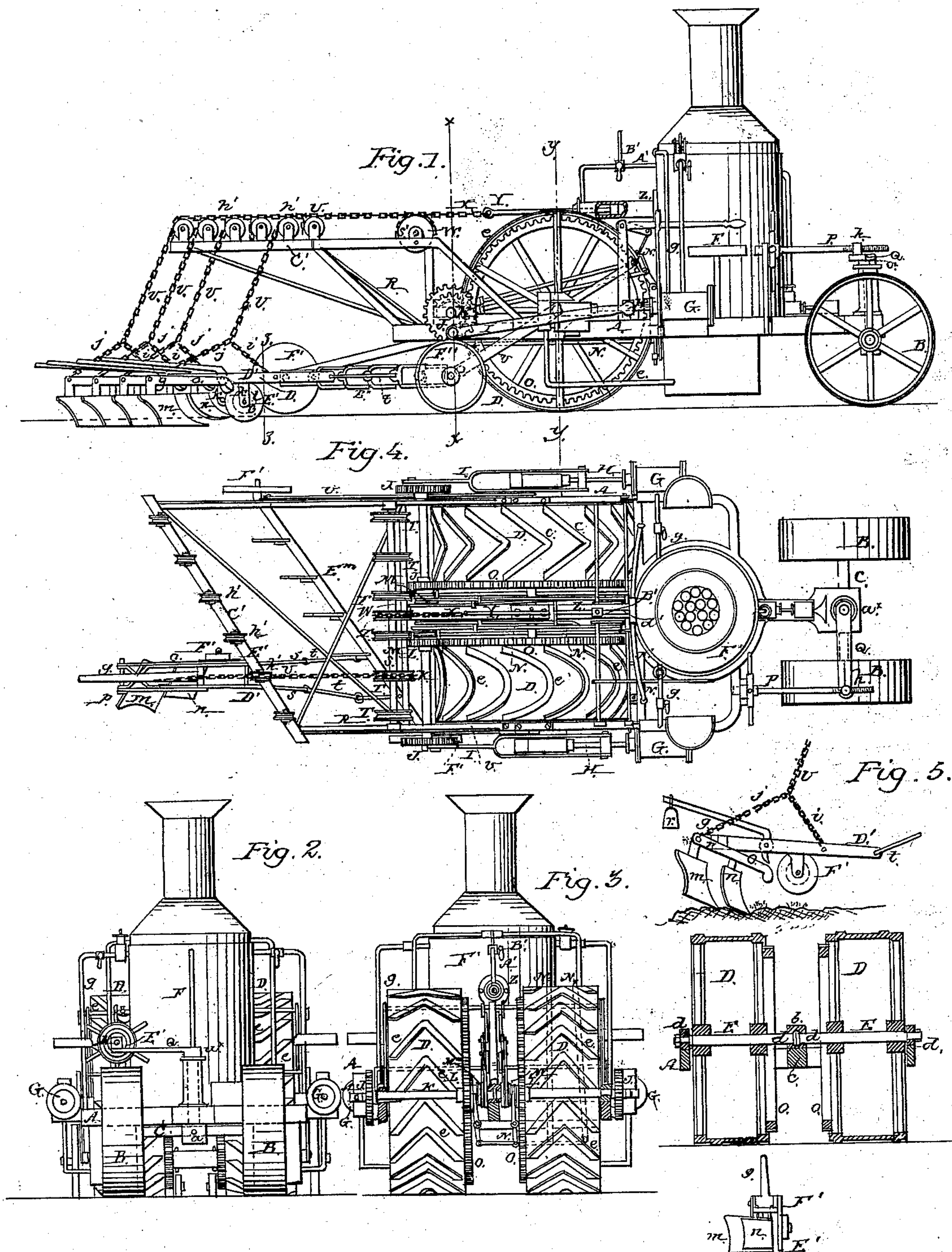


# SHOTWELL & HICKS.

Steam Plow.

No. { 1,433, }  
32,437. }

Patented May 28, 1861.



Witnesses:

L. W. Bendre  
J. F. Buckley

Inventors:

Samuel S. Shotwell  
Stephen R. Hicks



# UNITED STATES PATENT OFFICE.

S. L. SHOTWELL, OF OTTAWA, ILLINOIS, AND S. R. HICKS, OF NORTH HEMPSTEAD, NEW YORK.

## IMPROVEMENT IN STEAM-PLOWS.

Specification forming part of Letters Patent No. 32,437, dated May 28, 1861.

*To all whom it may concern:*

Be it known that we, S. L. SHOTWELL, of Ottawa, in the county of La Salle and State of Illinois, and S. R. HICKS, of North Hempstead, in the county of Queens and State of New York, have invented a new and Improved Steam-Plow; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side elevation of our invention; Fig. 2, a front view of same; Fig. 3, a back sectional view of same, taken in the line *x x*, Fig. 1; Fig. 4, a plan or top view of same; Fig. 5, a detached side view of one of the plows; Fig. 6, a detached sectional view of the driving-wheels, taken in the line *y y*, Fig. 1; Fig. 7, a detached sectional view of a plow, taken in the line *z z*, Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this invention is to obtain a steam plowing-machine that will be simple in construction, efficient in its operation, and under the complete control of the attendant, both as regards the management of the motive power, steam, and also as regards the plow attachment.

The chief difficulties attending the operation of steam-plows—that is to say, all those that have passed under our observation—have been complexity of arrangement, a lack of traction in the driving-wheels, and a difficulty in controlling the operating parts, which difficulties, it is believed, are fully obviated by our invention.

To enable those skilled in the art to fully understand and construct our invention, we will proceed to describe it.

A represents a horizontal frame, which is supported at its front end by wheels B B, the axle C of which is attached at its center to the framing by a universal joint, *a*, so as to admit of the turning of the wheels to guide the machine, and also to admit of a vertical adjustment of the axle, so that its wheels may rise and fall to conform to the inequalities of the surface of the ground.

The back part of the frame A is supported by two wheels, D D, which are placed on inde-

pendent axles E E, the inner bearing, *b*, of which is on a central longitudinal bar, *c*, of the frame A. Each axle E is provided at its end with shoulders *d*, which are fitted in the bearings of the axles and at their outer sides, and prevent any longitudinal play of the latter, and also serve to stiffen the frame, preventing any lateral spreading of the same. This is an important feature of the invention, as the frame A is greatly strengthened thereby, and a much lighter one may be used than could be employed without this lateral tie. (See Fig. 6.)

The peripheries or treads of the wheels D D are made of boiler-plate iron, in order to bear the great strain and sudden jars to which they are liable in propelling the machine, which usually weighs about seven tons, and would break cast-iron wheels. In order to increase the traction of these wheels wrought-iron ribs are riveted to their tread, as seen in Fig. 3 at *e*, or at *e'*, Fig. 4. These ribs may be either V or U shaped, so as not to press the wheels either to the right or to the left upon the axle, as would be the case if the ribs ran obliquely across the tread in one direction. They should overlap each other, so that as the wheel travels one rib will reach the ground before the preceding one leaves the same, thus securing a continuous hold of the ground and preventing the wheel from slipping.

On the front part of the frame A there is placed an upright boiler, F, from which steam-pipes *g* supply the cylinders G G with steam. These cylinders are of usual construction, and are placed one at each side of the frame A, as clearly shown in Fig. 4. The piston-rod H of each cylinder is connected by a rod, I, to crank-wheels J J at the ends of a shaft, K, which is placed transversely on the back part of the frame A. On this shaft K there is placed loosely two pinions, L L, and these pinions may be connected at any time to the shaft K by means of clutches M M, which are connected to levers N. (See Figs. 1, 3, and 4.) To the inner side of each wheel D there is secured a concentric toothed rim, O, and into these rims the pinions L L gear. By this arrangement it will be seen that power is applied to the wheels D D and the machine propelled along, and it will also be seen that either wheel may be thrown out of gear when desired by



disconnecting its pinion L from its clutch M. This is essential in turning, for the wheel that makes the outside circuit should be rotated, while the other should be disconnected from the shaft K. It will also be seen by this arrangement that a space is allowed between the wheels B B and D D, so that the machine may not only be used as a steam-plow for plowing land to receive seed, but also used as a steam cultivator-plow, the rows of plants being between the wheels B B D D, as will be fully understood by referring to Fig. 4.

The machine may be readily guided as may be required by turning a screw-shaft, P, which works in a nut, *h*, at the end of an arm, Q, said arm being attached by an upright, *a*<sup>x</sup>, to the universal joint *a* of the axle C.

On the frame A, at its back part, there is secured an elevated framing, R, on which a shaft, S, is placed and allowed to rotate freely. This shaft S has a series of wheels, T, placed upon it at equal distances apart, to which chains U are attached.

On the center of the shaft S there is placed a wheel, W, to which a chain, X, is attached. This chain X is connected to a piston-rod, Y, the head of which is fitted and works in a cylinder, Z, into the outer end of which steam is admitted from the boiler F by means of a pipe, A', which is provided with a three-way cock, B'.

The chains U are attached to the wheels T and pass over pulleys *h'*, which are placed on an oblique bar, C', at the back part of the frame A. The lower ends of the chains U are branched, as shown in Fig. 1, and the front parts, *i*, are rather shorter than the back parts, *j*. The parts *i* of the branched end of the chains are attached to the front parts of plow-beams D', and the parts *j* are attached to the back ends of the beams D'.

Each plow-beam D' is provided with a rotary colter, E', and gage-wheel F', as seen in Figs. 5 and 7. Between the side of this colter and the gage-wheel there is a small space, as seen in Fig. 7, for the dirt to work through and fall out, thus preventing the colter from clogging. The colter and gage-wheel are secured in place by the pendant *k* and arm or axle *l*.

The beams D' are each provided with two plows, *m n*, one being directly behind the other, and the front plow, *m*, considerably narrower than the back one. The plows *m n* are not attached directly to the beams D', but are attached to frames *o*, the back ends of which are connected by joints *p* to the back end of the beams D'. The front ends of the frames *o* are held to their beams by levers *g*, the back parts of which have weights *r* on them, as shown in Fig. 5. The front ends of the levers *g* are bent or curved to form hooks to catch under the front ends of the frames *o*. (See Fig. 5, in which the frame *o* is shown detached from its lever.)

The beams D' of the plows are formed of two parts, *s s*, which are bent outward in a flaring manner, and the front end of each part

*s* is attached to a beam, E'', by a link, *t*. (See Fig. 4.) By this arrangement it will be seen that the plows will have a certain self-adjusting movement, for the links *t* are at each side of the line of draft, and by having one—the right-hand one—bent outward a little farther than the left-hand one all side draft of the plows will be compensated for, and in case of a plow being canted or turned at one side by any obstruction the draft movement will have a tendency to correct the position as soon as the obstruction has been passed, and in case any or all of the plows come in contact with a fixed obstruction that cannot be passed the front ends of the framing *o*, under the draft movement of the machine, will be forced downward, the levers *g* thrown upward, and the frames *o* allowed to turn back on their joints or pivots, so as to relieve the plows.

Any one of the frames *o* may turn, as above described, independently of the other plows in the gang; and the beam D' is so attached by the links *t t* that either end of said beam, or both ends together, may rise or fall freely to facilitate plowing on uneven ground or the passing of obstacles.

At any time when it is desired to raise all the plows bodily from the ground the attendant turns the cock B', so as to allow steam to pass into the cylinder Z and force forward the piston, and thereby turn the shaft S and wind up the chains U. By this means the front parts of the plow-beams D' will be elevated first, as the front part, *i*, of the branched ends of the chains are shorter than the back parts, *j*, and the plows will therefore run out of the ground. By reversing the position of cock B' the steam is allowed to escape through the pipe *u* from the cylinder Z, and the plows fall by their own gravity.

By the use of the additional steam-cylinder Z the steam used for elevating the plows can be so controlled as to give the effect of an elastic power not liable to injure the machine; but in the common way, where the power of the main engine or engines is employed to raise the plows by means of clutches or other devices, it is difficult to throw such apparatus out of gear just at the proper moment, and as the engine and machine continue to move the plows are liable to be raised too high, thus breaking or otherwise injuring the machinery, and with such apparatus it is impossible to raise the plows while the machine stands still—as when stopped by a stone or other obstacle. With our additional engine such difficulties are obviated. We can raise the plows and hold or depress the same independently of the traveling gear.

The beam E'' has a wheel, F'', at each end, and said beam is attached to the frame A by swinging bars *v v*. By this arrangement the beam E'' and plows are allowed to conform to the inequalities of the surface of the ground.

The details of our machine may be somewhat varied without departing from our invention, so long as the same effect is produced.



We do not claim the arrangement of the boiler F, the steam-cylinder G G, or the use of the chains U with branched ends, and we are aware that most of the separate devices employed by us have been previously used, and that several engines and an oblique frame carrying a gang of plows have also been employed in steam-plows; therefore we limit our claims to the specific combinations and features hereinafter specified.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. The arrangement of the additional steam cylinder and piston, in connection with the propelling engine or engines, and the oblique series of pulleys *h'*, carrying independent or disconnected plows, when the whole is constructed and operated substantially in the manner and for the purposes set forth.

2. The arrangement of the series of short links *t t*, in combination with the series of independent plows or gangs, and the oblique bars *E''*, mounted on wheels *F''*, for the purpose of giving the plows a free motion in passing obstacles, and yet preventing said plows from falling sidewise, substantially as specified.

3. The above-described peculiar arrangement of crank-wheels J J, loose pinions L L, sliding clutches M M, and crank-shaft K, in combination with the driving-wheels D D, substantially as set forth.

4. The arrangement of the plow-frames *o* and levers *g*, applied to the beams *D'*, to operate as and for the purposes set forth.

SAMUEL L. SHOTWELL.  
STEPHEN R. HICKS.

Witnesses:

L. W. BENDRÉ,  
S. F. BUCKLE.