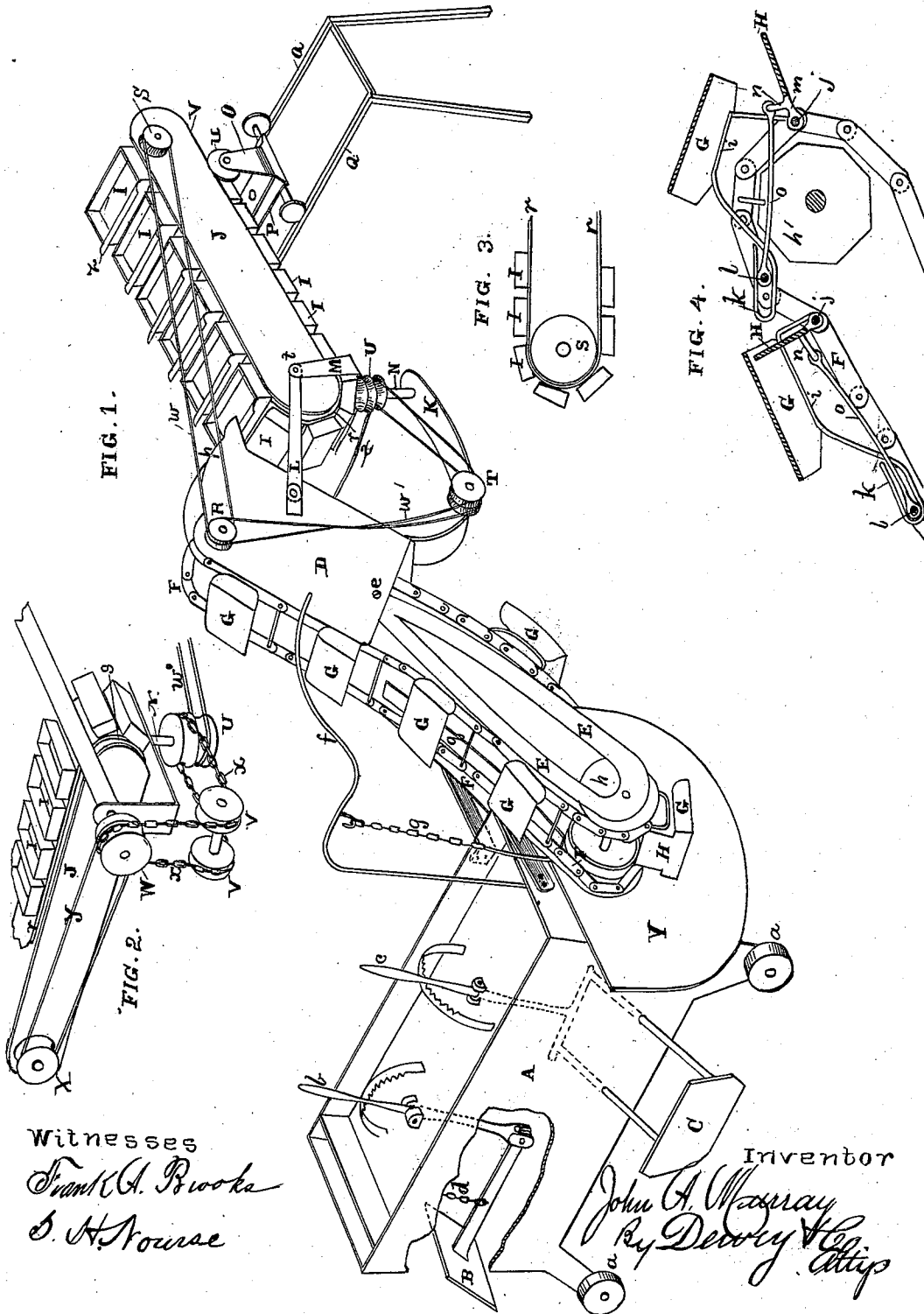


J. A. MURRAY.
Ditching and Dredging Machine.

No. 230,329.

Patented July 20, 1880.



Witnesses

Frank A. Brooks
S. H. Nourse

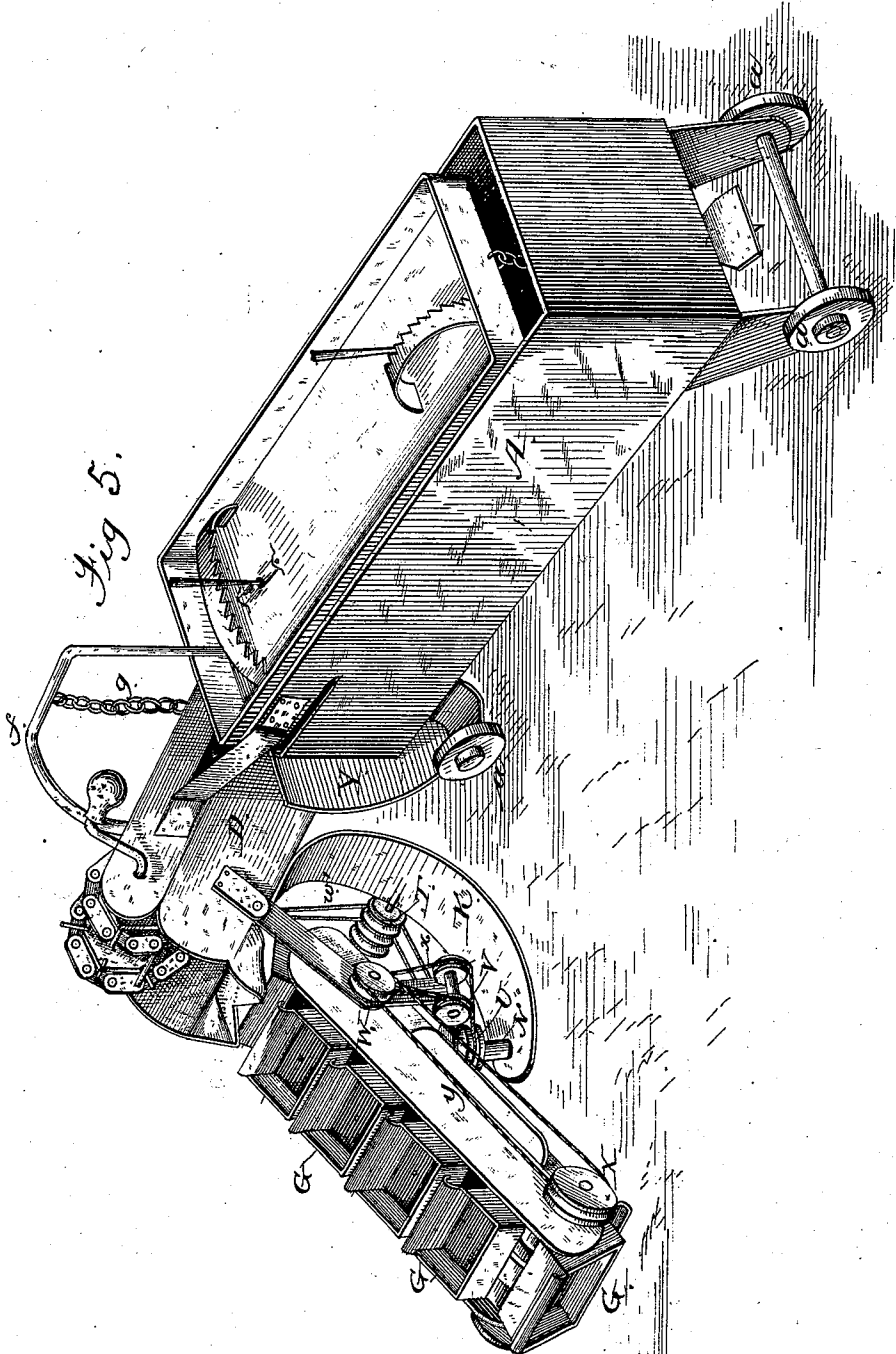
Inventor

John A. Murray
By Dewey & Co.

J. A. MURRAY.
Ditching and Dredging Machine.

No. 230,329.

Patented July 20, 1880.



Attest;
T. Walter Fowler,
R. K. Evans

Inventor;
J. A. Murray
by his attys.
A. H. Evans & Co.

UNITED STATES PATENT OFFICE.

JOHN A. MURRAY, OF STOCKTON, CALIFORNIA, ASSIGNOR OF ONE-HALF OF
HIS RIGHT TO CHRISTOPHER C. CASTLE, OF SAME PLACE.

DITCHING AND DREDGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 230,329, dated July 20, 1880.

Application filed June 7, 1879.

To all whom it may concern:

Be it known that I, JOHN A. MURRAY, of Stockton, county of San Joaquin, and State of California, have invented an Improved Ditching and Dredging Machine; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to an improved ditching and dredging machine; and my improvements consist in certain details of construction by means of which I am enabled to remove the mud or earth from the ditch and deposit it at a distance therefrom, the operation being continuous.

It also consists in providing buckets or scoops having peculiarly arranged bottoms, which open and close automatically at the proper time, so as to drop the loads freely and rapidly, as is more fully described in the accompanying drawings.

Figure 1 is a general perspective view of my invention. Figs. 2, 3, and 4 are details of construction. Fig. 5 is a perspective view, representing the machine from the opposite side to that shown in Fig. 1.

Let A represent the frame-work or body of the device, which is mounted on wheels *a*, so as to be run easily on a tramway or timbers, if desired, in the ditch or cut, and in a line with it. On this frame is swung the lever *b*, provided with a foot, B, by means of which the car or frame is pushed ahead, as hereinafter described. Another lever, *c*, controls the movements of the anchor or spud C, which, by being forced against the side of the cut, will hold the frame or car steadily in position.

On the front end of the car is the guide or gage Y for the cutter, which also prevents any earth from falling back under the car or frame.

The foot B is swung on a chain or cord, *d*, by which it may be raised or lowered, as desired.

On the corner of the car or frame, above the guide, is secured the box D, on which is pivoted the swinging carrier E, said carrier swinging on the pin *e*, so that its lower end may be raised or lowered. A support, *f*, runs from the frame to the box D, and a chain, *g*, secured to this, is fastened on the lower end of the carrier, so as to raise or lower it, as de-

sired. At the lower end of the carrier are the chain-pulleys *h*, and at the upper end of the box D are the corresponding chain-pulleys *h'*, Fig. 4, the chain-belts F revolving around these pulleys and carrying the buckets G, as shown. The buckets G, which are secured on these chains and between them, have hinged or swinging bottoms H. The bucket itself is secured on rods *i*, bent as shown, one on each side, the ends of the rods near the bottom being hinged or swiveled on a bar, *j*, which extends between the chains just at the bottom of the bucket. The other ends of these rods are formed with elongated loops *k*, which inclose a bar, *l*, also connecting the opposite parts of the chain F.

The bottom H of the bucket has an extension, *m*, which loops around the bar *j*, so as to form a hinge on said bar, on which the bottom may swing. On a loop, *n*, formed on said extension, is hinged the operating-bar *o*, the other end of which is hinged to the bar *l*, as shown. This arrangement is necessary in order that the bottom of the bucket will remain closed during the time the bucket is carrying its load, but will open automatically at the proper time for the load to be dumped.

While the bucket is traveling up the incline on the chains and carrying its load the bottom is held up against the bucket, so that the contents may not escape. As soon as the bucket begins to pass above and around the upper pulleys, *h'*, the elongated loops on the rods *i*, (that support the bucket,) fitting loosely on the bar *l*, permit a certain freedom of motion to the bucket, which allows it to pass around the pulleys readily, while the bar *o* (which is hinged at one end to the loop in the extension of the bucket-bottom and rigidly secured at its opposite end to the bar *l*) passes around the curve between the pulleys *h'* nearer the axis, and in consequence thereof said bar *o* pushes the bottom of the bucket back on its hinges and forces it away from the bucket, so that the contents will drop out onto the slide or chute *p*, where they are directed into the boxes I on the belt *r*, as hereinafter described.

When the bucket passes the pulleys and the chains straighten out the bar *o* pulls the bottom back against the bucket again and closes

it. The bottom is again swung open at the bottom of the carrier, but in coming up the lower side on its way to the top the bottom is closed in the same manner as after rounding the upper pulley. In this way the opening and closing of the bucket-bottom is made automatic, and although the bottom is independent of the bucket, it is so arranged as to open and close the bucket at the proper time.

The cut and feed of the buckets are regulated by lowering or raising the lower end of the carrier E by means of the chains or tackle *g*, said carrier swinging on the pin *e*, moving in the box D. The chains will always remain in line whether the lower end of the carrier is lower or higher. On the inner edges of the carrier are placed guides *g*, in which the chains may slide when the carrier is raised.

The boxes I revolve on a belt, *r*, which passes around the shafts or rollers *s* (see Fig. 3) on the frame J. This frame J is placed at the end of the box D, so that the material dumped from the boxes and falling onto the slide or chute *p* will be directed into the dump-boxes I. A curved arm, K, extends from the lower end of the box D to the lower under end of the frame J, and is suitably braced.

Hinged hangers L extend from the center of the box D to a shaft, *t*, passing through the frame J, and this shaft also passes through the arms of the support M, the lower part of which is held by the standard N, resting on the curved arm K, as shown. The inner end of the frame J, with its belt and dump-boxes, is thus held firmly. The outer end is supported on the pivoted rest O, provided with the rollers *u*, which bear on the flanges *v* on the sides of the frame J. This rest O is centrally pivoted on the small car P, which rolls on the tracks Q, which are provided with suitable supports, as shown.

The tracks, with their supports, and car and rests may be moved in and out in the frame, as desired, the rollers *u* at all times holding up the frame by means of the flanges *v*.

When the contents of the boxes are to be dumped off at a straight line with the buckets as they revolve on the chain, the power to operate the belt with its dump-boxes is imparted from a pulley, R, on the same shaft as the pulleys *h'* on the box D, by means of a cord or chain, *w*, passing around the pulley S on the outer end of the frame J, said pulley S rotating the rollers *s* and moving the belt and dump-boxes.

It is sometimes desirable to swing the outer end of the frame J to the right or left of a direct line of the buckets, in order that the material may be dumped conveniently to suit any desirable purposes. When this is to be done the hangers L are disconnected from the frame J by drawing out the shaft *t* and again replacing it, but leaving the hangers attached to the box D only. The frame J may then be turned in the arc of a circle the center of which is represented by the standard N.

By rolling the car P one way or another on

its track the outer end of the frame is directed to the right or left, and supported there in any position, the pivoted rest O revolving slightly one way or another, so as to admit of a lateral motion of the car with respect to the frame and dump-boxes.

In order that the motion of the belt carrying the dump-boxes may be kept up when the frame is in any position, an endless belt or cord, *w'*, leads from the operating-pulley R down to a double pulley, T, and around a double pulley, U, revolving on the pivot or standard N, so as to revolve said double pulleys U. Another endless belt or rope, *x'*, passes around these pulleys U, (see Fig. 2,) under the double leading-pulleys V, and over the double pulleys W, from which another belt, *y*, leads over a pulley, X, on the outer end of the frame J, so as to rotate the belt and move the dump-boxes. These dump-boxes are provided with curved flanges *z* on one edge, as shown, which lap over the following one, so as to prevent the dirt falling between and also prevents the dirt from the chute falling back.

By means of the cords and pulleys connected with the frame J, as described, the belt carrying the dump-boxes is rotated, no matter in what position the frame may be. The frame may be elevated or depressed, or its outer end curved in either direction, so as to dump the dirt in any desired position.

When it is desired to move the body of the digger ahead, by lowering the foot to the ground and operating the lever-connection with it it may be moved ahead on its wheels. To hold it in place steadily the anchor or spud is forced against the side of the cut, and the lever controlling it dropped into a notch, which holds it in place. The guide on the front of the car or body keeps the dirt from dropping down under the car, and also furnishes a guide by which a regular cut may be made.

This device may be used for cutting ditches, &c., or it may be used for dredging out rivers, &c., by mounting the car on a float or scow and allowing the swinging carrier to drop down.

The mud and debris may be carried in any desired direction by means of the dumping-boxes. As these boxes are moved along by their belt they dump their loads at the outer end of the frame as they revolve over the pulley or roller at the end.

The guide Y may be made removable and interchangeable, if desired. Its form regulates the form of the ditch or cut by furnishing a guide to regulate the feed of the buckets on their swinging carrier.

I am aware that excavators have been constructed with one or more carrying or delivering belts; and I am also aware that automatic discharging-buckets have been attached to carrying-belts. I do not therefore claim, broadly, such devices.

Neither do I claim, broadly, a dredging-bucket carried by endless chains, and having a gate, the latter being attached by a link or bar to

the chains and opened and closed by the action of another link connecting said gate with the chain, together with the bending and straightening of the chains in their movement around the drums; but

What I do claim as new, and desire to secure by Letters Patent, is—

1. The car or body A, with its moving foot B, operated by the lever *b*, spud or anchor C, and lever *c*, and carrying the guide Y, the whole moving on the rollers or wheels *a*, all combined and adapted to move within the cut or ditch, substantially as and for the purpose herein described.

2. The combination, with the car or body A, of the box D, with its pulleys *h'*, frame E, with its pulleys *h*, guide *g*, and chains F, carrying the revolving buckets G, with their swinging bottoms H, substantially as and for the purpose herein described.

3. In a dredging-apparatus having buckets carried by endless chains and provided with gates which are opened and closed by the bending and straightening of the chains as they pass around the drums at each end, the buckets G, mounted on the hinged rods *i*, provided with the elongated loops *k*, in combination with the chains F, revolving on the pulleys *h h'*, and provided with the rods *j l*, operating-bar *o*, and hinged bottom H, with its extension *m* and loops *n*, whereby said buckets are closed or opened automatically, substantially as and for the purpose herein described.

4. In a dredging apparatus having buckets carried by endless chains and provided with gates which are opened and closed by the bending and straightening of the chains as

they pass around the drums at each end, the bucket G, mounted on rods *i*, which have their ends hinged to rods *j l*, separated by two or more links of the chains F, in combination with the hinged bottom H, operating-bar *o*, and loop *n*, as described, whereby the bottom of the bucket is allowed to open when passing around the pulleys and closed again when running in a direct line, substantially as and for the purpose herein described.

5. The boxes I, attached to the belt *r*, revolving on the rollers *s* in the frame J, resting on the standard or pivot N, in combination with the car P, carrying the pivoted rest O, and mounted on the tracks Q, whereby the loads of the boxes may be dropped anywhere in the arc of a circle the center of which is the standard N, under the chute *p*, into which the buckets G dump, substantially as herein described.

6. The ditching and excavating machine consisting of the car A, with its feeding-foot B, anchor C, and guide Y, in combination with the box D, with its hinged swinging carrier E and chain F, and buckets G, as shown, and the receiving and dumping boxes I, moving on the belt *r*, within the frame J, having its outer end supported, as shown, and fitted to move about the vertical standard N, so as to deliver the contents at any desired point, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOHN A. MURRAY.

Witnesses:

CHAS. G. YALE,
S. H. NOURSE.