2 Sheets--Sheet 1.

W. S. LANE.

Improvement in Excavating-Machines.

No. 130,059. Patented July 30, 1872.

Fig. 1

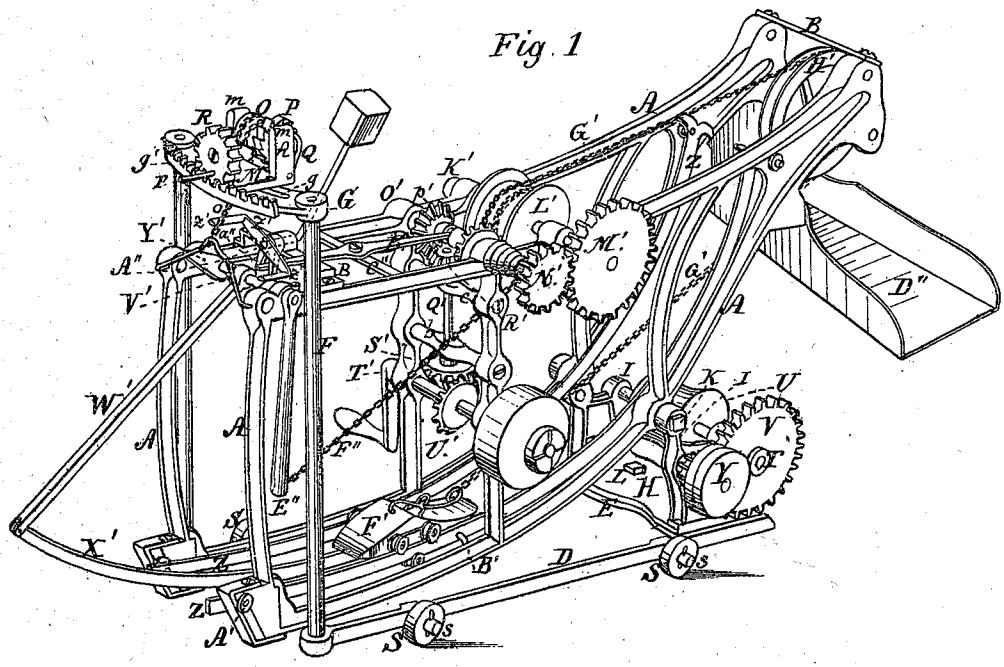


Fig. 2.

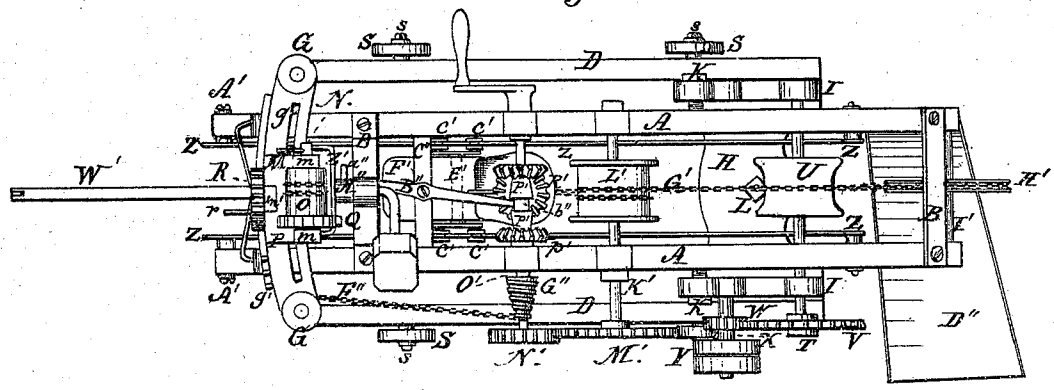
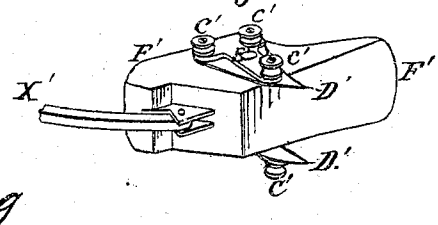


Fig. 3.



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AM. PHOTO-LITHOGRAPHIC CO. N.Y. OSBORNE'S PROCESS

2 Sheets--Sheet 2.

W. S. LANE.

Improvement in Excavating-Machines.

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Fig. 4.

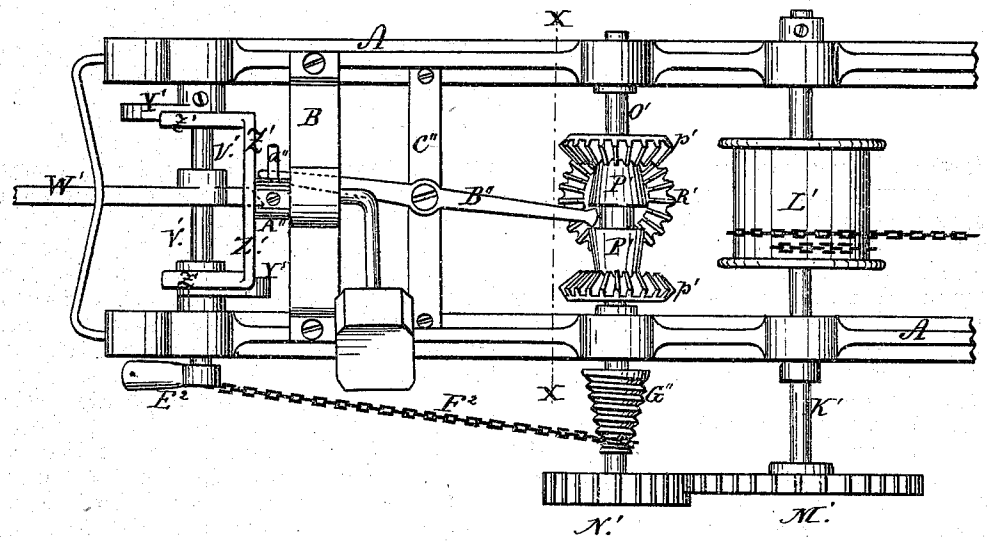


Fig. 5.

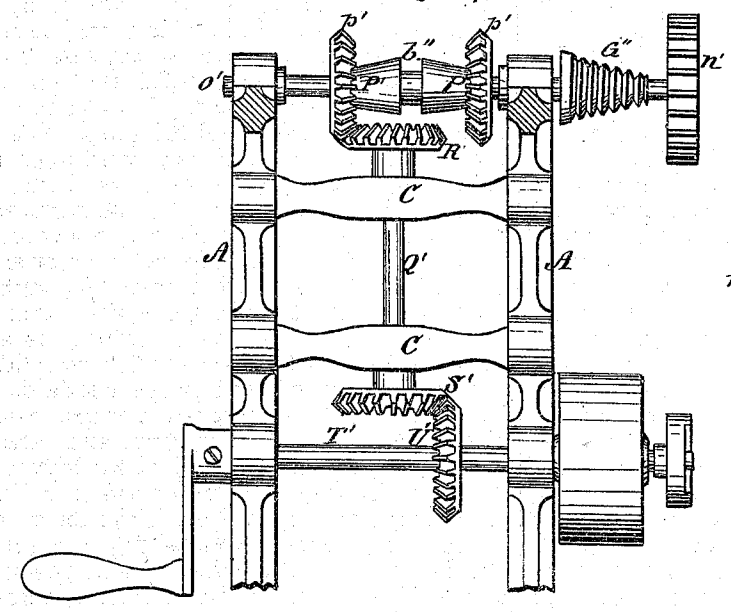
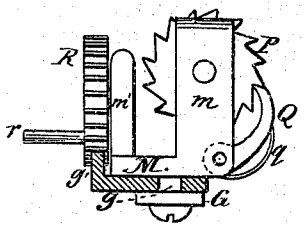


Fig. 6



Witnesses
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A.M. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS)

UNITED STATES PATENT OFFICE.

WILLIAM S. LANE, OF CAIRO, ILLINOIS, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO J. W. McKINNEY, OF SAME PLACE.

IMPROVEMENT IN EXCAVATING-MACHINES.

Specification forming part of Letters Patent No. **130,059**, dated July 30, 1872.

To all whom it may concern:

Be it known that I, WILLIAM S. LANE, of Cairo, in the county of Alexander and in the State of Illinois, have invented certain new and useful Improvements in Dredging-Machines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a perspective view of my improved machine. Fig. 2 is a plan view of the upper side of the same. Fig. 3 is a perspective view, from beneath, of the scoop. Fig. 4 is a plan view of the rear portion of the frame and the reversing mechanism, enlarged. Fig. 5 is a vertical section of said frame on line *x x* of Fig. 4, and Fig. 6 is a side elevation of the means employed for securing the vertical and lateral adjustment of the pivoted frame.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to produce a cheap, simple, efficient, and portable means whereby the usual operations of dredging or digging may be performed; and it consists, principally, in the peculiar construction and combination of the adjustable and stationary frames, substantially as and for the purpose hereinafter specified. It consists, further, in the means employed for securing the vertical and lateral adjustment of the rear end of the operating-frame, substantially as and for the purpose hereinafter shown. It consists, further, in the construction and combination of the scoop-truck and ways, substantially as and for the purpose hereinafter set forth. It consists, further, in the means employed for elevating the scoop, substantially as and for the purpose hereinafter shown and described. It consists, further, in the means employed for tilting or dumping the scoop, substantially as is hereinafter specified. It consists, finally, in the means employed for reversing the movement of the drum-shaft that receives and contains the elevating-chain, substantially as and for the purpose hereinafter shown.

In the annexed drawing, A and A represent the sides of the adjustable frame, constructed in the form shown in Fig. 1, and connected together by means of two cross-bars, B, passing between its upper edges and two other bars, C, which extend between the central vertical bar of said sides. The supporting-frame is composed of two horizontal side rails, D, secured together at their forward ends by means of a plate, E, from whence they extend rearward in parallel lines, and at their rear ends are secured in relative position by means of two standards, F, which extend vertically upward from said ends, and at their upper ends are connected together by a plate, G, which plate is formed upon a circle, of which the center is a perpendicular line passing through the transverse and longitudinal center of the plate E, and is provided, centrally and longitudinally, with a slot, *g*, and upon its rear edge with a toothed rack, *g'*. Upon the plate E is placed a corresponding plate, H, from the ends of which extend upward two standards, I, that furnish bearings for two shafts (the object of which will be hereinafter explained) and for the adjustable frame, the latter of which is pivoted to or upon said standards by means of two bolts, K, that pass horizontally through said parts, and enable said frame to be oscillated in a vertical plane, so as to elevate or depress its rear end. The plates E and H are connected together by means of a vertical bolt, L, which forms an axial bearing, upon or around which the adjustable frame may be moved horizontally within the limits allowed by the standards F. The rear end of the adjustable frame is sustained and adjusted to vertical and lateral positions by means of the following-described devices: Resting upon the cross-bar or plate G is a carriage composed of a horizontal plate, M, from which extend vertically upward three standards, *m*. Within the front standard *m* is journaled a shaft, N, upon which is affixed a drum, O, and a ratchet-wheel, P, the first of which is connected to or with the rear end of the adjustable frame A by means of a chain, *o*, while said ratchet-wheel is caused to engage with a pawl, Q, that is pivoted upon and extends upward from the plate M. A spring, *q*, attached at one end to or upon the plate M,

has its opposite end resting upon the pawl Q in such a manner as to hold the latter in engagement with the teeth of the ratchet-wheel. A crank, or other equivalent device, attached to one end of the shaft N, enables the drum to be rotated so as to wind upon or unwind from the same the chain *o*, and correspondingly elevate or depress the rear end of the adjustable frame A.

The carriage described is connected to or with the plate G by means of two bolts, which pass downward through the slot *g* into a plate or gib placed beneath said plate G and spanning said slot *g*, the relative positions of said parts being such as to permit said carriage to move freely upon said slotted plate.

The lateral adjustment of the carriage and pivoted frame is effected by means of a pinion, R, which is suitably journaled upon the rear standard *m'* of said carriage, and meshes with the toothed rack *g'*. A stud, *r*, projecting rearward from the face of the pinion R, enables the latter to be rotated, and, by engagement with the fixed rack, move the carriage in either direction.

The supporting-frame is provided with four wheels, S, which are journaled upon suitable arms, *s*, that extend horizontally and laterally outward so as to permit said frame to be moved in a longitudinal direction, which operation is effected by means of the following-described apparatus: Journaled horizontally within the front side of the standards I is a shaft, T, upon the central portion of which is secured a drum, U, provided with a concave periphery for the reception of a chain. Upon one end of the shaft T, outside of the standard, is secured a gear-wheel, V, that meshes with and is driven by means of a pinion, W, which pinion is attached to a short shaft, X, that is journaled within one or both of said standards I. A loose and a tight pulley, Y, placed upon the outer end of the shaft X, enables the same to be driven by a belt from other parts of the machine. If, now, one end of a chain be secured to some stationary object in front of the machine and said chain passed one or more times around the drum U, it will be seen that by causing the latter to revolve said chain will be wound thereon and said machine moved correspondingly forward. Pivoted at one end to or upon the inner side of each frame side A, and near its upper forward end, is a flat metal bar, Z, which is bent edgewise into a curve having a somewhat smaller radius than that of the curve of the lower portion of said frame side. The rear end of each way or guide Z is attached loosely to the corresponding portion of the frame side A by means of a bolt, A', which passes laterally and horizontally through a slot in the same and is provided upon its outer end with a head and washer, which, spanning said slot, secure the lateral positions of said parts without interfering with the vertical movement of said way within the limits of said slot. A rod, B', extending laterally and horizontally outward from the side of each bar, near its longitudinal center, and thence downward through a suitable opening in the contiguous portion of the frame, serves to confine said way in lateral position at that point. Upon the ways Z, thus constructed, is placed a truck consisting of three grooved pulleys, C', journaled in the form of a triangle, upon a suitable plate, D, which plate and pulleys are connected to or with similar parts by means of a cross-bar, E'. The distance between the grooves of the opposite series of pulleys being just equal to the span of the ways, the truck is placed upon the latter with two pulleys of each series resting upon the upper edge of a way and the third pulley embracing the lower edge of the same. Upon the shaft or cross-bar E' is pivoted a sheet-metal scoop, F', having preferably the form shown, to the forward upper side of which is attached one end of a chain, G', that from thence extends upward and forward to and around a pulley, H', that is secured upon a shaft, I', suitably journaled within the upper and forward portions of the frame A. A second shaft, K', is journaled within the upper edge of the frame A near its longitudinal center, and is provided with a drum, L', which receives and contains the chain G' after the latter leaves the pulley H', so that by causing said shaft and drum to revolve the chain will be wound upon or unwound from the latter, and the scoop drawn forward and upward or permitted to drop downward and rearward. Upon the projecting end of the shaft K' is secured a gear-wheel, M, which meshes with and receives motion from a pinion, N', that is in like manner attached to the end of a shaft, O', which is journaled immediately in rear of said shaft K'. Between the frame sides a sleeve, P', provided upon each end with an inward-facing bevel-pinion, *p'*, is placed, upon the shaft O' and connected therewith radially by means of a key which projects from said shaft, and, fitting into a suitable key-way in said sleeve, enables the same to move longitudinally upon said shaft. Immediately beneath the shaft O' a shaft, Q', is journaled vertically within the cross-bars C, and is provided at each end with a bevel-pinion, R' and S', which face upward and downward, as shown, the upper pinion R' having a suitable size and position to enable it to mesh with the pinions *p'* as either of the latter are brought in contact with said pinion by moving the sleeve upon its shaft. Directly beneath the lower end of the vertical shaft is journaled the driving-shaft T', which is provided with a beveled pinion, U', that meshes with and imparts motion to the pinion S', while upon the end or ends of said shaft are provided pulleys or other suitable devices for connecting to or with the motive power. If, now, motion is imparted to the driving-shaft T', and the pinions *p'* caused to alternately engage with the pin-

ion R′, the chain-drum may be caused to rotate in either direction, and such motion may be changed or entirely suspended by changing the longitudinal position of said pinions *p′* upon their shaft.

This result is effected automatically by the following-described means: Journaled within suitable bearings at or near the rear upper corners of the frame sides A is a shaft, *b′*, which is provided at its longitudinal center with an arm, W′, that extends downward to a point about in a line with the rear ends of the scoop-ways, and is connected to or with the lower side and rear end of the scoop by means of a curved bar, X′, which bar extends between and is pivoted at its ends to or upon said parts F′ and W′. From opposite sides of the shaft V′ extend horizontally outward two arms or wipers, Y′, which, as said shaft is given a semi-rotary movement in opposite directions, alternately impinge against two arms, *z′*, that extend horizontally rearward from the ends of a rock-shaft arm, Z′, which latter arm is affixed to the end of a rock-shaft, A″, that is suitably journaled within the rear cross-bar B, said shaft being placed horizontally and in a line with the movement, fore and aft, of the scoop. From the lower side of the rock-shaft A″ two arms, *a″*, extend downward and apart, so as to form an Λ-shaped space, within which is contained one end of a lever, B″, that is pivoted, at its longitudinal center, to or upon a cross-bar, C″, and has its opposite or forward end contained within a groove, *b″*, formed within the periphery of the sleeve P′. As thus arranged, it will be seen that the semi-rotary movement of the shaft V′ (caused by the operation of the scoop through the bar X′ and the arm W′) is communicated, through the wipers Y′, the arms *z′*, and the rock-shaft arm Z′, to the rock-shaft A″, and from the latter, through the arms *a″* and pivoted lever B″, to the sleeve P′ and its pinions, so as to cause said pinions to be shifted and the motion of the chain-drum reversed at the instant that the scoop reaches the limit of its stroke in either direction, by which means the continuous motion of the driving-shaft in one direction is automatically converted into a reciprocating movement in opposite directions of said scoop. Suspended from the forward end of the frame A is a spout, D″, which from thence extends laterally outward and downward, and into which it is designed to discharge the contents of the scoop as it reaches the limit of its upward and forward stroke. In order to accomplish such result it is requisite that the scoop should, just before dumping, be thrown forward so as to slack its chain, and also that the rear end of said scoop should be elevated. These movements are effected by means of an arm, E″, which is secured to the projecting end of the shaft V′, and, extending downward, has attached to its end one end of a chain, F″, the opposite end of which is attached to the small end of a fusee, G″, that is placed upon the shaft O′, between the pinion N′ and the side of the frame A. As the scoop moves forward the chain F″, which was at first slack, runs upon the increasing swell of the fusee G″, and at or near the end of the forward stroke of said scoop gains upon the chain G′, and pressing said scoop forward slackens said chain G′ and causes the forward movement of said scoop to be effected entirely by means of the bar X′, by which means, as the upper end of the former passes above the lower edge of the pulley H′, a sudden tautening of said chain G′ is effected, so as to tilt downward upon said end, while at the same time a lifting pressure is applied to the rear end of said scoop and its longitudinal position reversed, so as to cause its contents to pass outward and downward into the discharge-spout. When much work is to be performed it is designed to place two or more of these devices side by side, and by connecting their driving-shafts enable them to be operated simultaneously by one engine.

Although more especially designed for loosening and raising earth, I do not confine myself to such use, as the device is equally applicable to the elevation of grain, coal, or other like substances.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. The adjustable frame A and A, the cross-bars B and C, the supporting-frame D, E, F, and G, the plate H, and the standards I, when said parts are constructed and combined substantially as and for the purpose specified.

2. The means employed for securing the vertical and lateral adjustment of the pivoted frame, consisting of the plate G provided with the slot *g* and toothed rack *g′*, the carriage M, *m*, and *m′*, the shaft N, the drum O, the ratchet-wheel P, the pawl Q, the chain *o*, the pinion R, and the stud *r*, when said parts are constructed and combined substantially as shown.

3. The scoop-truck, consisting of the grooved pulleys C′, suitably journaled upon the plates D, and connected by means of the cross-bar E, in combination with the ways Z and scoop F′, substantially as and for the purpose set forth.

4. In combination with the next above-named elements, the chain G′, the pulley H′, the shafts I′, K′, O′, Q′, and T′, the drum L′, the gear M′, and the pinions N′, *p′*, R′, S′, and U′, when said parts are constructed and relatively arranged substantially as and for the purpose shown and described.

5. In combination with the scoop-truck and ways, the curved bar X′, the shaft V′, the arms W′ and E″, the chain F″, and the fusee G″, attached to and revolving with the shaft O′, substantially as and for the purpose specified.

6. The shaft V′ provided with the wipers

Y′, the rock-shaft A″ provided with the arms Z′ and x', the lever B″, and the sliding sleeve P′ provided with the pinions p', when said parts are combined with each other and with the elevating mechanism, substantially as and for the purpose shown.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of July, 1872.

WILLIAM S. LANE.

Witnesses:
GEO. S. PRINDLE,
EDM. F. BROWN.